

311 INSTITUTE GLOBAL FUTURES ADVISORY : EDUCATION : FORESIGHT : INNOVATION : LEADERSHIP : STRATEGY

AT THE 311 INSTITUTE WE HELP YOU PREPARE YOUR ORGANISATION FOR THE FUTURE .

We **IDENTIFY SIGNALS, MAP THEIR IMPACTS,** and help you **CREATE EXECUTABLE STRATEGIES** .

STRATEGIC HORIZON SCANNING

We identify the technologies and trends that could and or will impact your organisation across a 50 year time period.

ORGANISATIONAL READINESS

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311 INSTITUTE

RISK & DISRUPTION MAPPING

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We help you transform data and insights into executable strategies that ensure you keep ahead of global changes.

IF YOU THINK THE WORLD IS COMPLEX
YOU ARE NOT ALONE

IF YOU SEE EVERYTHING CHANGING
YOU ARE NOT ALONE

IF YOU ARE WORRIED ABOUT THE FUTURE
YOU ARE NOT ALONE

311 INSTITUTE

YOUR GUIDE AND ALLY IN A CHANGING WORLD

ABOUT THE AUTHOR

Matthew Griffin, multi-award winning geopolitical advisor, leadership coach, and Futurist, and 15 times author of the smash Codex of the Future series, is described by his clients as a "Walking encyclopedia of the future" and a "Futurist polymath." Matthew is the Founder and Futurist in Chief of the 311 Institute, a global Futures and Deep Futures advisory looking up to 50 years out, as well as the World Futures Forum and XPotential University - two philanthropic organisations whose mission it is to solve global inequality and the world's greatest challenges.

Regularly featured in the global media including the AP, BBC, Bloomberg, CNBC, Discovery, Forbes, Khaleej Times, RT, the Telegraph, ViacomCBS, WIRED, and the WSJ, Matthew's ability to identify, track, and explain the impacts of hundreds of exponential emerging technologies and trends on global business, culture, and society is unparalleled.

Recognised as one of the world's most reknowned futurists, disruption, foresight, and strategy experts Matthew is an international advisor and keynote speaker who helps the world's most respected brands, governments, investors, NGO's, and royal households, explore, envision, and shape our collective future.

BE BOLD .

MAKE FIRST CONTACT .

PROUDLY BUILDING THE FUTURE WITH ... & MANY OTHERS

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AXA
BCG
Disney
DP WORLD
NOKIA
NOVARTIS
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adidas
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ARM
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Microsoft
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SAMSUNG
T-Mobile
UBS
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WPP



A LETTER FROM OUR FOUNDER

MATTHEW GRIFFIN

WE LIVE in extraordinary times, in a world where individuals, organisations, and technology can impact the lives of billions of people and change the world at a speed and scale that would have been unimaginable just twenty years ago.

We also live in a world full of challenges, and a world where all too often negative news gets amplified at the expense of good news, and where tales of hope, inspiration, and positivity get drowned out and lost in the noise. It's no wonder therefore that today more people are more anxious about the future than ever before. And, arguably, a society which believes it's marching towards the darkness, rather than the light, has a poorer future than one that doesn't. Hope, however, is all around us and it's our purpose to light the way so all of us, people and planet, can prosper.

TESTIMONIALS

THANK YOU EVERYONE !

#FUTURENOW

EXTRAORDINARY!
Peter K., EMEA Managing Director
ACCENTURE

ASTOUNDING!
Peter B., COO
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SUPERB!
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WILLIS TOWERS WATSON

OUR MISSION.

FOR PEOPLE & PLANET : BUILDING A BETTER FUTURE

OUR MISSION is to be a driving force to help solve the world's greatest challenges, help organisations build sustainable and lasting legacies, and democratise access to the future so everyone everywhere, irrespective of their ability or background, can benefit from it.

We do this by surfacing essential future-focused insights and open sourcing our content, by amplifying inspiring stories and voices, and by bringing people together.

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311 INSTITUTE

Our **globally renown** Futures and Deep Futures advisory working with the world's most respected brands, governments, and investors to explore and shape the future of global business, culture, and society.

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XPOTENTIAL UNIVERSITY

Our **philanthropic university** working with academia and governments around the world to improve education equity and deliver future focused education for everyone.

“INSTEAD OF FOLLOWING THE TRENDS BE THE ONE WHO DEFINES THEM … ”

- Matthew Griffin, Founder

311 Institute
World Futures Forum
XPotential University

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Explore the technologies and trends revolutionisning how content is made and consumed.

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Third Edition published February 2025. To request this Codex in an alternative language please contact the author.

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WELCOME
FROM THE AUTHOR

PEOPLE . PLANET . PURPOSE . PROSPERITY

THE SKELETON COAST . NAMIBIA . 19.9873° S, 13.2605° E

I chose this striking image to represent this section because in many ways it's representative of many of today's realities: The Skeleton Coast is complex and unpredictable, but home to an amazingly adaptable ecosystem, yet it's also representative of the stark contrast between the have and have nots, those with water and other resources and those without, our increasingly polarised society, and even the contrast between our habitable blue planet and the desolation of space. The desert and the sea are also relentless, just like the human spirit, and given the right conditions they can overcome everything in their path, just as humanity can when we work together for the benefit of everyone to create a brighter future for all of us.

THE **311 Institute Annual Trends and Foresight Codex** is designed to be your **one stop resource** for everything that's trending, and it's continuously updated. It also contains everything you need to run your very own strategic foresight programs, model scenarios, and develop actionable strategies that help you prosper in the future - whether that's as an individual, or your company, sector, country, or even our planet.

To make the Codex easy to use it's divided into eight distinct sections, or Booklets as I like to call them. The first booklet contains important background information, details on using the Codex, and my three strategic foresight programs. The other seven contain some of the most detailed insights into hundreds of the world's most impactful STEEP, Line of Business, and Sector trends that you'll see anywhere.

Having already written a veritable encyclopedia's worth of books as part of the **Codex of the Future Series**, I felt that writing this Codex was a natural next step and the best way to round out a truly remarkable set of world class future focused resources that contain everything you need to design, debate, create, and shape your own future.

A fascinating and eye opening experience into our world you'll discover that many trends are like our planet's tides - relentless forces that are hard to control or influence that directly and indirectly impact all manner of things. By using this Codex you'll be able to understand what these trends are, how they interact with one another, their impact and reach, and what actions you can take to lean into the ones you're interested in and how to protect yourself from the ones that harm your interests.

A simple yet powerful example of the direct and indirect power trends have on shaping our world can be highlighted using the Energy Sector as an example whose trends impact everything from the business models and product development of automotive manufacturers in the Transport Sector, Climate Change and the environment, corporate ESG programs and investment, Government policy making, the multi-trillion dollar investment portfolios of the global Financial Services sector, and much more.

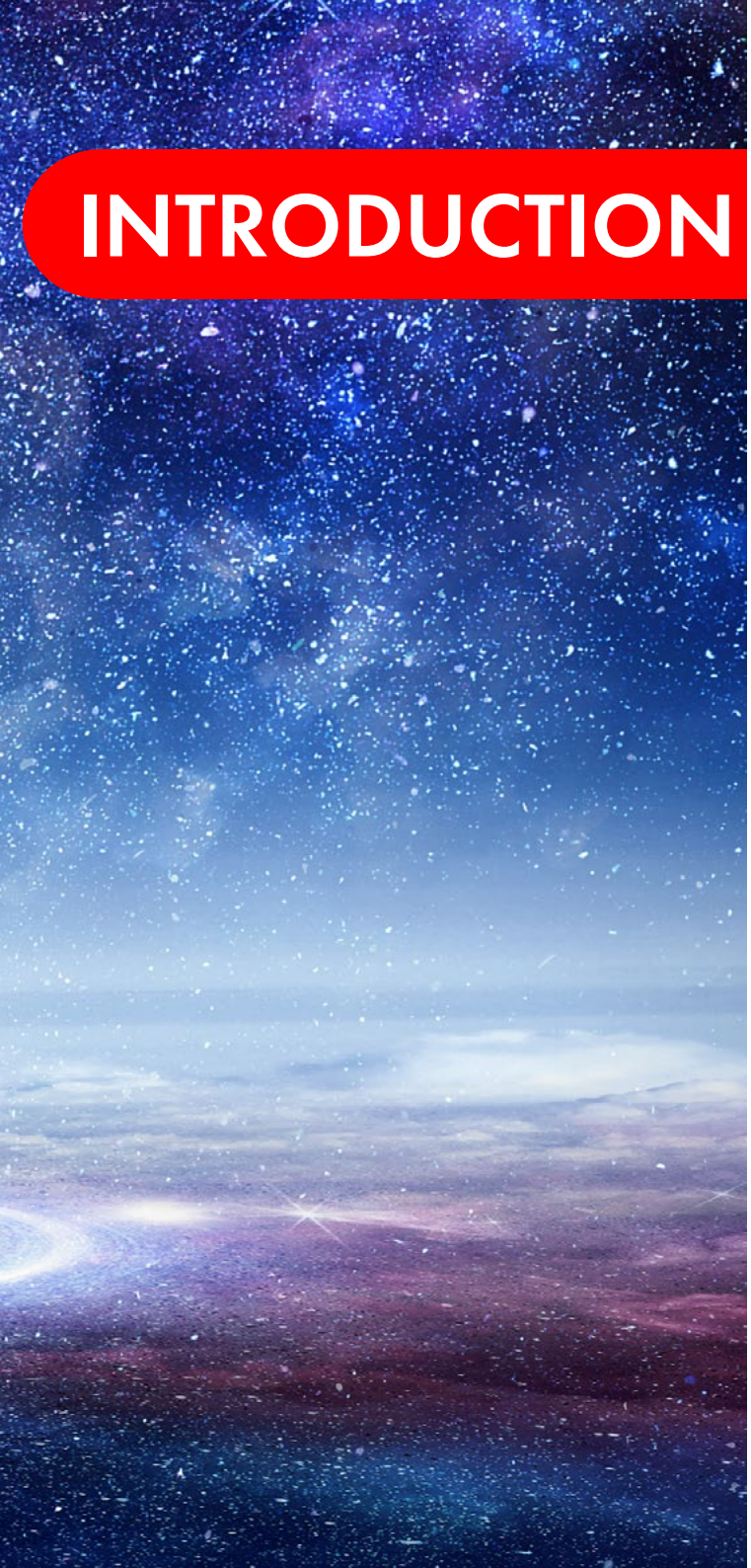
No other trends book puts so many trends in one place or makes them so accessible, and that's this books USP. That is, of course, if hundreds of thousands of insights and statistics aren't already enough for you!

Explore More,

Matthew Griffin
Founder and Futurist in Chief







INTRODUCTION

RAVAGED BY climate change and geopolitical instability, inequality, pandemics, rapid technological change, Xenophobia, and war it would be easy to say we live in unparalleled times. But that would be a fallacy because a hundred years or so ago the people of the time were living through their own pandemics, their own wars, their own technological transformations, and staring down the barrel of all manner of other challenges.

Look at today's world though from another viewpoint and since those times the world has experienced its longest ever period of peace. Famine, illiteracy, and poverty are at their lowest levels since records began, and our quality of life and lifespans are the best they've ever been.

Even though many of us crave the security of absolute certainty humanity has always lived in turbulent and uncertain times, and as much as uncertainty can seem awful it's also been responsible for helping propel humanity to where it is today. It's forced us to adapt, to think outside of the box, to look at problems from different angles, and it's helped give us the mental tool kit we need to overcome seemingly insurmountable challenges on a near daily basis.

The past and the future have always been strange bedfellows, and then there's us - trying to reconcile the certainty of the past that we can't change with the uncertainty of the future that we can change. Today, every one of us has more power to change the world than ever before, to build and develop products that change the lives of billions of people at a scale and speed unimaginable just twenty years ago.

However, as the global rate of change accelerates we face new challenges, such as the ability to ingest enough information fast enough and have the cognitive ability and agility to develop new winning strategies at speeds that would have amazed older generations.

OUR NEW VUCA-MAX WORLD

No doubt you'll have heard of the term VUCA, an acronym devised by the US military in the 1970's to describe the world of the time which they felt was increasingly Volatile Uncertain Complex and Ambiguous.

Fast forwards to today and we have a new acronym to describe our world, the **VUCA-MAX** world, where in addition to the above the changes that we're witnessing today are increasingly

VUCA - MAX

THE NEW WAY TO EXPLAIN HOW OUR WORLD IS CHANGING

VOLATILE
UNCERTAIN
COMPLEX
AMBIGUOUS

MASSIVE
ACCELERATING
E**X**PONENTIAL

Notes:

Massive, Accelerating, and Exponential, the impact of which means that it's harder than ever before for individuals and organisations everywhere to predict the effects of disruption on their lives and business, and to see and capitalise on new opportunities.

THE TWO SIDES OF VUCA-MAX

Look around you and you can see the impact of this new VUCA-MAX world everywhere, for better and worse, as we see leaders struggle and old incumbents fade, and as we see new leaders and incumbents emerge from the metaphorical flames.

For example, as we discuss in more detail in our **Future of Exponential Disruption Codex**, the rate of global disruption is accelerating, so much so that we can disrupt the status quo in just a single day. Furthermore, the scale of many of the changes we're seeing are global, or what we sometimes refer to as "System Level." And then, of course, the only thing being affected is everything - every aspect of global business, culture, and society.

Value Destruction

The first impact of this new world is that today we're seeing technology led disruption especially destroy over $50 Trillion of global GDP. After all, just look at how technology, let alone other trends, is disrupting every sector, and even the tech sector itself.

CEO Burn Out

Another impact is that CEOs are finding it increasingly difficult to see all of the changes that are taking place and understand how they might play out, and then develop profitable and successful strategies navigate them, with the consequence being that they're burning out faster with the average multi-national CEO tenure falling from a global average of 6 years down to 5 in the last five years.

CEOs No Longer In Control

Adding more fuel to the fire McKinsey's global leadership surveys are routinely highlighting the fact that today CEOs only directly influence 45% of what happens to their organisations - such as go to market, hiring and talent development and retention, investment and M&A, R&D, and strategy - with the remaining 55% being more directly

Notes:

influenced by external factors such as changing consumer behaviours, environmental and political trends, market forces, regulations, technological disruption, and so forth.

Take a minute to think about this - at a fundamental level this means that CEOs aren't in control of their companies, the external forces are. That's significant.

Dead In A Decade

And there's more still, with surveys such as the PWC 27th Annual Global CEO Survey which surveyed over 4,700 multi-national CEO's from every industry and more than 100 countries finding that a staggering 45% of CEOs interviewed believe their companies won't survive the next ten years without being re-invented.

Now take a minute to think about that as well. Without being re-invented almost half of the world's largest companies could be gone or a shadow of their former selves in a decade.

Everything Up For Grabs

So, if you wanted a wake up call there are four big ones for you. But let's not forget that there are two sides to every coin, and in this case the upsides are just as wild.

First off, while old value is being destroyed organisations like ARK Invest believe that disruptive technologies will help create over $200 Trillion of new value and economic opportunity, which is why today more than 65% of big cap organisations are running some form of Creative Destruction programs. And secondly, as old incumbents and industries are torn down new ones are being created with some examples including the rise of AI companies and the switch to Electric Vehicles and renewable energy - all of which have already created new industry behemoths with multi-trillion dollar valuations.

SUMMARY

With great change comes great opportunity, but understanding these changes, navigating and benefiting from them requires new tools and new thinking, and that's why I created the **Codex of the Future Series** - to help you land on the right side of history and provide you with everything you need on your futures journey.

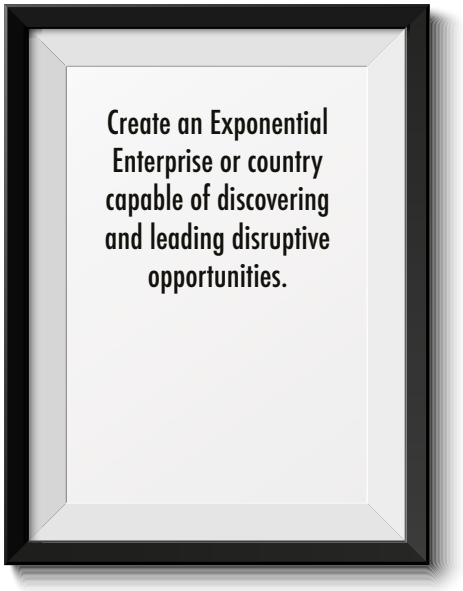
MERCEDES INVENTED THE AUTOMOBILE . BUT TESLA RE-INVENTED IT .

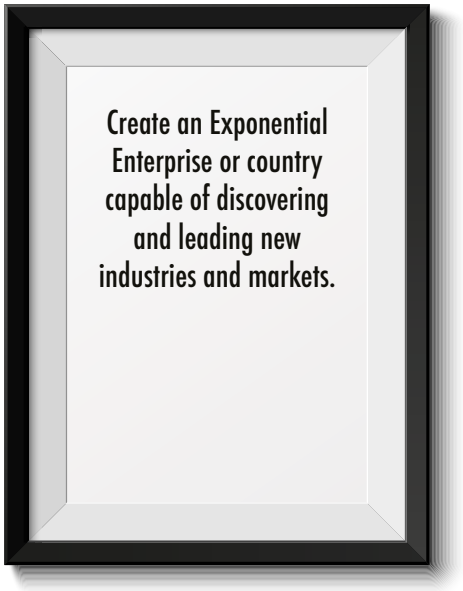
MARKET CAP PEAK DEC 2024 : MERCEDES $79 BILLION . TESLA $1.5 TRILLION

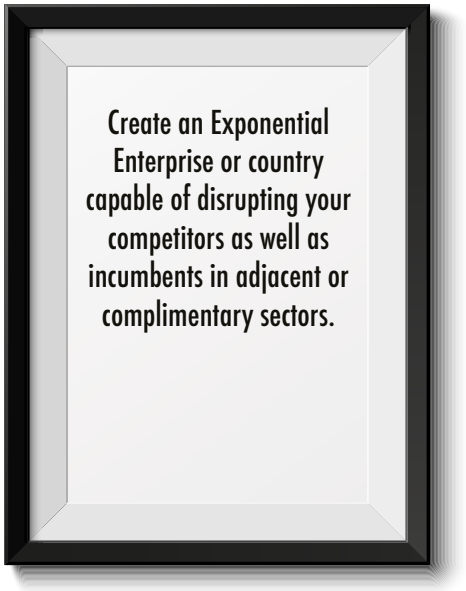
THE PURPOSE OF THIS CODEX . . .

THIS CODEX is designed to help you and your teams stay ahead of current and emerging trends, and ultimately and help you ...









" ADAPT AND CHANGE **BEFORE** ANY MAJOR TRENDS OR CHANGES . "

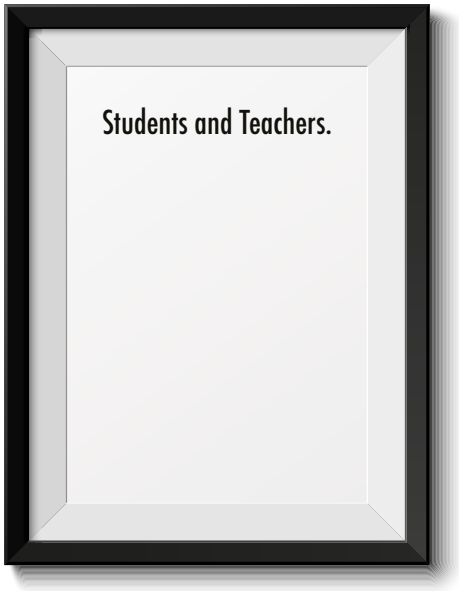
- Jack Ma, Alibaba

THIS CODEX HAS BEEN CREATED FOR . . .

IT'S EASY. If you want to change the world or shape the future or if you are just simply curious about the world you live in then this Codex has been created for you.







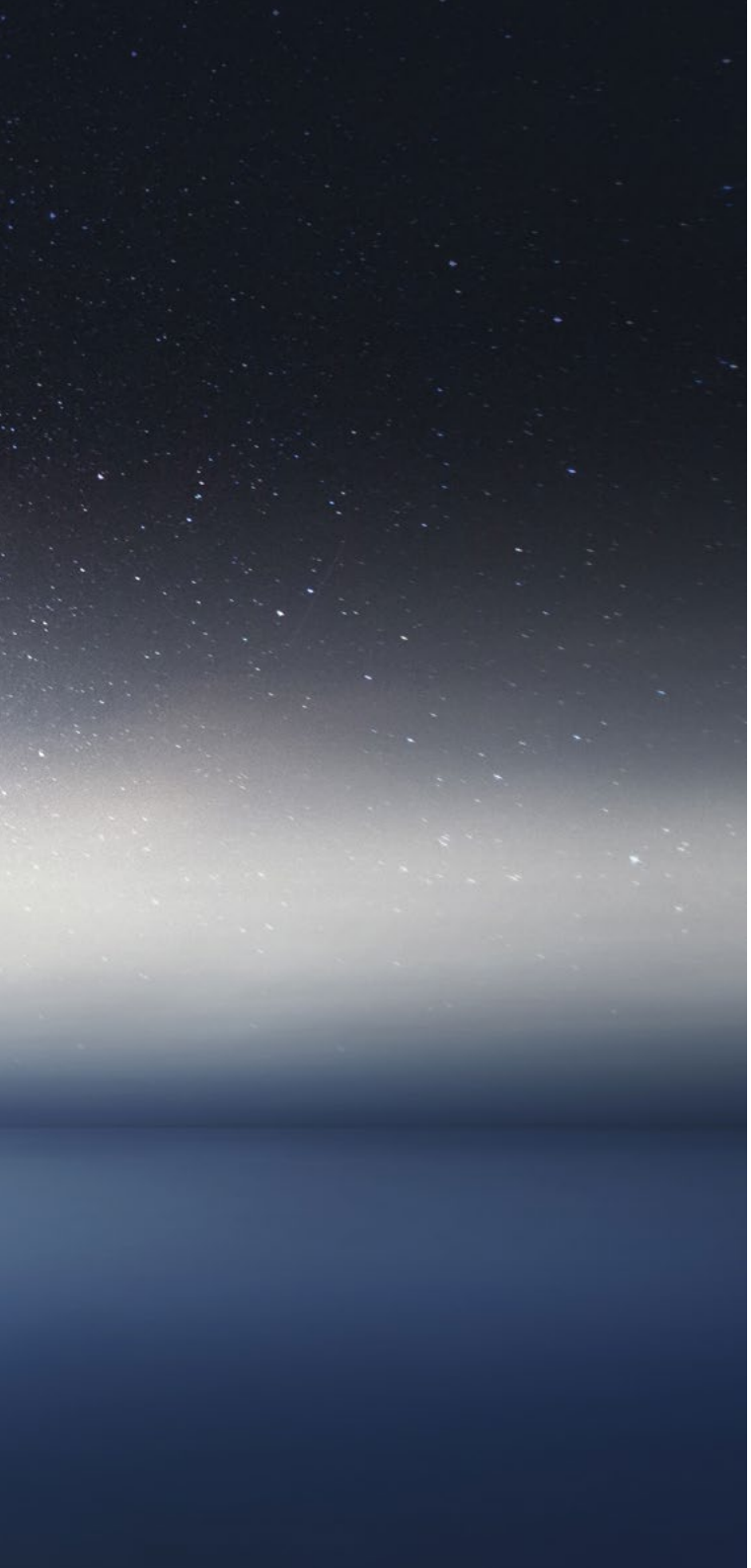


" FOLLOW THE TRENDLINES NOT THE HEADLINES . "

- William B. Clinton, 42nd US President

HOW TO USE THIS CODEX





WITH SO many trends and technologies shaping our world and with more emerging all the time it's easy to get overwhelmed and fail to grasp their individual and collective impact on the things you care about. This is why I've done my utmost to make this Codex, and all the others in the **Codex of the Future Series**, as simple as possible for you to explore and use irrespective of your goals, role, or sector.

Read this section carefully to get as much value from this Codex as possible and explore the trends with impunity then, if you wish to, choose one of our three tailor made **Strategic Foresight Programs** to create your very own Futures Scenarios and initiatives that help you prepare for all the Plausible, Possible, Preferable, Preposterous, and Probable futures that lie ahead of you.

EVERY TREND COVERED

As you can see from the chart on the following page there are a significant number of categories represented in this Codex and they're laid out in categorical order to make finding the trends you care about as easy as possible - so easy in fact you'll wonder why noone else has ever laid it out this way before.

EVERY TREND CROSS LINKED

Since every trend is affected by and also affects other trends I've conveniently highlighted the related trends in **BOLD** to make it easier for you to follow the proverbial breadcrumbs.

UNIVERSAL AND SPECIFIC TRENDS

Some trends such as STEEP (Societal, Technological, Economic, Environmental, and Political) trends and many Line of Business trends are universal in nature - in other words they broadly apply to everyone in very similar ways irrespective of your business, industry, or region. Then other trends, such as Sector Specific Trends, are much more likely to have an over sized impact on some industries and stakeholders than others.

It's also important to remember that each trend can have direct and indirect, and obvious and non-obvious impacts on others, so even though you might not think a trend is relevant to what you care about, it might very well be.

Good examples of this include **Climate Change** in our Environmental Trends category, the **Net Zero Pledges** trend in our Political Trends category, the **Diversity and Inclusion** trend in

Notes:

our HR and Training category, and the **Ransomware** trend in the Security Trends category - all of which impact and influence the behaviours, decisions, operations, and policies of almost every company in every industry, as well as many other trends.

Meanwhile, the **Single Stage to Orbit** trend in the Aerospace Industry affects that sector the most - in terms of behaviours, investment, and strategy - but again even this trend has far reaching indirect consequences for many other trend categories including the Communications, Defense, Energy, and even Manufacturing industries as it becomes cheaper and easier to deploy all manner of assets into space.

So, as you can see everything is connected which is why we chose this format to present it all to you.

311 TRENDS EXPLORER . FIND TRENDS FAST .

ECONOMIC TRENDS	ENVIRONMENTAL TRENDS	POLITICAL TRENDS	SOCIETAL TRENDS	TECHNOLOGICAL TRENDS
UNIVERSAL TRENDS	BUSINESS MODELS	MARKETING	SUSTAINABILITY	
	CONSUMER BEHAVIOURS	OPERATING MODEL	WORKFORCE	
	CUSTOMER EXPERIENCE	R&D	WORKPLACE	
	HR AND TRAINING	SECURITY		
	ICT	SUPPLY CHAIN		
SECTOR TRENDS	AEROSPACE	EDUCATION	INSURANCE	SPORTS
	AGRICULTURE	ENERGY	LOGISTICS	TELECOMS
	AVIATION	FINANCIAL SERVICES	MANUFACTURING	TRANSPORT
	CONSTRUCTION	GAMING	MEDIA & ENTERTAINMENT	
	DEFENCE	HEALTHCARE	RETAIL	

2
3
CLIMATE CHANGE

3RD YEAR ON THE LIST

10

4
5
9
6
7

QUICK TAKE

Scientists saw it coming in the 1950's. They called it out and made films about it in the 1980's. And now, over forty years later individuals, governments, and organisations are starting to take unilateral global action to tackle Climate Change with many scientist arguing that we are now too late to avoid a "life altering" 1.5C increase in average global temperatures, and that we are within years of crossing a climate tipping point which will see its devastating global effects accelerate and create a run away cascade of **Extreme Weather** and devastation.

8
9
Data sources: IPCC, National Geographic, WWF, and various.

IMPACT

The impact of Climate Change can be seen everywhere - from the changes of the seasons, and the subtle changes in the flora and fauna in peoples gardens, to the tree covered mountain slopes that used to be buried by glaciers and snow, to the expanding deserts of the Sahara, and the deep of the oceans. It impacts every living thing and every natural system on Earth.

From longer frost free growing seasons, to changes in global rain patterns, longer droughts and more intense heat waves, and more extreme weather, to more powerful hurricanes and higher sea levels, the consequences are as varied as they are acute.

If the world warms by 1.5C then the Arctic Ocean will become ice free once every 100 years, with extreme hot days in the mid-latitudes being at least 3C hotter than pre-industrial levels, and sea levels could rise by up to 0.77m, with a further decrease in global bio-diversity of between 5% and 8%. Meanwhile corals could decline by at least 70% with marine fisheries annual productivity declining by at least 1.5 Million tons. And a 2C rise would be exponentially worse for people and planet.

EXAMPLES

Earth is mission critical for humanity and all life on Earth. And as the rate of Climate Change accelerates we continue to see a variety of records being set and smashed with climactic events that used to be once in a century becoming once a decade, and then the norm. And examples of these are plentiful.

Greenland's ice sheet, the world's second largest after Antarctica, is now melting 12 times faster than in the past 12,000 years and loosing over 532 Billion tons of ice a year - and that rate is accelerating. Not only does this melt account for almost 25% of today's sea level rise, but in 2021 the melt rate accelerated even further when, during a time when temperatures in the region were already 18C higher than average, three days worth of rain - where the rain itself was a first for the region - dumped over 7 Billion tons of rain water onto the ice sheet.

And, from the world's biggest, deadliest, and most damaging floods, to the world's biggest, deadliest, and most damaging droughts, heatwaves, hurricanes, and wildfires almost every country on the planet is now feeing the damaging impacts of climate change.

ACT NOW

As we see elsewhere in our universe, from the dust dunes of Mars to the acidic oceans of Venus, our planet will always be able to adapt to new climactic conditions. But life on Earth will find it increasingly difficult as Climate Change accelerates and its effects become more extreme and pronounced. Therefore, ironically, tackling this trend is more about saving humanity's future than the planets.

EXPLORE: 12

- Carbon Capture and Storage
- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Government, Manufacturing, Sustainability, Transportation, and Work
- Net Zero Pledges
- Unilateral global accords and coordinated global action

USING THE TREND SHEETS

IN THIS codex we've gone to great lengths to document the major trends affecting all sectors and line of business operations and simplify them for you. Furthermore, we're always surfacing more trends which is why this codex is regularly updated. As a result each trend contains all manner of action points, details, insights, and stats that you can use to your advantage, whether it's developing scenarios and strategies using the frameworks in this and our **other codexes**, or whether it's just exploring the art of the possible. This is the key to the sheets:

1 / UNITED NATIONS SDG NUMBER

The UN SDG most impacted if you act on the trend.

2 / TREND NAME

The most appropriate name for the trend.

3 / YEARS IN THE CODEX

How many years the trend has been listed in our codex since the first edition.

4 / TREND LONGEVITY

LONG MEDIUM SHORT

The trends longevity and how long it is expected to have an impact for.

5 / TREND PRIORITY

The higher the number the more attention and weight you should give the trend.

6 / TREND MOMENTUM

ASCENDING FLAT DESCENDING

The overall momentum of the trend.

7 / TIMING OF THE TREND

HERE NOW EMERGING DISTANT

When the trend is expected to have a measurable and pronounced impact.

8 / RELATED TRENDS

Other trends that either impact the trend or are impacted by it.

9 / DATA SOURCES

A list of our data sources for the trend.

10 / IMAGE

An image to portray the trend.

11 / ACTION

The action we suggest organisations take now based on the available data.

12 / EXPLORE

Other things you can or should explore to better understand the trend and how to solve or use it to your advantage.

13 / DISCOVER MORE

Click or scan the QR codes to access more resources or arrange an expert call with us.

TRANSPARENCY AND METHODOLOGY





IN A world where data is generally anonymous, aggregated, and ubiquitous, where it's increasingly generated by machines, faked, and unverified, and where it can spun in a multitude of ways to show or promote different opinions, points of view, or even diametrically opposed positions, today more than ever before we all have to ask the question: "Do we trust the data?"

IN DATA WE DON'T TRUST

At the 311 Institute we have a **Zero Trust** approach to all the data we gather and analyse until we can either independently verify it or achieve a high degree of confidence that it's accurate and authentic, because in a world where data forms the basis of almost all human and machine decision making, whether those decisions are ideological, political, professional, societal, or other, trusting the wrong data can have dire consequences.

Ultimately, what our approach means for is that you too can have a high degree of confidence in the data we publish, and while we will never claim that it's one hundred percent accurate you have our word that everything we publish has been cross referenced and reviewed with critical and cynical human eyes.

TRANSPARENCY PLEDGE

Throughout all of our work we also extend a Transparency Pledge.

Firstly, all the data we present is unbiased, and while our authors - including any Artificial Intelligences that we may lean on which we'll come to in a moment - invariably have their own bias or opinions we always ensure we present a balanced and grounded real world view so that you can form your own opinions without having to worry about being subjected to unannounced or unclear bias.

Secondly, while we do our best to ensure the integrity of our data we still urge you to use your own common sense, do your own due diligence, and view it with critical eyes. And, if for whatever reason, there are cases where we are unsure about the datas accuracy or authenticity then we use best endeavours to flag it accordingly.

Thirdly, where possible and practical we always cite our sources. And, as you'll see from our data methodology on the following pages, we always reference primary research and direct observations first, only stepping through the remainder of the steps in our methodology if left with no better alternatives.

Notes:

Fourthly, in an age where Generative Artificial Intelligence (GAI) is being used by companies large and small to generate or "knock out" content we default to human authors, and we will for a very long time to come because our own experiments with GAI have so far shown it to cite false or inaccurate sources and generate highly inaccurate results or Hallucinations.

As emerging technology experts ourselves though when the time inevitably comes for us to incorporate more GAI content into our work then we will be clear about it, apply our normal rigour, and incorporate a visible GAI Data Confidence Scale on the pages it's used.

OUR METHODOLOGY

All of this then brings us to the methodology we use - the 311 Institute Data Scale - to ensure the data in this Codex is of the highest quality and lives up to your expectations.

As you can see on the following page when it comes to the data we publish we source it from the highest quality sources first and only move down the scale when better alternatives aren't available.
We rank the data we publish and our data sources according to a sliding scale of accuracy, authenticity, bias, business model, confidence, consistency, explainability, integrity, professionalism, purpose, recognition, transparency, and many other factors. Unsurprisingly what we consider to be the gold standard is at the top.

MIND THE DATA GAP

All this said though we are also very aware that especially when it comes to gathering global statistics many datasets, even from the most reputable and far reaching primary research companies and global institutions, are often incomplete with not all countries gathering or sharing data, and we also recognise that the data collection and methodologies can all vary wildly so in these cases we do our best to close the gaps in a balanced, transparent way.

SUMMARY

All in all, not only does this make putting this Codex difficult but now hopefully you can see the lengths we go to to ensure you have quality data you can rely on, and a partner you can trust.

OUR DATA SCALE

01 PRIMARY DATA SOURCES

DATA COLLECTED VIA DIRECT RESEARCH FROM REPUTABLE SOURCES .

HIGH	Clear business model and sources of income
HIGH	Data confidence and transparency
HIGH	Domestic, international, and peer recognition
HIGH	Robust and transparent methodologies

02 SECONDARY DATA SOURCES

DATA AGGREGATORS WITH LIMITED DIRECT RESEARCH .

MEDIUM	Clear business model and sources of income
MEDIUM	Data confidence and transparency
MEDIUM	Domestic, international, and peer recognition
MEDIUM	Robust and transparent methodologies

03 TERTIARY DATA SOURCES

DATA AGGREGATORS AND PUBLISHERS WITH NO DIRECT RESEARCH .

LOW	Clear business model and sources of income
LOW	Data confidence and transparency
LOW	Domestic, international, and peer recognition
LOW	Robust and transparent methodologies

04 GENERATIVE AI SOURCES

OUR DATA OF LAST RESORT .

While Generative AI has its advantages, especially where there are gaps in the data or where the data is widely dispersed, it's proven to be highly error prone. As a result the lack of accuracy and transparency makes it an unreliable source of information.

TREND HUNTERS





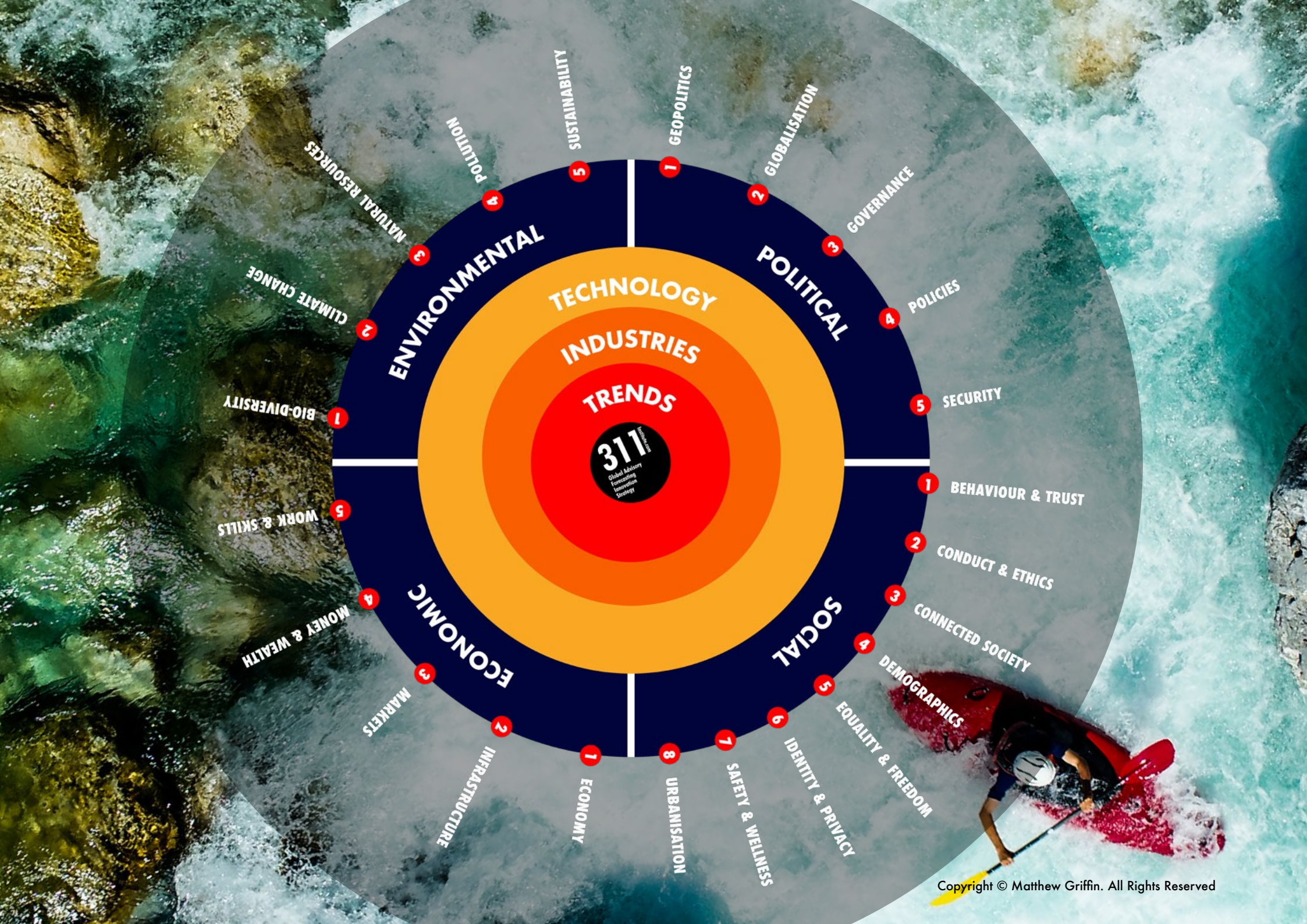
IN THE investment community they often talk about being profit hunters. In the foresight community we often talk about being trend hunters.

Planning the future of your organisation must always begin with identifying and exploring meaningful signs as you look out towards the horizon and one of the best ways of doing this is identifying emerging trends and understanding their behaviours and implications on each other as well as on the future of global business, culture, and society.

Whether we know it or not see it or not every moment of every day every aspect of our lives are directly and indirectly influenced by all manner of trends that shape our present and future, and identifying and understanding them all as well as their implications requires us to connect the dots and track changes across an incredibly broad range of trend categories.

Today more than ever leaders everywhere should explore the potential that trends have to shape the future of their organisations, factor them into their strategic decision making, and then evolve their business strategies accordingly.

Now more than ever, in a rapidly changing and increasingly connected and disruptive world failing to track trends in a meaningful way will put you at a competitive disadvantage and put your future prosperity at risk. It is for this reason I created this codex, a literal "trends catalogue" that puts every trend and every titbit of relevant information right at your fingertips.



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INTRODUCING MEGATRENDS AND TRENDS .

MEGATRENDS ARE powerful, transformative forces, backed by observable and verifiable data, that have the power to shape the future of global business, culture, and society, and they have been shaping the way we live for centuries - just think about the automobile, electricity, the internet or any number of other everyday items. And they will continue shaping our society until the end of time or human existence - whichever comes sooner.

Exploring megatrends and their implications is an integral part of helping organisations contemplate and envision different versions of the future. They also indicate a general direction of change, and can themselves be comprised of several different trends with the overall direction of their future development often being dictated and influenced by their past - but not always.

They are also often not surprising to us - they are often familiar things, changes that are already happening today and that are highly likely to continue happening into the future.

To use an analogy you can think of megatrends in much the same way as you think about the ocean – a large unstoppable force that seems to have a mind of its own and that only seems to travel in one direction despite some of your best efforts to disrupt or divert it. In this example the ocean is the megatrend, and eventually, like it or not, it's going to sweep you in one overall direction.

Within this ocean though there are other smaller forces, or microtrends, at work – currents, eddies, and vortexes. And, as the megatrend sweeps you in one overall direction it's often these microtrends that snare you and determine your final eventual destination – your future state.

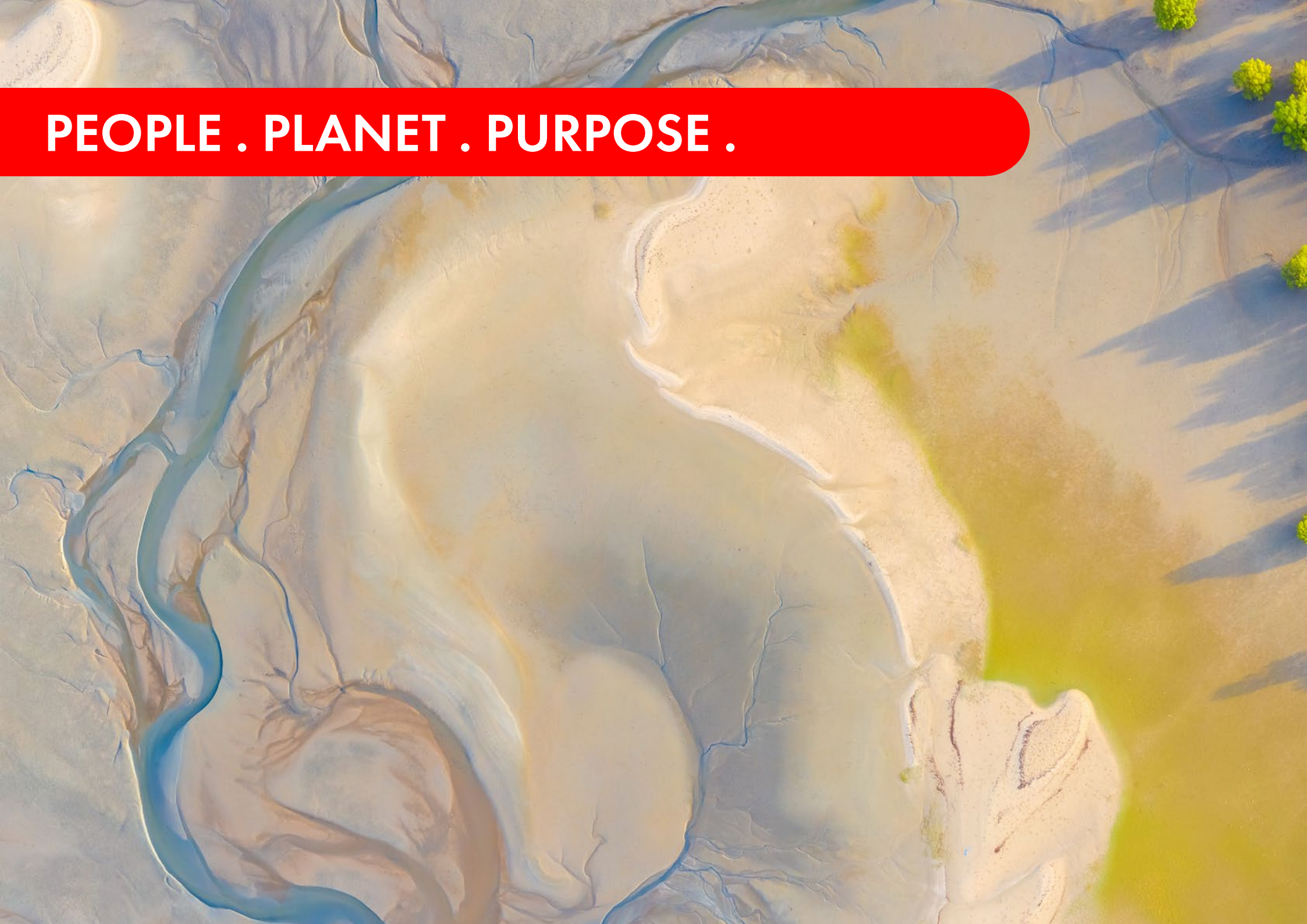
A simplistic example of this is the impact Climate Change, a megatrend, has had directly and indirectly on the global energy sector. Swept along by this then snared by many smaller trends such as bans on the sales of combustion engine vehicles, cultural backlashes, investor fallout, Net Zero policies, and rising emissions and extreme weather events, the sector's been forced to radically alter its path and ditch its reliance on fossil fuels - whether it wanted to or not.

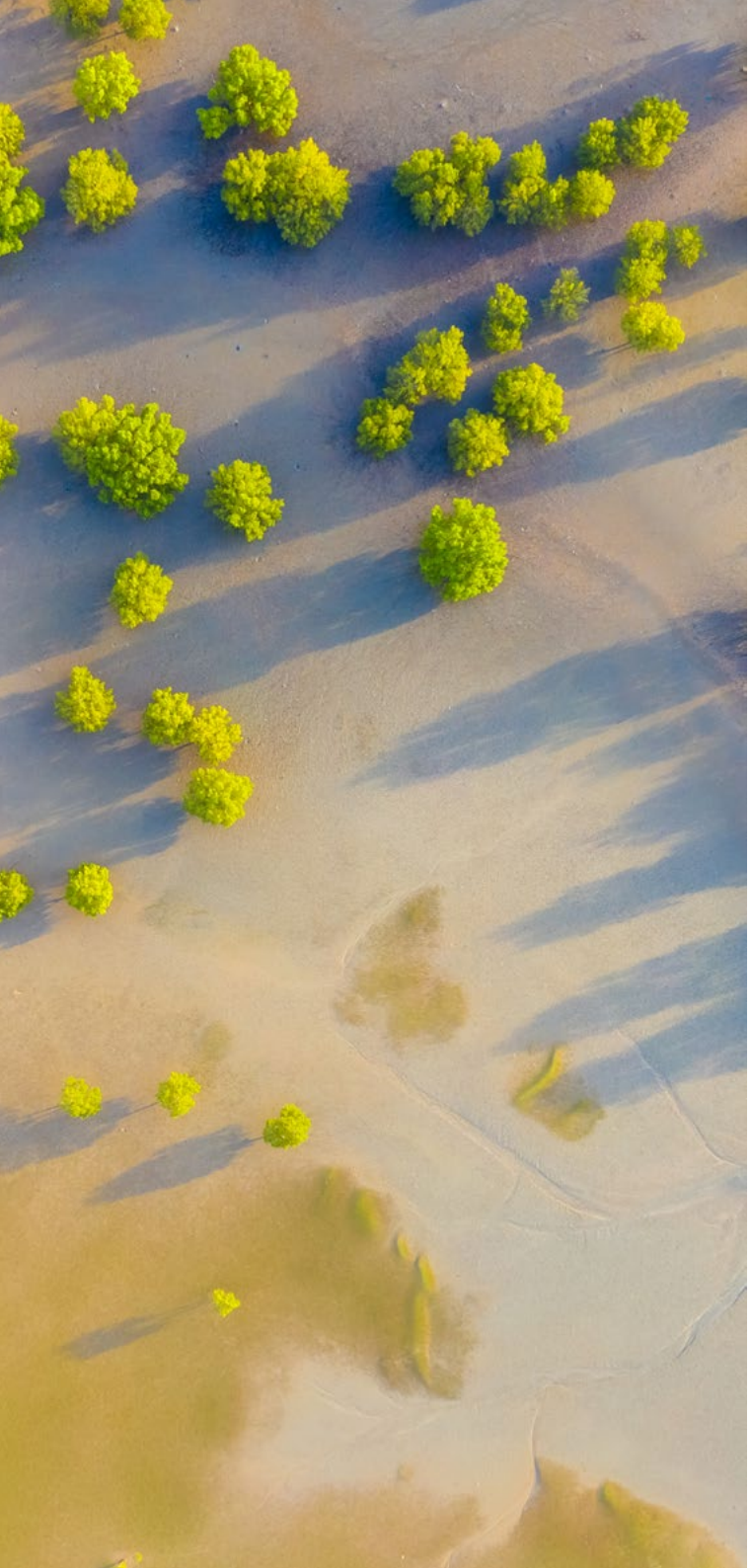
While these trends and others have all played their role in shaping the future of the sector it's the rise of another trend that's ultimately accelerated the sectors transformation away from its roots - the investment in and development of low cost renewable energy technologies which have irrevocably changed the sector's economics.

Arguably, had any of these trends played out differently this transition may never have happened so, as you can see, we are all at the mercy of trends in one way or another which is why it's crucial we explore them and their possible implications thoroughly.

TREND CATEGORISATION

In this codex I cover as many trends as possible so you have all the information you need and, as I explained earlier on, I've categorised them all according to their STEEP (Social, Technology, Economic, Environmental, and Political), line of business, and sector relevance.


PEOPLE . PLANET . PURPOSE .



TO PROSPER and thrive in both today's world and in the future organisations must be driven by more than profit and the bottom line. They must have a deep rooted and authentic desire to help improve the lives of all those they share the planet with, to protect our home, and be purpose driven.

In short they should be driven by and take ownership of the phrase: People. Planet. Purpose.

THE FUTURE IS OUR LEGACY

Today, our world and everyone and everything that relies on it face a great number of seemingly insurmountable challenges and it's down to each of us to play our role in finding solutions and solving them so we can leave this world a better place than when we entered it. After all, as I often say: "The future is the legacy we leave behind."

As a result, and with this at the forefront of our minds at the 311 Institute, and our associated companies, we have made it our central purpose to do our utmost to amplify positive voices, highlight solutions to these challenges no matter how implausible they may seem, and empower everyone to play their part.

This is also the reason why woven throughout all the content we publish across all our platforms you will find insights, narratives, and solutions that align with the seventeen United Nations Sustainability Development Goals - the UN SDG.

That said neither we, our clients, or the organisations we partner with and support are under any illusion that the road ahead isn't long, often uncharted, and littered with obstacles. But, we're determined and collectively, as we have already demonstrated many times together, there's no problem we can't solve.

THE 311 FUTURE WORLD SERIES

As a result, and because talk is always often just cheap, when it comes to solving all seventeen UN SDG and other "Grand Challenges" we created the 311 Future World Series - a dedicated space to highlight the impact of these challenges on the world and its inhabitants and highlight the solutions we have in our hands today to solve them, as well as the even greater number and variety of solutions we see emerging on almost a daily basis.

Developing solutions to these challenges



THE 311 FUTURE WORLD SERIES

While they aren't always obvious we already have the **solutions** we need to solve all 17 UN SDG, from Hunger and Water to Education and Inequality, so we all have reasons to be optimistic. Click the QR code and **explore them all**.

Notes:

though is just one part of the equation, and often the hardest job is getting them to where they need to be, in time, and into the hands of the people who need them.

It's for this and other reasons therefore why, even though today we have millions of passionate entrepreneurs and organisations all around the world, we need everyone to play their part, and even the smallest contribution makes a difference.

If you would like learn more about the UN SDG, the challenges we face, and the solutions to them then I encourage you to explore our content and website, and to reach out.

Explore More,

MATTHEW Griffin
Founder and Futurist in Chief



TURNING TRENDS INTO ACTION





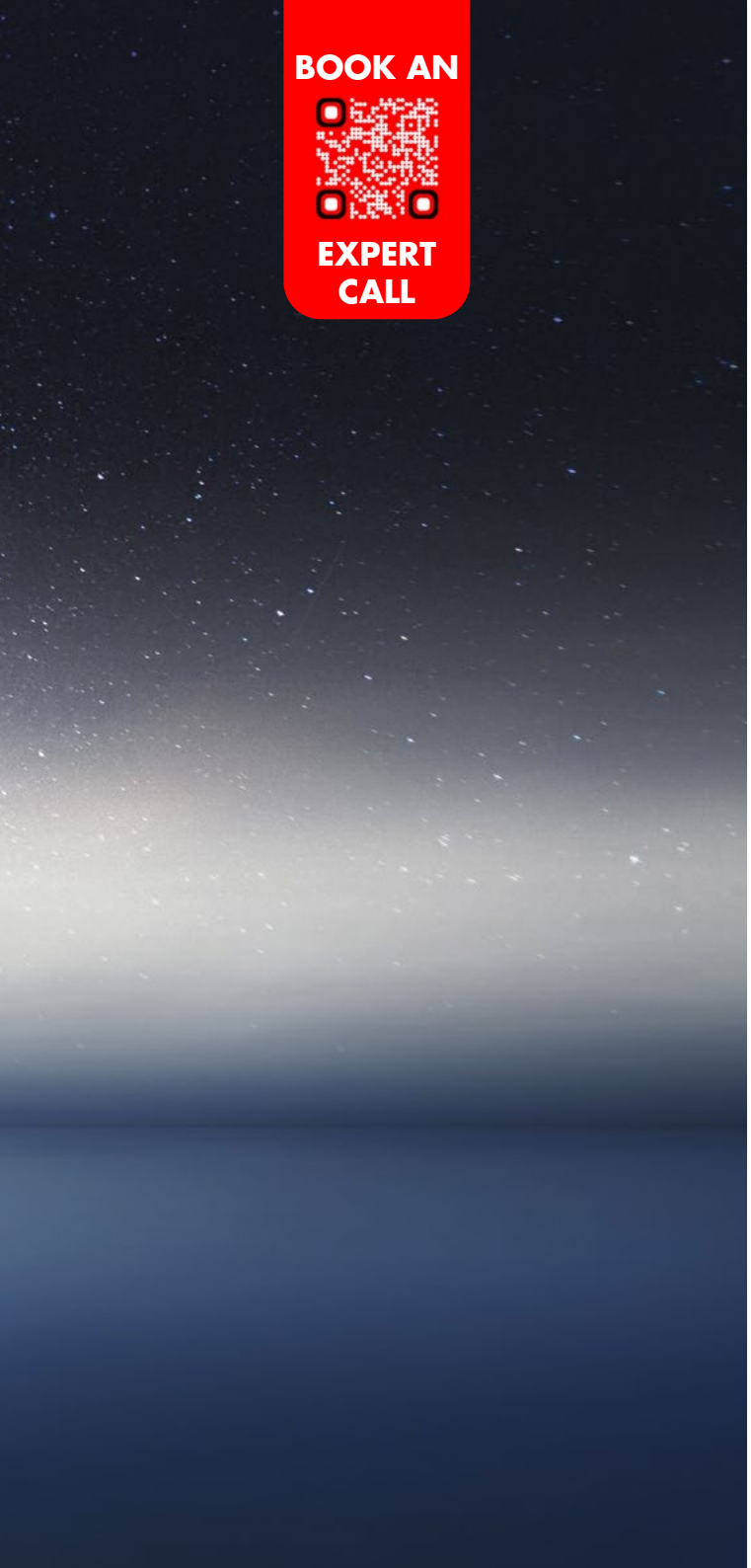
PERHAPS ONE of the main reasons you're reading this codex, and perhaps some of the others in our **Codex of the Future Series**, is because you're curious about the future and want to understand how different emerging concepts, ideas, signals, technologies, and trends could impact the future of your country, industry, or organisation. Or all of them.

If that's the case then you'll no doubt quickly realise two things. Firstly, there's a huge amount of information to investigate and explore, spanning lots of different topic areas. Secondly, trying to explore the many direct and indirect implications of them all, as well as what happens when they converge, can be complicated, confusing, and frustrating.

As a result it's highly likely that you'll need something that helps you explore, navigate, and design Plausible, Possible, Preferable, Preposterous, and Probable short, medium, and deep futures so you can benefit from them all which is why we've included two of our three tailor made Strategic Foresight Programs in this codex - the **Horizon LITE** and **Horizon Pro Programs**, with the third program the **Horizon ELITE** Program having its own dedicated codex the **How to Build Exponential Enterprises Codex** - which include all the foresight frameworks, models, resources, and tools you need to identify and dominate new markets and opportunities, and why we've also included an overview of our first of a kind **Anchoring Constants Model** which has helped our clients, and some of the worlds largest companies extend their leadership positions for more than a decade.

THE VALUE OF STRATEGIC FORESIGHT





FUNDAMENTALLY, STRATEGIC Foresight is about three things, namely saving you precious time, minimising future surprises, and preparing you for what's coming.

WHY YOU SHOULD RUN A PROGRAM

While many organisations run strategic foresight workshops in our increasingly VUCA-MAX world, the effects of which you can see all around you, we believe you should run regular programs. The reason for this is simple - workshops, like scenario workshops, are single events, you start them and finish them, and once they're complete it's easy to loose momentum, see participants go back to being consumed by their day jobs, and shelve the outputs.

By running a program though you maintain consistency, the team, and just as importantly the momentum. It's also much more likely that the results will be turned into valuable actionable initiatives.

THE VALUE OF STRATEGIC FORESIGHT

Strategic foresight acts as a counter balance to our VUCA-MAX world by giving you the opportunity to envision the future, develop scenarios, and explore how they could benefit or harm your organisation within a safe environment.

It also provides you with the critical thinking and valuable insights you need to discuss how the organisation can adapt or react to these futures, make better faster decisions, and design resilient business strategies and visions that maximise the upsides, minimise the downsides, and stand the test of time.

Over simplifying the issue, the vast majority of organisations care about three things: decreasing costs and risks, and increasing revenues. So, love it or not, like any business activity futures thinking and strategic foresight programs all have to be able to demonstrate intangible or tangible returns that align with your organisations goals. And, also, let's face it, nothing prompts organisations to embrace foresight and futures thinking programs like a gigantic hit to the top and bottom lines as markets change and customers vote with their feet and as new competitors and disruptors erode your organisations competitive advantage and value propositions.

As surveys conducted by Deloitte and Aarhus School of Business and Social Sciences have shown organisations with dedicated corporate foresight teams realise a 200% higher market

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cap on average than their peers, and organisations who are “Future Prepared” are on average 33% more profitable.

So, whether you measure your future in dividends, dollar amounts, market differentiation, or organisational readiness and resilience, or all of these, there are plenty of rewards to be realised by those who are prepared.

LESSONS FROM HOLLYWOOD

However, while an organisation can hire the best experts and foresight teams its ability to turn strategic foresight into business value ultimately relies on its ability to use the insights wisely to develop strategic advantage. And doing this is much more complicated than most stakeholders imagine, which is perhaps why many organisations stop or ‘ratchet down’ after running their scenario workshops and fail to use the results to design and inform their future business strategies that they can then, importantly, action and execute.

Hollywood provides us with plenty of time travelling heroes who travel back to the past - with perfect knowledge of their timelines’ history and other people’s futures - to change and manipulate the future for their own gain.

In some cases these characters, like Biff in Back to the Future Part 2, use this perfect knowledge to amass huge fortunes by betting on the right stocks. In Minority Report Tom Cruise uses the pre-cogs to catch future criminals. And then in the Terminator and X-Men franchises the characters try to save humanity - with varying degrees of success, and innumerable complications.

And the lesson is this - even with perfect knowledge of the future sometimes these characters win and sometimes they loose in dramatic fashion which then goes to show us one thing - trying to manipulate and shape the future to your advantage is difficult even under the best circumstances and with the best insights.

Putting this in business terms, once you have information about the future you trust, and when it comes to using it to your advantage, execution is everything, and for the organisations that get it right the rewards as we can see today can be game changing, and in some cases world changing.

Notes:



MOST FORESIGHT PROGRAMS ONLY SHOW YOU 30% OF THE FUTURE .

OURS SHOWS YOU EVERYTHING .

WHAT ARE YOU MISSING ?



OUR ANCHORING CONSTANTS MODEL





WE ALL know everything is constantly changing - at the micro and the macro level. Even as you read this the cells in your body are changing you at a physical level, let alone when we think about all of the changes that are happening around us in the wider digital, physical, and virtual worlds. And, as the number of things changing continues to increase almost exponentially as we see with the VUCA-MAX world we discussed previously, this gives us at the 311 Institute, and by extension you, an issue.

That issue namely being the fact that the more things that change the harder it is for us all to envision the Plausible, Possible, Preferred, Probable, and Preposterous futures in the near, medium, and long term.

THE TWO BIG PROBLEMS TO SOLVE

When it comes to strategic foresight programs there are arguably two problems to solve. The first is identifying all the signals, technologies, and trends that have any kind of direct or indirect impact on your programs objectives. And then the second is trying to assess the trajectories of all these changes and their impacts on everything the organisation cares about over the time frame your organisation cares about.

Suffice to say the first point is incredibly hard, which is why we created our **Codex of the Future Series**, and the second point is even harder so we devised a way to simplify it and we call it the **Anchoring Constants Model** which we increasingly see being a crucial lynch pin in our futures and strategic foresight programs and in helping us accurately envision the future.

INTRODUCING ANCHORING CONSTANTS

Anchoring Constants are obvious and everywhere but you probably don't think about them very much.

From a top down perspective they are the **"Innate Behaviours Of Different Systems That Are Always True Under Almost All Circumstances That Persist Across Time"** that subversively drive and influence how and why almost everything changes in the way that it does. Or, looking at it from the bottom up, they are the lowest common denominators that determine how a system might react to a particular event or stimulus, such as a signal, technology, or trend, and over time influence its trajectory and likelihood of success.

THE 311 INSTITUTE MODEL OF

ANCHORING CONSTANTS

" THE INNATE BEHAVIOURS OF SYSTEMS THAT ARE ALWAYS TRUE UNDER ALMOST ALL CIRCUMSTANCES THAT PERSIST ACROSS TIME . "

- Matthew Griffin , Founder , 311 Institute

Notes:

There are constants everywhere and, as for "Systems," you can think of those as categories or themes, and the more of these anchoring constants that an individual signal, technology, or trend aligns with then the more likely that it is that it will ascend, persist, and possibly dominate in the years to come.

Then, once we've assessed how those individual signals, technologies, and trends align with these anchoring constants then our next step at the 311 Institute is to try to figure out what happens when they start converging and colliding with one another and what futures those results could create.

For example, you could say that the innate behaviour of a sovereign economy is to grow - this is its Anchoring Constant - so in this example we might look for signals, technologies, and trends that support that growth.

Then, as we move through our due diligence process if we discover two similar but competing trends which align with this Anchoring Constant then we will do our utmost to assess which one aligns the best with the Anchoring Constant we care about. And, while it's an imperfect practise in the main it gives us a much better chance of identifying and predicting the winners and, therefore, improving the accuracy of our Horizon 1, 2, and 3 forecasts.

WHAT'S IN A NAME

So you might wonder why I use this term. Firstly, these innate behaviours often "Anchor" the development of the technologies and trends we monitor because if there is no connection to these innate behaviours then the relevance and usefulness of those technologies and trends to business, culture, and society will be negligible or nil which means that over time they'll likely fade away.

Secondly, these innate behaviours are "Constants" because, very importantly, they hold true across time and don't change - something that is especially important when we're dealing with near to long term futures, even as everything else around them changes. So let's run an example.

Say we're running a strategic foresight program investigating the long term future of company operating models - a random project. Economically we know growing "Revenue Growth" is an Anchoring Constant, but if we're comparing two trends such as "Human Operated Companies" versus "AI Operated Companies" then if the latter

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can grow company revenues faster and more sustainably then it's more likely that over time this will become the more dominant trend of the two and could become the status quo.

Hopefully this simple example shows you why, irrespective of the objectives of our strategic foresight program, being able to identify these anchoring constants is vitally important and how they can help us extrapolate out the likely future of an individual technology or trend, or collection thereof. And while there will always be Black Swans and wild cards they are the exception not the rule.

APPLICABILITY TO ALL CATEGORIES

This method can also be applied to almost every category and topic of your choosing whether it's Cyber, where an anchoring constant might include "Identity," Luxury Holidays, which might include "Enjoyment," and all manner of other things.

In the next few pages I highlight a few of the anchoring constants that we associate with the STEEP (Societal, Technological, Economic, Environmental, and Political) categories and some of the innate behaviours we use to ground our own futures thinking and underpin some of the activities in our strategic forecasting programs.

" CHANGE IS NOT THE ONLY CONSTANT IN LIFE . "

- Matthew Griffin , Founder , 311 Institute

ECONOMIC

FIRST ORDER ANCHORING CONSTANTS

BALANCE OF TRADE

COMPETITIVE DYNAMICS

ECONOMIC GROWTH

EFFICIENCY

PRICE STABILITY

PRODUCTIVITY

PROFIT MAXIMISATION

RESOURCE ACQUISITION

ENVIRONMENTAL

FIRST ORDER ANCHORING CONSTANTS

EQUILIBRIUM

INTERDEPENDENCE

NATURAL SELECTION

POLITICAL

FIRST ORDER ANCHORING CONSTANTS

CONTROL

GDP GROWTH

INTERNATIONAL RELATIONS

NATIONAL SECURITY

NATIONALISM

POLITICAL SURVIVAL

POWER AND INFLUENCE

SOCIETAL

FIRST ORDER ANCHORING CONSTANTS

ADAPTABILITY

BASIC NEEDS

EMOTIONAL INFLUENCE

SELF-ORGANISATION

SOCIAL COOPERATION

SOCIAL STRATIFICATION

TRUST

UNITARY SURVIVAL

TECHNOLOGICAL

FIRST ORDER ANCHORING CONSTANTS

AGENCY

AUTOMATION

IMPROVING COST - PERFORMANCE

IMPROVING UTILITY

MINIATURISATION

PERVASIVENESS

SERVICE ACCESS

VALUE

FIRST ORDER ANCHORING CONSTANTS

DESIRABILITY

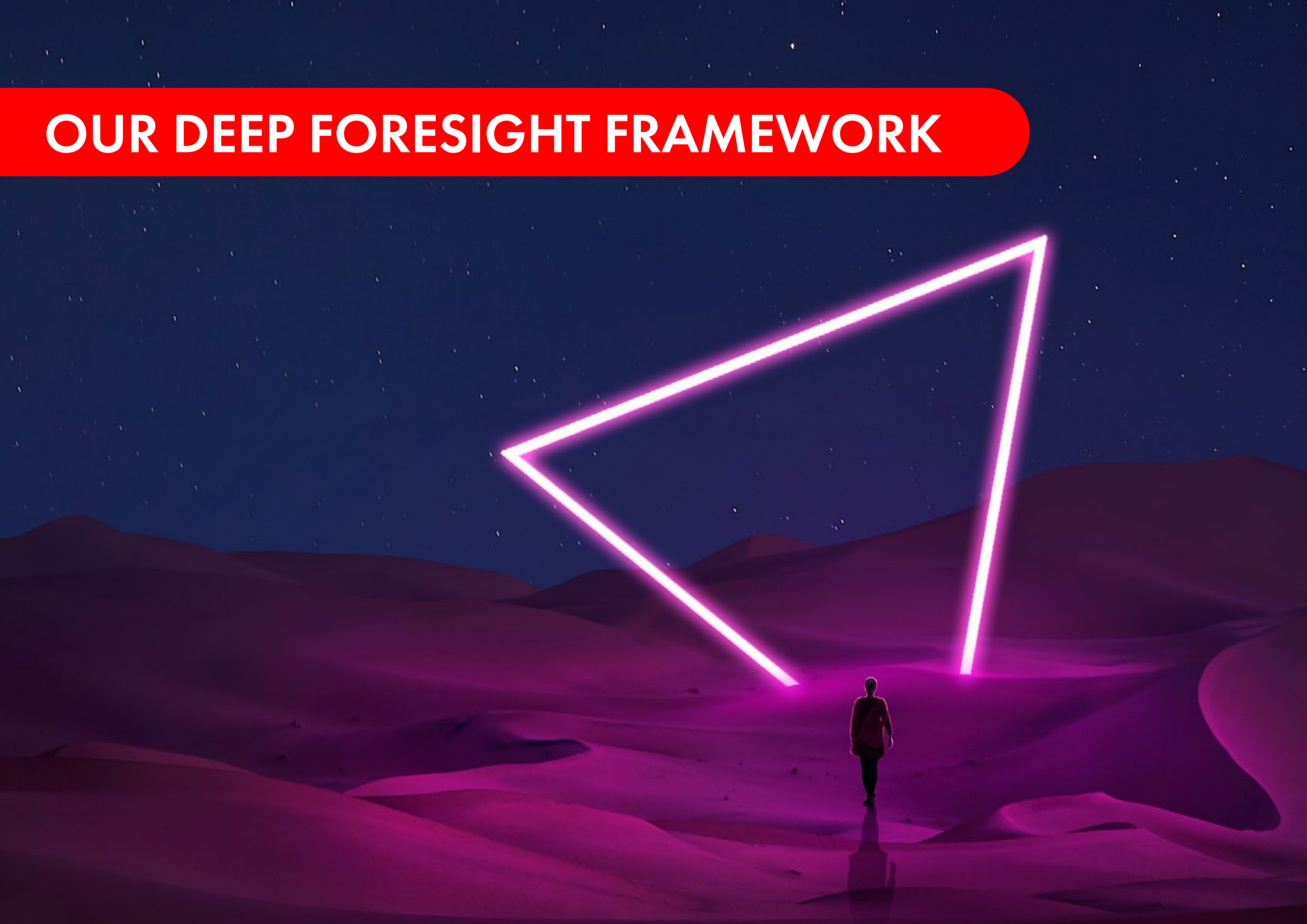
TIMING

UNIQUENESS

UTILITY

SUPPLY - DEMAND

OUR DEEP FORESIGHT FRAMEWORK





WHEN YOU set out to explore the future there are two aspects - the strategic foresight framework and program you use to plan and guide your journey, and then there's the journey itself, the act of going through the experience and coming out the other side having achieved your objectives. And while almost every futures organisation talks about the value of their frameworks in our estimation you simply cannot have one without the other. In our eyes both - the guide, your companion, and the journey - are both equally important.

This is why at the 311 Institute we've put a huge amount of thought into both and, for the reasons I'll share with you here, developed a brand new Deep Foresight Framework and the three new custom Strategic Foresight Programs that I detailed in the previous chapter.

OUR AMBITION

At the 311 Institute we see ambition as a good thing which is why we support so many wonderful change makers and entrepreneurs around the world.

From our own perspective though from the outset it was our ambition to be the worlds best Futures and Deep Futures advisory, without exception, and to create a company that democratised access to the future and helped people, irrespective of their ability, background, or circumstances easily and accurately determine how different futures could affect the topics they were passionate about.

Today, our breadth and depth of futures expertise and insights gives us agency to work with any stakeholders in any sector in any country at an expert level and identify opportunities and threats many years, and in some cases decades, ahead of time and then help our clients develop the capacity, capabilities, and culture that help them thrive in these Plausible, Preferable, Probable, Possible, and Preposterous futures.

And there's a reason why I mention this ambition.

OLD FRAMEWORKS ARE FLAWED

As the rate of global disruption accelerates, as science fiction becomes science fact, and as the VUCA world becomes increasingly VUCA-MAX where, in addition to VUCA, the changes are increasingly Massive, Accelerating, and eXponential, we noticed very early on that the traditional strategic foresight

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tools and frameworks that people were using, most of which were developed decades ago and in a completely different era in time, were increasingly ineffective at helping organisations identify and explore everything that they needed to see today that could help them envision tomorrow, and a future that plays by new rules and which has less and less in common with our past.

Additionally, and somewhat ironically, most of those same frameworks hadn't been updated in decades and had failed to keep pace with the very futures that they were designed to help envision.

Digging deeper into this, and feel free to correct me if you feel I'm wrong because I'm always up for a good chat, not only did the vast majority of them fail to help organisations identify and, dare I say predict, some of the large system level changes we're seeing today, but they also failed miserably at spotting the rise of significant new technologies and trends such as the rise of Generative AI, the latter of which, as we all know now, changed the world and which we spotted and started discussing with our clients over a decade ago.

AVOIDING THE COMPANY GRAVEYARD

From an organisational perspective missing vital insights and signals like these and failing to understand their significance can quite literally end companies.

In the case of Generative AI, for example, its emergence caused many companies in the EdTech sector who were selling Adaptive Education solutions to go bankrupt. Meanwhile, in other examples it caused share prices to dive by up to 90% and then on the other side of the coin in the case of Microsoft, one of our long standing clients, it helped push their market cap to more than $3 Trillion.

As you can see, in today's world you miss one, albeit world changing signal, and it can make the difference between being the world's biggest company by market cap or closing your doors forever.

From our first hand experience with clients we believe that when it comes to the future today organisations are missing at least 60 percent of the bigger picture, and in a world that's changing as much as it is and as fast as it is that can make all the difference in the markets.

As we saw this point was also hammered home hard in the PWC 27th Global

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CEO Survey, in which a mind boggling 45 percent of the 4,702 CEO's of multi-national companies surveyed said that and I quote "they didn't believe their companies would be economically viable in 10 years time without significant re-invention." That, by any measure, is a staggering statistic.

Just linger on that for a moment - almost half of the CEO's running today's biggest companies don't think their companies will survive if they don't reinvent themselves.

This then prompts us to ask the question: is this a failure of the strategic foresight programs they're running, data discovery, corporate culture and leadership, or all four?

Admittedly, it'll be a combination of all these. But, if we don't fix all these issues and soon then we could see almost half of companies going to the wall, fading away, or being sold in a fire sale. And none of us want that. And this, in part, is just one of the reasons that compelled us to create the 311 Institute Deep Foresight Framework.

INTRODUCING THE DEEP FORESIGHT FRAMEWORK .

HOPEFULLY, BY now you have a clear understanding of why we felt compelled to develop our own Deep Foresight Framework - a new strategic foresight framework built to help organisations envision Horizon 1, 2, and 3 futures, which we then embedded as the center piece of our three custom designed Strategic Foresight programs, the Horizon LITE, Pro, and ELITE Programs that, when combined together give you the ultimate foresight package you need to envision infinite futures and help you build the capabilities and organisational initiatives you need to thrive.

In this section you can read more about why we designed our framework as a Companion not just a guide, and learn more about all the content and materials we've created to help you as you venture forth on your "Futures Journey."

FRAMEWORKS AS COMPANIONS

As with many of the things we do at the 311 Institute when designing our framework we started with a blank sheet of paper - a First Principles approach. We even wondered if we should design a new framework because, frankly, we're not fans of them. In part this is because most frameworks are bloated and complicated, and more often than not they're all the same under the hood just with different logos and marketing layered on top.

However, despite our reticence we also realise the importance of frameworks as conceptual guides. And, when it comes to understanding and navigating the future, we all need guides.

But, for the explorers and travellers among us, we all know there are different calibres of guides. Going back to our earlier analogy at the beginning of this chapter, if we compare your strategic foresight program to a "Futures Journey" then as you'll know there are those 'tourist' guides that simply stand rooted to the spot and point in the direction you need to travel, and then there are those guides who are true Companions on your journey and light the way for you, and who turn your journey from being a chore to a joy, chaperone you and show you the sights to explore, the dangers to avoid and the short cuts to take. In short, they turn your journey into a rich, unforgettable experience that leaves you changed for the better.

From our first hand experience we felt that the majority of traditional frameworks are mere guides, they just point the way, which is why they fail so often to help teams spot and explore so many of the vitally important signals, technologies, and trends that are crucial in helping them see and understand the bigger "futures picture." And, we also knew from our conversations with our clients, that they too wanted a companion framework, not just a simple guide.

GROUNDING OUR FRAMEWORK

For a framework to be future fit we believe it has to be firmly anchored to helping clients achieve the three things they care about.

Firstly, it has to be able to capture the clients discovery space, namely the

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things they want to explore, and also their problem space, the issues they care about solving across a Horizon 1, 2, or 3 timeline. Secondly, it needs to give them everything they need to discover everything that will have a direct or indirect impact on these spaces. And, thirdly, it must provide them with everything they need to develop and explore scenarios and solutions, assess and evaluate them, and turn them into actionable initiatives. So that's precisely what we developed.

YOUR FUTURES JOURNEY

Having created the Deep Foresight framework then there's the actual journey itself - the act of you being a part of the organisations Futures Journey and its strategic foresight program. And, just like journeys, every strategic foresight program is different because of what stakeholders what to achieve, the people that are included, and a million other reasons.

Since our very founding as a company, and asides from our framework, we realised we needed to be able to provide our clients with the journey itself - the insights and sights, the views and points of view of the future, which is why since our inception we've worked so hard to develop the content and materials you need on this journey, including our wildly successful **Codex of the Future Series**, so that you have all the signals, technology, and trends information, and more, that you need all in one place, and from one company, that will help you envision and explore every future you could possibly imagine.

SUMMARY

As the future becomes increasingly complex, as the rate of change accelerates and as the magnitude of those changes increase exponentially, having a companion guide is one thing, but it's also vital to be able to get as a big a view of the future as possible.

Using a simple example, yes it's wonderful to have a great guide that shows you the desert, but if your actual objectives mean that you would have been better off exploring the jungle then while interesting that particular journey doesn't deliver what you needed it to. So what you need is both, an expert companion, and the right information and insights - or the right environment - to explore. And that's what we were literally born to do.

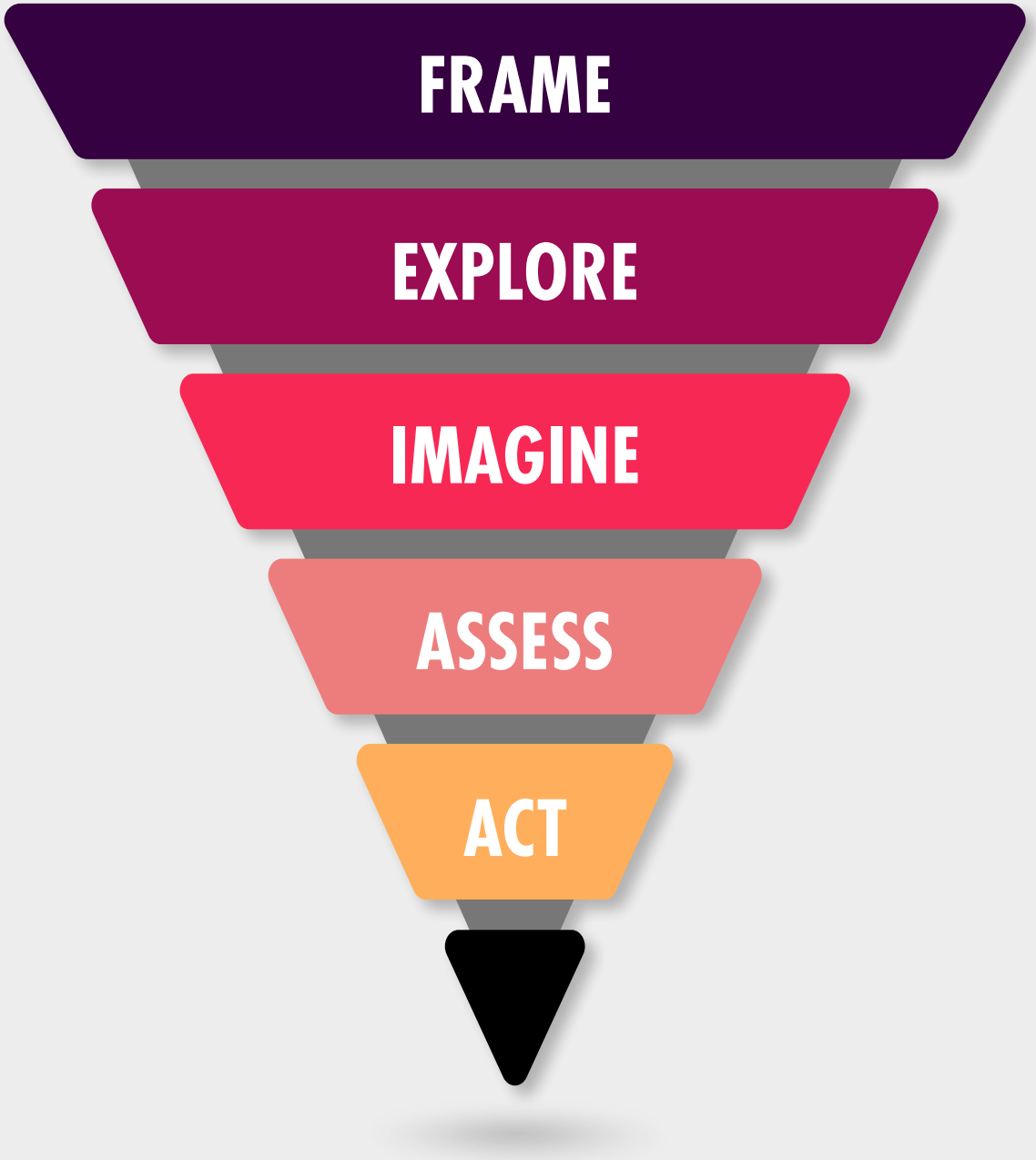
" FEAR IS THE MOTHER OF FORESIGHT . "

- Thomas Hardy

PURPOSE	MODELS
SET OBJECTIVES DEFINE THE OBJECTIVES OF YOUR STRATEGIC FORESIGHT PROGRAM	FRAME Model
EXPLORE EVERYTHING DISCOVER AND EXPLORE SIGNALS . TECH . TRENDS . &	EXPLORE Model PREDICT Model
SCENARIOS GENERATE FUTURES SCENARIOS	IMAGINE Model
ANALYSE AND SELECT THE FUTURE MEETS REALITY	ASSESS Model
TIME TO ACT TURN OUTPUTS INTO ACTIONS	ACT Model

SIGNALS . TECH . TRENDS . JUST A CLICK AWAY

LOOKING FOR FUTURES INFORMATION FOR YOUR PROGRAM? WE'VE GOT YOU



311 INSTITUTE

DEEP FORESIGHT FRAMEWORK

OUR STRATEGIC FORESIGHT MODELS





TO ACCOMPANY our Deep Foresight Framework, and to provide you with all the resources and tools you need to run your own Strategic Foresight programs and workshops, we developed a series of Deep Foresight Models, each of which compliments a specific stage of the framework. And, in our eternal quest to try and make envisioning the future as easy as possible we tried to make everything as simple as possible which means that no matter where you start your futures journey and no matter what your skill level or team size, these are all designed for you.

INTRODUCING THE MODELS

In total we have six models for you, all of which can be used together or individually depending on your goals and objectives. When used all together they will help you run a complete Strategic Foresight program and when used individually they will allow you to run discrete workshops of your choosing.

The models are the 311 Institute FRAME Model, EXPLORE and PREDICT Models, IMAGINE Model, ASSESS Model, and the ACT Model. As you will see in the following pages they each have a specific purpose.

The FRAME Model helps you frame the objectives of your strategic foresight program. The EXPLORE Model helps you discover and explore signals, technologies, and trends that might be relevant to your program, and the PREDICT Model helps you identify uncertainties and unknowns in those information sets. The IMAGINE Model then helps you generate your Futures Scenarios, the ASSESS Model helps you assess and filter your scenarios, and last but not least the ACT Model helps you translate your chosen scenarios into actionable initiatives.

What could be easier than that? Seriously, if you know then let us know, we'd love to hear from you! Now enjoy the models and create your future ...

THE 311 INSTITUTE FRAME MODEL .

WELCOME TO the 311 Institute FRAME Model. Part of our custom designed **311 Institute Deep Foresight Framework**, and an integral part of all of the 311 Institutes Strategic Foresight programs, the objective of this model is to help individuals and organisations determine what they want their strategic foresight programs to achieve, and the results they want to realise.

In this section I will walk you through the purpose of each step of the model and how to run your own FRAME workshops.

INTRODUCING THE STEPS

1. Foresight Focus

In this first step you and your participants must determine your focus space for the program in terms of identifying the key areas, priorities, and topics that you care the most about, and then should start scoping out the programs overall objectives, which can be tactical or strategic, and quite literally anything you'd like them to be.

2. Results Definition

Having established the objectives of your program you now need to translate them into the specific results you want to see. These must be clearly aligned, defined, and measurable.

3. Alignment

Alignment, of both your objectives and results, as well as the expectations of the programs participants and stakeholders is crucial to ensure you are all on the same page and working towards common objectives. Effective alignment helps with organisational buy in, collaboration, and support, all of which are crucial.

4. Methodology Mapping

In this step you need to select the appropriate frameworks, methods, and tools that you are going to use during the different stages of your program. This ensures that the foresight process is rigorous and thorough, and that it's also well matched to the capabilities and skills of those participating.

5. Evaluation Criteria

Another crucial step it's essential that you define how the different stages of the program and the outputs are all going to be evaluated and who by.

This **FRAME MODEL** is part of the **311 INSTITUTE DEEP FORESIGHT FRAMEWORK**. Use it to frame your Strategic Foresight program's objectives.

F

FORESIGHT FOCUS

Decide the FOCUS and SCOPE of your Strategic Foresight program, identify key areas, priorities, themes, and topics.

R

RESULTS DEFINITION

Define the RESULTS you want to see at the end of the program and its OBJECTIVES.

A

ALIGNMENT

Make sure your objectives align with your organisations MISSION, PURPOSE, and VALUES.

M

METHODOLOGY MAPPING

Decide which METHODOLOGIES and TOOLS you'll use during the program.

E

EVALUATION CRITERIA

Decide how you will evaluate the success and effectiveness of the program.

COMPLETED? Move to the **EXPLORE MODEL** to find and analyse signals, technologies, and trends that matter ...

THE FRAME MODEL

PART OF THE 311 INSTITUTE DEEP FORESIGHT FRAMEWORK

THE 311 INSTITUTE EXPLORE MODEL .

WELCOME TO the 311 Institute EXPLORE Model. Part of our custom designed **311 Institute Deep Foresight Framework**, and an integral part of all of the 311 Institutes Strategic Foresight programs, the objective of this model is to help you discover and contextualise information that's important to your programs objectives, from as wide a variety of data sources as possible, that you can then investigate before using the results to develop your Futures Scenarios in the next stage of the program.

In this section I will walk you through the purpose of each step of the model and how to run your own EXPLORE workshops.

INTRODUCING THE STEPS

1. Explore

In this step you are tasked with gathering together and exploring as much information as possible from as many different sources as possible.

2. Examine

Once you have gathered together this information now you need to forensically examine it piece by piece in order to assess the impact of each data fragment on your programs objectives.

3. Predict Consequences

Based on the insights you derived from the previous step your next task is to take the information fragments that you consider to have the greatest impact on your programs objectives and try to extrapolate out their future consequences and states, and their future trajectories.

4. Leverage Analytics

In the stage you are encouraged to use different analytical methodologies and tools to categorise and group the data fragments that have the most relevance to your program. By starting to group and structure the information in this way you should now be starting to get a much clearer view of which ones are the most important and have the greatest impact on the objectives your program cares about.

5. Observe Shifts

When it comes to the future almost everything is in constant motion, and the same is true of the insights you've gathered. As a result, in this step, you're encouraged to look for shifts in the behaviours and trajectories of your information fragments because by identifying these early you'll be able to discuss and explore the impact of these shifts on the Futures Scenarios you'll be creating in the next stage of the program.

6. Research Uncertainties

When analysing and exploring any volume of data there are always going to be uncertainties and unknowns, all of which could have unintended consequences for your program so in this step, and using the **311 Institute**

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PREDICT Model if needed, you are encouraged to try and identify as many of these uncertainties and unknowns as possible so that you can discuss and explore their impacts on the different things you care about.

6. Explore Intersections

In this final step you are given the opportunity to let loose the proverbial Chaos Monkey and clash together different data fragments - signals, technologies, and trends - and then discuss and explore what happens, or what could happen, when they intersect. By undertaking this very important, but often over looked exercise, not only will you identify new futures and new possibilities, eliminate even more uncertainties and unknowns, but you will also make your existing findings more robust, future proof, and useful.

This **EXPLORE MODEL** is part of the **311 INSTITUTE DEEP FORESIGHT FRAMEWORK**. Use it to discover important signals, technologies, and trends.

E

EXPLORE

Discover and explore important, meaningful, and relevant SIGNALS, TECHNOLOGIES and TRENDS.

X

EXAMINE

Examine your discoveries and identify the forces driving their BEHAVIOURS, FUTURE TRAJECTORIES, and IMPACTS.

P

PREDICT CONSEQUENCES

Predict what CONSEQUENCES these signals could have on your program objectives.

L

LEVERAGE ANALYTICS

Use analytical tools to categorise and group your insights in order of IMPACT and RELEVANCE.

O

OBSERVE SHIFTS

Look for SHIFTS in the behaviours and trajectories of the signals you care about and evaluate their impacts.

R

RESEARCH UNCERTAINTIES

In tandem with the 311 Institute **PREDICT MODEL** research UNCERTAINTIES and UNKNOWNS and their impacts.

E

EXPLORE INTERSECTIONS

Explore what could happen if the different signals you identified COLLIDE or CONVERGE.

COMPLETED? Move to the **PREDICT MODEL** to discover uncertainties and unknowns, or the **IMAGINE MODEL** to generate your Futures Scenarios ...

THE EXPLORE MODEL

PART OF THE 311 INSTITUTE DEEP FORESIGHT FRAMEWORK

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THE 311 INSTITUTE PREDICT MODEL .

WELCOME TO the 311 Institute PREDICT Model. Part of our custom designed **311 Institute Deep Foresight Framework**, and an integral part of all of the 311 Institutes Strategic Foresight programs, the objective of this model is to help you identify critical uncertainties, that you can then discuss, and unknowns, that then become knowns which you can plan for.

Designed to compliment the information you gathered and explored in the **311 Institute EXPLORE Model** this model plays a key role in helping you minimise future surprises which, if not discovered, could have serious consequences on the future success of your strategic foresight program and all of its outcomes.

In this section I will walk you through the purpose of each step of the model and how to run your own PREDICT workshops.

INTRODUCING THE STEPS

1. Probe

In this initial step your mission is to seek out critical uncertainties and unknowns in the information you gathered during the 311 Institute EXPLORE Model stage. Relying on your investigative skills and using the methods and tools at your disposal dig deeper into the information you gathered, broaden your context and look beyond the obvious, and examine it all from new perspectives.

2. Recognise

Having identified uncertainties and unknowns next you need to establish and recognise the direct and indirect impacts they could potentially have on one another, on the information you've already gathered, and perhaps most importantly on your thinking - the latter of which is now hopefully more expansive than it was before and should make it easier for you to spot new ideas and possibilities.

3. Evaluate

In this step it's time to analyse and evaluate your new insights, rank them in order of impact against your programs objectives, and determine what ripple effects they could create and how those could impact the Futures Scenarios you'll be generating in the next stage of the program.

4. Decide

This step is all about deciding how you're going to address and manage your findings, whether that's finding ways to leverage them for your benefit or minimising their downsides.

5. Intersections

In this step you're given the chance to explore what happens when different uncertainties and unknowns collide and intersect with one another and discuss the threats or opportunities that might emerge as a result.

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6. Constants

Even the behaviours and trajectories of uncertainties and unknowns are heavily influenced by Anchoring Constants - the term that we at the 311 Institute give to STEEP behaviours that don't change over time. Using the **311 Institute Anchoring Constants Model** align the uncertainties and unknowns you identified with the anchoring constants that have the greatest affect on them. Then group them together, estimate their future trajectories, and rank them by order of impact on your program objectives.

7. Transform

Finally, this step is about merging all your new insights with your work you did in the **311 Institute EXPLORE Model** stage. Not only will this add a huge amount of extra value to that stage, but it will also help you minimise future surprises and generate even more robust Futures Scenarios in the next stage of the program.

This **PREDICT MODEL** is part of the **311 INSTITUTE DEEP FORESIGHT FRAMEWORK**. Use it to help you discover uncertainties and unknowns.

P

PROBE
Actively SEARCH FOR and IDENTIFY sources of UNCERTAINTIES and UNKNOWNS in the environment.

R

RECOGNISE
Recognise and categorise the identified uncertainties and unknowns according to potential IMPACT and RELEVANCE.

E

EVALUATE
Evaluate the implications of these signals on your programs objectives.

D

DECIDE
Decide how to address the uncertainties and unknowns you identified.

I

INTERSECTIONS
Explore how different signals could COLLIDE or CONVERGE in complimentary and unexpected ways.

C

CONSTANTS
Explore how these intersections align with Constants using the 311 Institute **ANCHORING CONSTANTS MODEL**.

T

TRANSFORM
Incorporate your findings into the 311 Institute **EXPLORE MODEL** and evaluate their overall impacts.

COMPLETED? Move to the **IMAGINE MODEL** to generate Futures Scenarios ...

THE PREDICT MODEL

PART OF THE 311 INSTITUTE DEEP FORESIGHT FRAMEWORK

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THE 311 INSTITUTE IMAGINE MODEL .

WELCOME TO the 311 Institute IMAGINE Model. Part of our custom designed **311 Institute Deep Foresight Framework**, and an integral part of all of the 311 Institutes Strategic Foresight programs, the objective of this model is to help you generate your strategic foresight programs Futures Scenarios.

In this section I will walk you through the purpose of each step of the model and how to run your own IMAGINE workshops.

INTRODUCING THE STEPS

1. Investigate

In this first step you will thoroughly investigate all of the different signals, technologies, and trends that you identified during the EXPLORE Stage of the program and then you'll categorise them all by their impacts, and then rank them by the level of impact they have on your programs objectives.

2. Map Scenarios

In this step you start mapping out and developing your draft Futures Scenarios. You also get the opportunity to story board them and to really start thinking about how you would explain them to others and what it might be like to experience them.

3. Assess Opportunities and Risks

In this step the draft scenarios are scrutinised to assess their potential opportunities and risks. An important step this helps ensure you minimise any future surprises and, if necessary, have a way to manage the downsides of any risks that might manifest themselves in the future. Once you've completed your assessment you should then rank your scenarios according to the level of opportunity and risk they present.

4. Generate Scenarios

In this step you take everything you have created so far and generate your final Futures Scenarios.

5. Investigate Emerging Signals

Now that you have generated your final futures scenarios it's important to do due diligence on them to ensure that no emerging signals which could have an impact on them later on have been missed. This step is crucial to minimise future surprises and to capture any last minute signals, technologies, or trends that could have over looked.

6. Navigate Uncertainties

Having created your final scenarios this step is optional, but none the less we strongly advise you use **311 Institute PREDICT Model** to conduct one final check of your scenarios to try and identify any uncertainties and unknowns which, again, like the step above will help you minimise future surprises.

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7. Evaluate Impacts

In this, the final step of this stage you conduct a quick evaluation of the direct and indirect impacts that each of the scenarios you've generated could have on your programs objectives. This will then lay the foundations for the enxt stage, the ASSESS Stage, where you'll be doing a more thorough analysis of them all before selecting the final few to take through to the ACT Stage.

This **IMAGINE MODEL** is part of the **311 INSTITUTE DEEP FORESIGHT FRAMEWORK**. Use it to help you generate your Futures Scenarios.

I

INVESTIGATE

Investigate the signals you identified and categorise them by IMPACT and PRIORITY against your objectives.

M

MAP SCENARIOS

Start mapping out your Futures Scenarios.

A

ASSESS OPPORTUNITIES AND RISKS

Assess your draft scenarios OPPORTUNITIES and RISKS, in line with your program objectives, and rank by IMPACT.

G

GENERATE SCENARIOS

Generate your final Futures Scenarios by bringing everything you have discovered together.

I

INVESTIGATE EMERGING SIGNALS

Do a final sweep of your Futures Scenarios to try and identify any EMERGING SIGNALS you may have missed.

N

NAVIGATE UNCERTAINTIES

If desired use the 311 Institute **PREDICT MODEL** to SCAN your Futures Scenarios for uncertainties and unknowns.

E

EVALUATE IMPACTS

Evaluate the DIRECT and INDIRECT impacts of your final scenarios on your programs objectives.

COMPLETED? Move to the **ASSESS MODEL** to help you assess and analyse the Futures Scenarios you just generated ...

THE IMAGINE MODEL

PART OF THE 311 INSTITUTE DEEP FORESIGHT FRAMEWORK

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THE 311 INSTITUTE ASSESS MODEL .

WELCOME TO the 311 Institute ASSESS Model. Part of our custom designed **311 Institute Deep Foresight Framework**, and an integral part of all of the 311 Institutes Strategic Foresight programs, the objective of this model is to help you assess the credibility and viability of the Futures Scenarios you generated in the previous IMAGINE Stage before proceeding to select the final scenario - or scenarios - that you want to translate into actionable initiatives in the final stage of the program, the ACT Stage.

In this section I will walk you through the purpose of each step of the model and how to run your own ASSESS workshops.

INTRODUCING THE STEPS

1. Align With Objectives

This first step is about doing due diligence to assess whether or not each of the Futures Scenarios you generated in the previous stage align with your programs overall objectives and your organisations strategic direction. A crucial step this step ensures that you understand how well, or not as the case may be, your scenarios align with your with your desired outcomes, your key objectives, and your priorities, and ensures that your scenarios are relevant and can contribute meaningfully to your organisations future.

2. Scrutinise Assumptions

In this step you critically examine the underlying assumptions of each of your scenarios - assumptions which if not found and examined could influence their future behaviours, trajectories, and success for better or worse. An important activity this is where you get the opportunity to hunt for subconscious bias, among other things, and assess your scenarios overall credibility and viability to make sure they are built on realistic and solid foundations.

3. Synthesise Insights

In this step the aim is to synthesise the insights from the analysis you've done so far and identify common patterns, themes, and trends. These insights are invaluable as they'll help shape your future strategic decision making and guide many of your future actions.

4. Evaluate Impact

Having completed a significant amount of analysis already it's now time to evaluate the impact that each of your scenarios could have on the different parts of your organisation and its activities including, but not limited to, brand reputation, finance, marketing, operations, product development, sales, stakeholders, and more. A key step this will help you assess the likelihood and magnitude of different outcomes associated with each scenario, and will help you to start prioritising them based on their potential positive impact to the business.

5. Stakeholder Engagement

Open and honest engagement with key

Notes:

stakeholders is crucial for the proper analysis and dissection of your scenarios. This step involves engaging a diverse range of stakeholders from inside and outside of your organisation to get the necessary feedback from a diverse range of opinions and perspectives. Not only can this feedback be used to help you improve the relevance of your scenarios to your organisation, but it can also be crucial in helping you secure the right stakeholder buy in and support as you move to the next stage of the program, the ACT Stage, where you will finally translate your chosen scenarios into actionable initiatives.

6. Sensitivity Analysis

This final step involves conducting a sensitivity analysis to test the resilience of each scenario to different critical uncertainties or variables that could influence their outcomes. It helps identify which parts of a scenario are most susceptible to change and which are more robust, and gives you a better understanding of the scenarios ultimate survivability and viability.

THE ASSESS MODEL

PART OF THE 311 INSTITUTE DEEP FORESIGHT FRAMEWORK

This **ASSESS MODEL** is part of the **311 INSTITUTE DEEP FORESIGHT FRAMEWORK**. Use it to help you assess and analyse your Futures Scenarios.

A

ALIGN WITH OBJECTIVES

Ensure that each Futures Scenario you generated aligns with your program objectives.

S

SCRUTINISE ASSUMPTIONS

Scrutinise the underlying assumptions of each scenario to assess their CREDIBILITY and VIABILITY.

S

SYNTHESISE INSIGHTS

Identify COMMON THEMES in your Futures Scenarios and explore how they affect future decision making and actions.

E

EVALUATE IMPACT

Evaluate the IMPACT of each Futures Scenario on all aspects of the organisation and rank them by positive impact.

S

STAKEHOLDER ENGAGEMENT

Solicit FEEDBACK and insights from key stakeholders from inside and outside of your organisation.

S

SENSITIVITY ANALYSIS

TEST your scenarios resilience to different critical uncertainties, shocks, or variables that could influence their outcomes.

COMPLETED? Move to the **ACT MODEL** to help you turn your insights and Futures Scenarios into actionable initiatives and strategies ...

Notes:

THE 311 INSTITUTE ACT MODEL .

WELCOME TO the 311 Institute ACT Model. Part of our custom designed **311 Institute Deep Foresight Framework**, and an integral part of all of the 311 Institutes Strategic Foresight programs, the objective of this model is to help you finally translate the Futures Scenarios that you generated in the IMAGINE Stage of the program into actionable initiatives that can, depending on your programs goals, be anything from the creation of a new company strategy or vision to the creation of new products or programs, and anything else you desire.

In this section I will walk you through the purpose of each step of the model and how to run your own ACT workshops.

INTRODUCING THE STEPS

1.Align Vision and Objectives

This first step is about ensuring that there is a strong alignment between the Future Scenarios that you generated and the overarching objectives of your strategic foresight program. It's critical that the vision for the future is consistent with the goals and objectives that have been set out.

2. Collaborative Workshops

In this step everyone who has a vested interest in the program and all the relevant key stakeholders must take part in one or more collaborative workshops with the exclusive goal of transforming the insights gained from the foresight program into actionable strategies. These workshops are designed to be hands on sessions where stakeholders can engage with the material and each other to craft practical steps forward.

3. Translate Into Action Plans

In this, the ultimate final step of your entire strategic foresight program, you get to translate the outputs from the previous steps into concrete action plans that have the appropriate levels of funding and support, clearly defined goals, measurement metrics, and milestones, and suitable senior level ownership.

This **ACT MODEL** is part of the **311 INSTITUTE DEEP FORESIGHT FRAMEWORK**. Use it to create actionable initiatives and strategies.

A

ALIGN VISION AND OBJECTIVES

Ensure alignment between your final Futures Scenario(s) and your foresight programs objectives.

C

COLLABORATIVE WORKSHOPS

Facilitate collaborative key stakeholder workshops to create actionable initiatives from the foresight programs insights.

T

TRANSLATE INTO ACTION PLANS

Translate your strategies into actionable, measurable, and well resourced initiatives with clear timelines and ownership.

CONGRATULATIONS! You've completed the program!

THE ACT MODEL

PART OF THE 311 INSTITUTE DEEP FORESIGHT FRAMEWORK


CHOOSE YOUR FORESIGHT JOURNEY



PERHAPS THE main reasons you're reading this codex, and perhaps some of the others in our **Codex of the Future Series**, is because you're curious about the future and want to understand how different emerging concepts, ideas, signals, technologies, and trends could impact the future of your country, industry, or organisation. Or all of them.

If that's the case then you'll no doubt quickly realise two things: firstly, there's a huge amount of information to explore spanning thousands of different topic areas, and secondly trying to explore the literally infinite number of ways they can all interact with one another, directly and indirectly, to create and shape what we refer to as "the Future" can be daunting.

Ultimately, the upshot of this is that if you want to be able to explore all this and turn your discoveries and insights into actionable initiatives which help you prepare for these Plausible, Possible, Preferred, Probable, or Preposterous futures then you need Strategic Foresight.

And this is where we come in, not with one or two strategic foresight programs, but three.

OUR THREE FORESIGHT PROGRAMS

Why three you might ask, and the answer is simple. Like the rest of us you likely only have a certain amount of resources and time that you can dedicate to a program, a certain number of people, and it's also likely that everyone participating will have different abilities, backgrounds, objectives, and strengths.

Some of you, for example, might want to run a quick, discrete strategic foresight session with just a few people during a break, some might want to run a fully fledged program that shapes the future of the organisation, and some might want to build companies that disrupt and dominate new and existing markets.

This is why, as your companion and guide through your journey into the future I developed three programs that anyone, irrespective of their ability, background, or circumstances can use.

They are the 311 Institute Deep Foresight **Horizon LITE**, **PRO**, and **ELITE** programs, and as the names imply they go from light touch and lightning fast to being fully comprehensive and requiring enduring commitment.

Horizon LITE

This is my lightest and fastest strategic

Notes:

foresight program. It's a **one hour workshop** that anyone can run with minimal facilitation, preparation time, and resources, with just a few participants. It was specifically developed for those of you who are incredibly time poor, and for executives and organisers who might want to run a foresight workshop during lunch, at a company event, or any other time.

Horizon PRO

The 311 Institute's dedicated Strategic Foresight Program meanwhile is a **multi-week program** that you can run yourselves in the comfort of your own offices and with your own teams at your own pace. As one of the worlds few end to end strategic foresight programs it has been specifically developed to take you from a blank page to a fully actionable company strategy or set of actionable initiatives - whichever you prefer.

In it I provide you with everything you need including the resources, tools, and even the mindset and skills, to run your own strategic foresight program, as well as giving you the opportunity to run your own discrete individual Framing, Research, Scenario, and Futures Design workshops if you so wish.

Horizon ELITE

Last, but certainly not least, is our Horizon Elite program, a literal first of a kind program that is so comprehensive it has its own separate codex, the **How to Build Exponential Enterprises Codex**.

Unlike the Horizon Pro program this program takes you from a blank sheet of paper to a fully launched and scaled disruptive "Exponential Enterprise" that has everything it needs to dominate new and existing market opportunities.

Based on our conversations with some of the world's largest companies, including Shell whose teams literally invented scenario planning back in the 1970's, it was specifically designed to help companies, of all sizes, in their own terminology "Cross the Chasm" and help them envision the companies and markets of tomorrow and then give them everything then needed to transition from where they are today, their current operating model, to where they want to be tomorrow, their future operating model. Hence the crossing the chasm analogy.

Called the 311 Institute **ExPLORER Program** this is a **six month program** that is considered by many Fortune

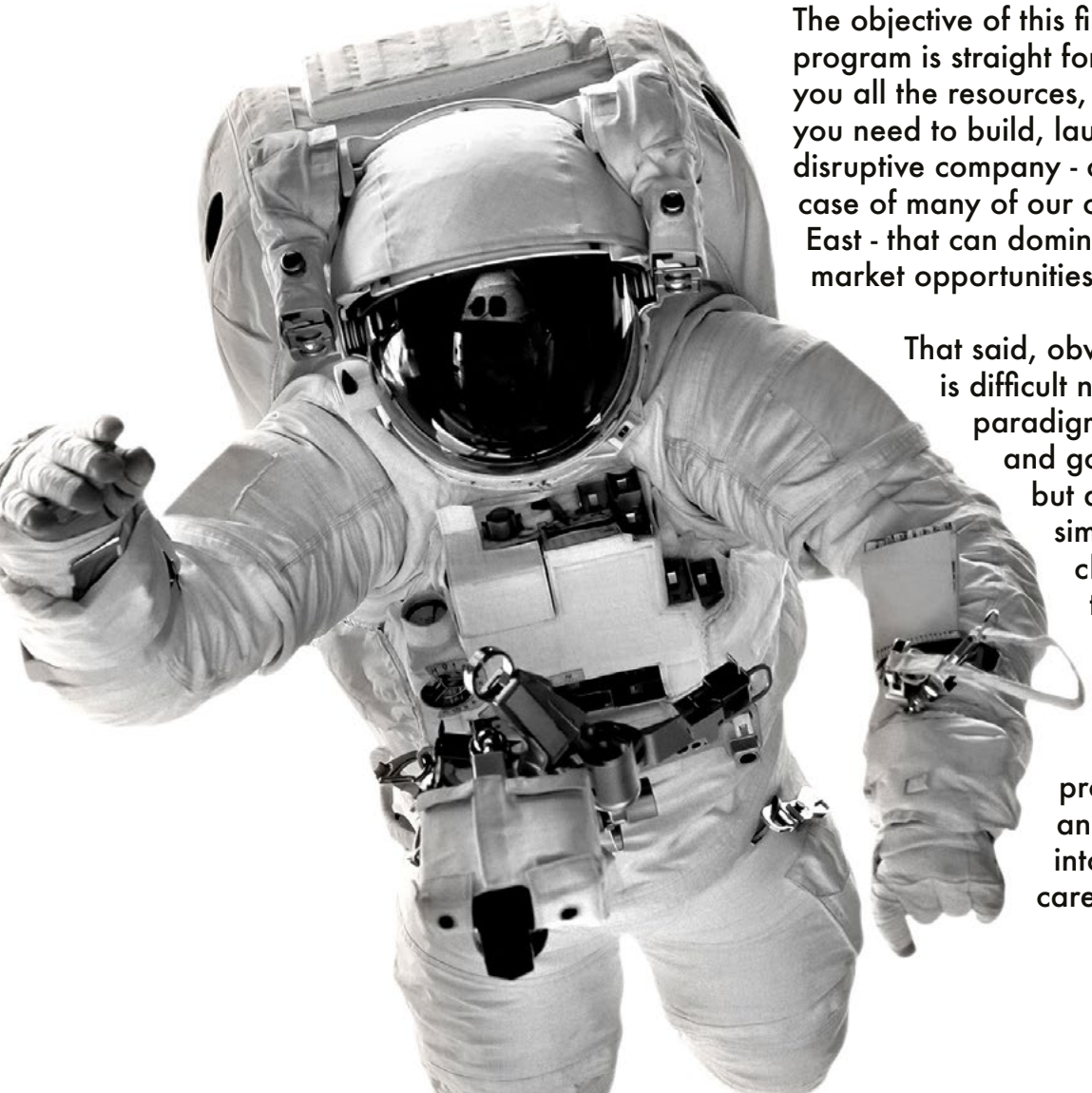
Notes:

100 companies as the Gold Standard of disruptive innovation and strategic foresight programs, with many of our clients using it to try to develop what they call “Centennial Companies” - companies who survive and thrive long enough to see in their first century of business - and the even, in the case of the UAE and other governments, develop the countries of the future.

311 INSTITUTE

HORIZON ELITE

START WITH A BLANK PAGE
BUILD A DISRUPTIVE COMPANY
LAUNCH AND SCALE IT



AS PREVIOUSLY explained this program is so comprehensive we gave it its own book - the **How to Build Exponential Enterprises Codex** which you can download for free from our website or by using the QR code in the index at the start of this Codex.

The objective of this first of a kind program is straight forwards - to give you all the resources, tools, and mindset you need to build, launch, and scale a disruptive company - or country as in the case of many of our clients in the Middle East - that can dominate new or existing market opportunities from scratch.

That said, obviously, doing this is difficult not only requiring a paradigm shift in corporate and government culture, but also requiring simultaneous changes to the way that leadership teams evaluate opportunity and risk, and how they build capability, products, and visions, and then launch them into the markets they care about.

Born out of conversations with the leaders of some of the worlds largest companies on the one hand this program is for entrepreneurs and intrapreneurs who have nothing more than a blank piece of paper in front of them, and on the other hand it's for executives who in their own terminology talk about the problem of "Crossing the Chasm," or in other words those executives who don't have a clear picture of how their future companies would operate in what markets and what products they would sell in the future, whether that's the near, medium, or long term future.

As more executives worry about the future and their company's ability to survive and thrive in it, with PWC's latest Annual Global CEO Survey finding that 45% of 4,702 respondents across 105 countries don't believe their companies will be viable in a decade without reinvention, today you can see that today it's more vital than ever that people have access to the experts and tools they need to re-imagine and reinvent their companies. And this is precisely what the 311 Institute **ExPLORER Program**, a seven step program that puts everything you need right at your fingertips, becomes invaluable.

The seven stages are as follows:

Notes:

The **ExPLORE** and **PREPARE** stages are all about establishing the right culture and mindset within your organisation, securing sponsorship and resources, recruiting the Core Team who will lead your program, and recruiting the PATHFINDER and PIONEER TEAMS who will assume the central role during the program's **LAUNCH** phase, with the Pathfinder Team helping to create disruptive innovations that align with Horizon 3 thinking, and the Pioneer Team finding new ways to extend the competitiveness of your company's existing products in line with Horizon 1 and 2 thinking.

The LAUNCH phase is then all about discovering new disruptive ideas, technologies, and trends and developing new product and product concepts that will help your organisation dominate existing markets while at the same time opening up new market opportunities.

The last four stages which are **ORGANISE**, **REVIEW**, **EXECUTE**, and **REPEAT** then give you everything you need to develop your new go to market strategies, raise capital and create new company vehicle structures if desired, and sell and promote these new products into the market. And then, of course, starting all over and repeating everything again.

311 INSTITUTE

HORIZON LITE

RUN A 60 MINUTE FORESIGHT SPRINT



LET'S FACE it in today's fast paced unforgiving world we can all play the "I'm too busy" card - even too busy to run a strategic foresight program that could save the company from future bankruptcy and ruin. Burn.

Alright, I know you get the point otherwise you wouldn't be reading this codex, and I'm just playing with you there. But, on a more serious note, if you only have an hour or so to spare in your hectic day, week, or month then I still don't think you should have to miss out on running your own strategic foresight program, so that's why I've developed this special one hour sprint that you and your colleagues can do in your lunch time - assuming your busy schedule allows you a lunch time that is.

To keep things simple this sprint focuses solely on exploring alternative futures and ideating new products so you can realise the benefits of those futures and or minimise their downsides in a very fast way. And, while it's true that it's impossible to boil the ocean as they say in an hour these fast sprints are purely designed to let anyone, with minimal commitment, resources, and skills, generate impressive results that inform your future thinking and help you generate new product ideas that have future potential and market impact.

So get going.

1 10 MINS

WELCOME & INTRODUCTION

Clearly outline the workshops objectives and time horizon, the topics you're interested in and the their importance, then give participants a brief introduction to Foresight and Horizon thinking.

2 15 MINS

IMAGINEERING . THINK WHAT THE FUTURE COULD LOOK LIKE .

Participants contemplate and discuss the impact the future could have on the chosen topics. They can be given help and access to research materials and can use the **Solution Board Worksheet** as an companion aide. Once discussions are concluded their output - the opportunities or problems - should be entered onto the **H123 Assumptions Worksheet**.

3 15 MINS

SOLUTIONEERING . IDEATE INITIATIVES AND SOLUTIONS .

Participants now have the opportunity to think about what new initiatives or solutions the organisation could create to address these opportunities or problems. Use Reverse Brainstorming if they get stuck. When complete both the problem and the accompanying initiative or solution should be summarised and entered onto the **Idea Feasibility Map Worksheet**.

4 10 MINS

VOTING TIME . VOTE ON THE TOP INITIATIVES AND SOLUTIONS .

Ask the participants to quickly debate and vote on the initiatives or solutions they would like to see being taken forwards and actioned by the organisation.

5 10 MINS

SUMMARY & NEXT STEPS

Summarise and close.

311 INSTITUTE

STRATEGIC FORESIGHT SPRINT AGENDA

H123 ASSUMPTIONS

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : FORESIGHT SPRINT WORKSHOP

Use this sheet to map out the key assumptions you have made for the time horizons you care about, place each assumption in the appropriate Horizon, these being Horizon 1 for near term, Horizon 2 for medium term, and Horizon 3 for longer term assumptions.

	HORIZON 1	HORIZON 2	HORIZON 3
IMPACT +			
IMPACT -			

WHAT WE CARE ABOUT :

Click or scan to download this resource and other innovation resources.

IDEA FEASIBILITY MAP

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : FORESIGHT SPRINT WORKSHOP

Use this sheet to map out your ideas by how easy or hard they are to do where this includes everything from developing to implementing and marketing the ideas.

IMPACT	HARDER	FEASIBILITY	EASIER
+			
-			

Click or scan to download this resource and other innovation resources.

SOLUTION BOARD

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : FORESIGHT SPRINT WORKSHOP

Use this sheet to explore the assumptions you've made about the future, the problems those assumptions create for your customers, and how you would solve those problems for the customer groups you've identified.

TEAM NAME AND NOTES:

1 ASSUMPTIONS
The assumptions you are making about the future as it relates to your chosen topic.

2 PROMPT
Any facilitator prompts or suggestions.

SO WHAT ?

What problem or problems do these assumptions create for your customers, and why would they really care?

THE STAKEHOLDERS

Who are the real stakeholders with these problems? Describe them.

THE SOLUTIONS

Ideate solutions to these problems.

Click or scan to download this resource and other innovation resources.

" PATIENCE AND FORESIGHT ARE THE TWO MOST IMPORTANT QUALITIES IN BUSINESS . "

- Henry Ford , Founder , Ford Motor Company

311 INSTITUTE

HORIZON PRO

START WITH A BLANK PAGE
RUN A FORESIGHT PROGRAM
CREATE YOUR NEW STRATEGY



THE SOLE purpose of the Horizon Pro program is to give you everything you need - all the resources, tools, and mindset - to take you from a blank piece of paper to a fully developed actionable company strategy that you can execute - with this latter component setting this program apart from all its peers.

As always, our objective at the 311 Institute is to provide you with everything you need to help you become future fit, future ready, and dare we say future proof. Okay, maybe not future proof but in our heads that's our ultimate objective. The result of which means you now have access to an easy four stage strategic foresight program that you can run in its entirety, or just cherry pick the parts of it that you're most interested in.

The four stages are as follows:

1. FUTURE FRAMING

The first and arguably most crucial stage is the ability to clearly frame and articulate your programs objectives and scope and the kinds of detailed or broad brush Horizon 1, 2, or 3 futures you want to explore during it.

2. FUTURES RESEARCH

The next stage in your quest to envision and explore the Plausible, Possible, Preferable, Preposterous, and Probable short, medium, and deep futures, is to gather lots of relevant qualitative and quantitative research - which can include any kind of information from any source - that you can analyse and use to develop your futures scenarios with.

3. FUTURE SCENARIOS

Next, the development of different future scenarios and the ability of different stakeholders to empathise, explore, and experience them and their many intricate implications is another crucial part of the program whose importance must not be underestimated.

4. FUTURE STRATEGY

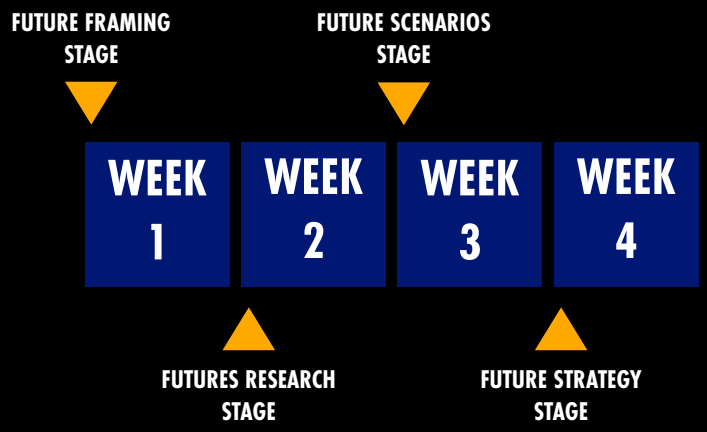
Then last, but not least, in the future strategy stage of your program your mission is to select a small number of preferable scenarios from the previous stage, assess and filter them, and translate the winning scenario into an actionable company strategy that you can execute.

HORIZON PRO PROGRAM TIMINGS

During the course of this program you will learn how to frame and create futures scenarios that align with your organisations core mission and future objectives then translate them into actionable organisational strategies and visions.

SCHEDULE

You have FOUR WEEKS to complete this program. However, if you need more time or less then that's your call.



PROGRAM PREP



Notes:

WHETHER YOU'RE running the entire 311 Institute Strategic Foresight Program or just a few discrete workshops that focus on one or more of the four stages - Future Framing, Futures Research, Future Scenarios, or Future Strategy - you'll need to be prepared, so in this section I'll be giving you everything you need to prepare and run anything or everything that you want.

GET READY

You'll find that preparing and running your workshops is an involving process that requires a deep understanding of both the theoretical underpinnings of futures studies and the practical considerations of workshop facilitation, so here I've synthesised a brief overview of what I consider to be the key topics you'll need to be aware of to help you through the process.

1. Understand Futures Foresight

Before diving into the practicalities of running your own workshops it's crucial that you have a firm grasp of the principles of Futures Studies. This discipline is not about predicting the future, but about exploring multiple future scenarios and understanding the dynamics that might lead to them.

2. Define Clear Objectives

As with anything you set out to do you're always going to achieve more and be more likely to succeed if your program and workshops have clear objectives - this is just one reason why the first stage, Future Framing, is so important.

These objectives can be anything you like, and once formed they will guide and influence every aspect of your program, from participant selection and the location you run out of, to the methods and tools you use, and everything in between.

3. Select the Right Participants

Programs thrive when the participants are a diverse group of individuals comprised of divergent - rather than convergent - thinkers that are fully engaged with the process. This is why the most successful programs and workshops always include people with a broad range of backgrounds and experiences. Therefore, keeping this at the fore front of your mind, be sure to recruit participants from different backgrounds and industries as well as with different

Notes:

experiences and seniorities.

4. Choose your Methods and Tools

There are many methods and tools that you can use in your workshops and each of our program stages include details of the ones we use and recommend as well as any additional resources we think you'll find helpful.

That said though ultimately the ones you choose will depend on your objectives, your participants, and what you're comfortable with, so if you aren't a fan of our recommendations then just go ahead and substitute them.

5. Design an Engaging Agenda

To get the best from the program it's important that you have a good agenda with a good flow that can keep the energy and momentum of the program going from start to end, so be sure to craft an agenda that builds gradually, builds bonds between participants, and that builds a common understanding of futures thinking, as well as one that appropriately balances discussions, interactive activities, participatory exercises, and other tasks with the experience and expertise of your participants and your objectives.

6. Facilitate Effectively

The facilitators role is to guide the discussions during the workshops without dominating them. We recommend that your facilitator or facilitators, depending on the size of your program, should be knowledgeable of the process, be proactive and well respected, understand that they are in control of the sessions and are responsible for their smooth running, and that they should be capable of managing divergent viewpoints constructively while keeping all of the participants engaged and focused.

7. Incorporate Real World Context

Throughout your program it's important that your scenarios and discussions are grounded in a real world context. Not only will this make the exercises more actionable and relatable for the participants, but it will also help ensure that technological advancements, trends, and other factors are incorporated into your scenarios.

8. Document and Follow Up

Notes:

As with any activity it's important that you maintain good documentation through and that you meticulously document the outcomes of your workshops. This includes documenting all key insights and outputs, the range of scenarios developed and resulting potential strategies, as well as all manner of other information - all of which should then be shared with the participants and relevant stakeholders. Additionally, you should also plan for follow up sessions to revisit the scenarios and refine strategies as needed.

9. Continuously Learn and Adapt

Finally, the field of futures studies is continually evolving, and nothing stays still so you should do your best to stay abreast of new case studies, methods, and theories. You should also reflect on each workshop and seek feedback to continuously improve your approach.

SUMMARY

Running a successful futures foresight program demands a blend of continuous learning, practical skills, and theoretical knowledge, all of which we provide at the 311 Institute. By following these guidelines and staying open to new ideas and perspectives you should now be able to facilitate workshops that not only explore possible futures but also inspires innovative thinking and strategic planning within your organisation.

FUTURE FRAMING



Notes:

BEFORE YOU even think about beginning your foresight program you first have to clearly define and communicate your objectives and scope, and your conduct and performance during this stage can determine the success or failure of your entire program.

While there are many methods you can use to frame your program in my opinion this one I'll walk you through is the simplest and yields the best results for organisations who want to create compelling futures scenarios that can be converted into real world actionable strategies and visions.

Framing, which includes both the creation of a single clear "Mission Sentence" that will become your program's North Star, as well as planning the details of how you're going to run your program is made up of three distinct components: **Domain Description**, **Assessment**, and **Logistics**, and I'll get to those soon.

CRAFTING A MISSION SENTENCE

Your first objective during this stage is to craft your all important mission sentence which involves conducting as many interviews as possible with all manner of different stakeholders - both within and external to your organisation - with the aim of gathering together all the information described in the following domain description section.

While your final sentence can arguably have any structure and contain all manner of "things of interest" such as activities, behaviours, industries, target groups, time horizons, topics, and many others I'd strongly encourage you to be wary of crafting sentences that are too broad or too detailed since both these could impact your teams ability to discover meaningful insights and affect the overall value of your program.

Some Examples

While there are no limits on the final sentence you construct there are obviously good examples and bad ones so here are two good ones to get you off to a flying start.

The first way is to craft a straight forwards "Future of [Something] in [Year]" sentence that you can explore with an example of being "The future of Mobility in 2040" which, unsurprisingly, means that the futures scenarios you create in the next stage will explore the future of mobility in the year 2040.
The second way is to structure your sentence as a question such as "How

SOME EXAMPLES .

"OUR FUTURES SCENARIOS WILL EXPLORE THE ...

... FUTURE OF ENERGY IN 2040."

... FUTURE OF ENERGY BUYING IN 2040."

... FUTURE OF ENERGY BUYING IN JAPAN IN 2040."

... IMPACT OF RENEWABLES ON OUR ENERGY PORTFOLIO IN 2040."

... AND MANY MORE."

SO MANY EXAMPLES . SO MANY POSSIBILITIES .

Notes:

will [Target Community] [Do Something] in [Year] and how will that affect [Something]?" with a simple example being "How will families buy electricity in 2040 and how will that affect our future product development?"

As you can see when it comes to crafting your own sentence it's not particularly hard to do, but that said it's absolutely crucial that you fully understand your organisations objectives, misunderstand them or get them wrong and your entire program will be focusing on the wrong goal and end up failing to deliver the expected value.

It's also important to note that the sentence you craft invites open ended responses rather than Yes No ones which help to reinforce your programs objectives - namely to create futures scenarios and not predictions.

Finally, the sentence type you choose should be dictated by your organisations operational concerns and objectives, which is something you can determine as you conduct your pre-program interviews.

DOMAIN DESCRIPTION

Now I've walked you through the basics of a good mission sentence it's time to gather together all the information you'll need to create it, and this is where the domain description component comes into play.

The first component of framing, domain description, involves deciding what kind of future scenarios you want to create and focus on so, unsurprisingly, it forms the bulk of this stage.

It has four steps: Focal Issue, Geographies, Time Horizon, and Stakeholders, and working through each of these steps will help you zero in on the things that matter most to your organisation so you can craft that perfect sentence.

Focal Issue

This step describes the central issue - the focal issue - that your organisation wants to explore, and determining this will arguably be your greatest challenge as all the stakeholders you interview during this step will likely all have their own politically skewed objectives and competing agendas. It is important, therefore, that you have a plan, remain unbiased, and that your program is led and supported by people who are able to see the big picture and render

Notes:

all these agendas and objectives into a format you can use.

Geographies

In this step you constrain your programs geographical boundaries because, let's face it, when it comes to researching your focal issue there will be some countries or territories you'll be interested in and some it won't, so it's important that your team knows what these boundaries are.

For instance, on the one hand futures scenarios with the focal issue "The future of Mobility in 2040" might well prefer to take a global viewpoint, while on the other scenarios such as "How will [People] in [Territory] buy [Products] in [Year]?" could take more of a local viewpoint.

Needless to say adding these geographic constraints into your mission sentence will have a significant impact on your entire program and its outcomes.

Time Horizon

In this step you must decide how many years into the future the scenarios your teams create are going to cover. For most organisations the bare minimum is five years, below which a forecasting rather than foresight approach would probably be best, but needless to say futures scenarios can go as far into the future as you like and, for example, we have plenty of clients who want to be able to celebrate their hundredth year in business so look ahead fifty years or more.

When thinking about what your ideal time horizon is it's also advisable to consider the impact that various Social, Technological, Economic, Environmental, and Political (STEEP) trends, as well as others such as industry and market specific ones, could have on your focal issue and align with them appropriately.

These trends can literally include anything and everything but ones such as the rate of technological change as well as the social and political trends at play within your geographies and markets of interest should always be at the forefront of your mind.

For example,I when it comes to technological change it should be fairly easy for you to figure out which technologies you should be paying attention to by looking at your focal issue and determining which technologies are embedded into it. Then, the faster the rate of change of such technologies,

Notes:

as I've discussed elsewhere many times before, the shorter your time horizon should be.

For instance, scenarios with a focal issue that includes "DeepFakes" or even more broadly "Entertainment" could have a relatively short time horizon, while scenarios with a focal issue that includes "Climate Change" could have a much longer one. Fundamentally this difference is because of the different rates of technological change embedded within those focal issues and the ones you care about.

Meanwhile, when it comes to political and social trends you might more closely align your time horizon with election cycles or important social issues of the time.

As you should be able to tell from just these few examples selecting the right time horizon for your program can be trickier than you might at first think, but nonetheless it's important everyone agrees on it and makes an informed choice.

Stakeholders

This final step refers to all the different stakeholders of interest to you - both external and internal to the organisation - who can add value to your program and who could be directly or indirectly impacted by your focal issue and your futures scenarios.

Stakeholders can literally include anyone who you think will be relevant including but not limited to advisors, customers, executives, experts, partners, and even competitors, as well as advocacy groups, communities of interest, policy makers, and many others.

If there's a key take away here then it's leave no stone unturned, and making sure you include and interview everyone you need to, while maintaining cultural and political neutrality, will be crucial when it comes to helping you craft and explore your future scenarios and their impact on each of the different stakeholder communities you care about.

ASSESSMENT

Now you have completed the first component assessment involves deciding the purpose of your futures scenarios. For instance, what are they going to be used for.

Unlike domain description which focuses simply on your organisations objectives

Notes:

for the program this component focuses more on the desired overall outcomes for your program and how they will all be measured. It has two steps: Expected Outcomes and Measurement.

Expected Outcomes

These are your organisations desired outcomes for the program, and they can be tangible and non-tangible.

They can also have an impact at the organisational level, for example to influence future investments and inform innovation, recruiting, and training initiatives, as well as at the individual level, such as building awareness, creativity, and engagement.

Once you've chosen the outcomes that matter to you and that you want to realise then you'll then need a way to measure them.

Measurement

This step refers to all the different methods and tools you have at your disposal to assess at the end of the program whether or not it's achieved your expected outcomes. While this step can include simple activities such as conducting interviews and surveys it can also include more advanced methods such as Case Study Analysis, Grounded Theory Analysis, Regression Analysis, and many other methods. Ultimately, the method you choose will be based on your own organisations goals and objectives and the level of resources you have at your disposal.

LOGISTICS

Finally, the third and last component of this stage, logistics, involves planning all of the technical particulars of the program itself, and needless to say there's a lot to think about and do during this component to make sure you have everything and everyone you need to give the program the best chance of success.

From selecting your program's Scenario Team, facilitators, and other necessary stakeholders, to determining the duration of the program and the right location and facilities, as well as ensuring you have all the resources and support you need there's a whole host of things you need to be on top of.

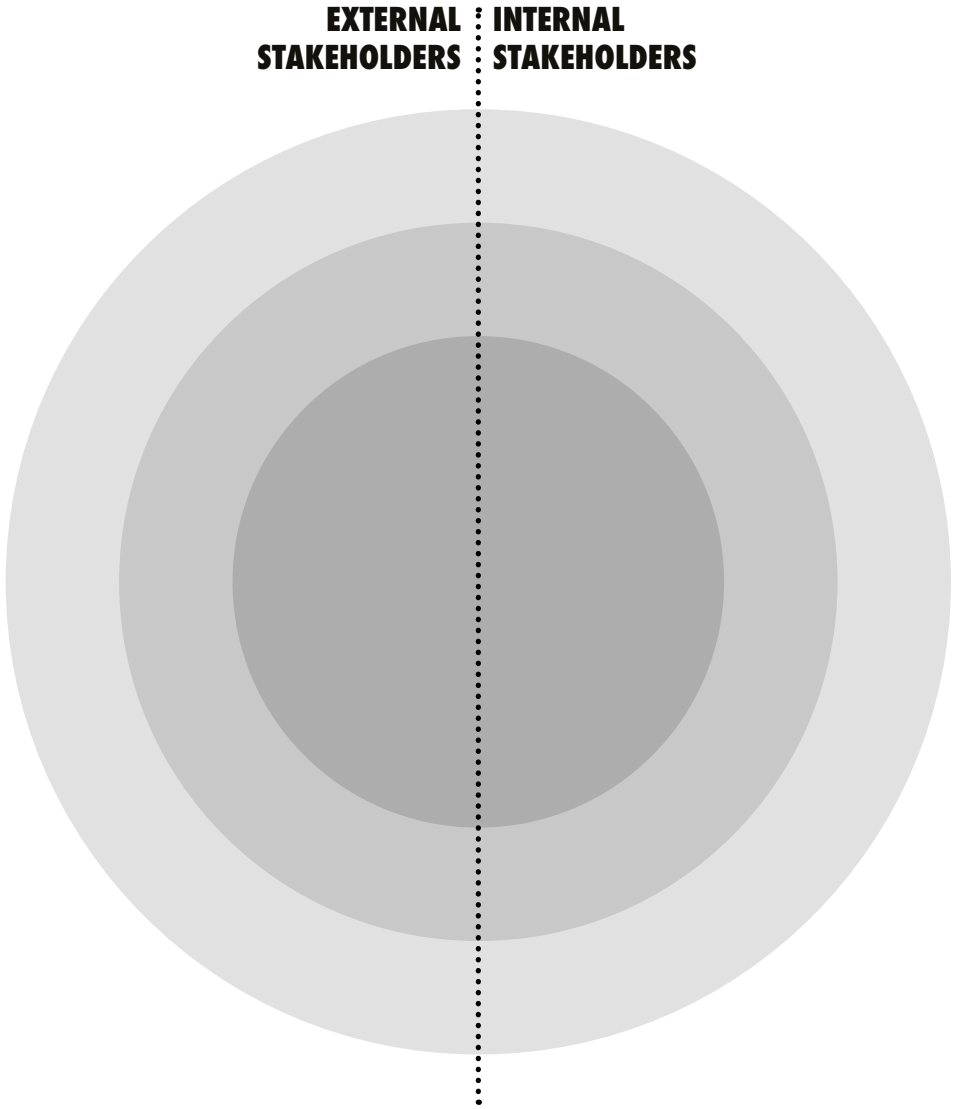
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STAKEHOLDER MAP

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : FRAMING STAGE

Use this sheet to map out the external and internal stakeholders who are most relevant to your program and its objectives. Place the more relevant ones nearer to the center of the circle and the less relevant ones towards the edges, and remember to include senior stakeholders.

TEAM NAME AND NOTES:



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" THE FUTURE ISN'T WHAT IT USED TO BE . "

FUTURES RESEARCH



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WHEN IT comes to trying to craft futures scenarios or decode, envision, and predict the future the "'What' [happens next?]" is equally as important as the "How?" and "When?" it, whatever it is, happens.

However, in order to answer these and other pertinent questions, and to find what we call the "Driving Forces" of change that will shape the future, you'll need to be disciplined about how you conduct your futures research, and focus on its breadth, depth, and quality.

BEWARE THE FUTURE PARADOX

Ironically, when it comes to forecasting the future one of the odd things you'll need to get your head around is that there's a paradox to contend with that if left unmentioned could lead to teams being over confident in the accuracy of their predictions and have unintended consequences down the line.

On the one hand we are often regularly told even by many Futurists - just explore YouTube or your favourite information source - that you can't predict the future. But, on the other all of us know with certainty that in the future Artificial Intelligence (AI) will be more capable and powerful, battery and computer storage densities will be greater, cameras and imaging systems will be higher resolution, computers and networks will be faster, and that cars will be autonomous and electric - just for example.

Which then leads us to wonder how is it that almost anyone - even Joe public off the street - can know any of these things with any kind of certainty? And the answer is simple. It's because we can all see these things happening with our own eyes, and analyse, assess, and extrapolate out thousands of complimentary data points and indicators.

For example, in the case of Electric Vehicles (EV) we can - dare I say - be certain that future vehicles will be battery based - vehicles that people refer to as Battery Electric Vehicles or "BEV" for short.

The reason for this is because we can see them in the showrooms and on our roads, we can see sticker prices falling and numbers and ranges increasing, we can see more investments being made and more infrastructure being built, and we can read about the new government policies which ban the sale of internal combustion engines from 2035 onwards. Gather together these and lots of

Notes:

other relatively easily observable data points and it doesn't take a highly paid professional foresight team to figure out that the future of vehicles, and ergo mobility and transportation in general, will be electric and battery based.

Making a "prediction" like this is only possible because in some cases we have enough experience, expertise, and insights, to let us see beyond the horizon with almost abject unabated confidence. Yet, even though at times it seems like we can be absolutely certain with our predictions there are always "Wild Cards" that can creep in and change things.

I call this the future paradox, and sometimes these wild cards might mean we have to modify our predictions mid flight, and in others they can quickly render what seem even our most confident predictions obsolete.

In the case of BEV's for example these wild cards can include the sudden reversal of government policies and favourable tax incentives - as we saw happen with the Trump administration in the early 20's. Then there's also the potential emergence of new breakthrough innovations and technologies, such as the ability to distribute Hydrogen through the existing gas networks, and the development of fuel cells - the combination of which could suddenly make Hydrogen Fuel Cell Electric Vehicles (FCEV) an increasingly viable alternative, and many other examples.

It's for these and other reasons therefore why we must always prepare our forecasts and futures scenarios carefully, be able to adapt them quickly, and only ever present the future in terms of Plausible, Possible, Probable, Preferable, and even Preposterous futures - setting the right expectations is everything.

RESEARCH AREAS

When it comes to crafting and exploring all these potential futures and researching information that is pertinent to your program there are many sources of information you can explore to gather together the information and insights you'll need to create and inform your futures scenarios in the next stage. Below are just a few.

Alternative Industries

The vast majority of organisations all too often limit their research to what their competitors and peers in the space

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are doing, but as organisations become increasingly digital and global, and as the boundaries between many previously distinct and siloed industries continue to erode the things and trends that could influence and shape your own future are just as likely to come from another alternative industry as from your own.

Alternative Languages

When doing your research searching in alternative languages can also yield a valuable amount of information, with the added bonus that this particular approach can also provide you with a new perspective on things.

Centers of Gravity

Part of being a good foresight expert or futurist is being able to detect intangible signals that could easily be missed or overlooked by others that could have material consequences on what the future ends up being. One of the methods we use to identify these intangibles is to look out for what we call Centers of Gravity. Just as we can see new stars in spiral galaxies being formed by spotting the tell tale signs of inter stellar gasses coming together around a center of gravity we can use this same principle to identify signals that look they are coalescing and then assess the likelihood that they'll create a new trend, technology, or futurescape.

Disruptive Startups And Upstarts

Today starting a business is cheaper and easier than ever before and with net new company registrations soaring above 100 million in just the past few years there are more entrepreneurs than ever before looking for chinks in established industry value chains and developing new products and services that help them craft the future in the image of their choosing rather than cow towing to the status quo. As a consequence while there is a huge amount of noise in this space there are also many inspirational things and trends for you to discover and explore.

Explore Far And Wide

Many people often limit their foresight programs to the confines of their own country, industry, or language, but by exploring wider and further than these artificial boundaries you will be amazed at the sheer volume and variety of new insights you'll discover.

Notes:

Exponential Investors

The global investment community is often an area that most people overlook when it comes to researching new things and trends, but they like you are trying to predict and shape the future for their own advantage so in some ways they're your kindred spirits in this program - all of which makes them and their portfolios good candidates to research.

Exponential Problem Hunters

There are a great number of mass market exponential problems worth solving and exploring, so take time to research the challenges the world is facing and take time to explore the things and trends that they're fuelling.

Exponential Technologies

The 311 Institute **Codex of the Future Series** of books includes details on hundreds of emerging and exponential technologies that are all blank slates waiting for explorers like you to discover, these technologies are also often the driving force behind many of the new products and services, as well as things and trends we see, so your aim should be to explore as many of them as possible in order to understand how they could influence and shape the future.

Keyword Combinations

Almost like a game of chance where sometimes you hit the jackpot and other times you don't, keyword combinations can be a great and simple way to help you find new information and sources of information as well as surface unknown unknowns. Furthermore, the combinations can be anything you like so my advice would be to create a reference dictionary of keywords and phrases that you can combine that align with the objectives of your program, with an example being "Nanotech + Breakthrough" which could help you find the latest Nanotech breakthroughs, and so forth.

Trend Hunters

The 311 Institute **Codex of the Future Series** also includes details on hundreds of powerful emerging trends that you can explore and research, all of which in their own way will influence and shape the future. By exploring them all you'll quickly discover that many of them influence many of the research areas I've highlighted here, and the scenarios and themes you care about.

" THE BEST WAY TO PREDICT THE FUTURE IS TO CREATE IT . "

- Abraham Lincoln, 16th US President

DRIVING FORCE PROFILE

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : RESEARCH STAGE

Use this sheet to dive into a particular driving force - an insight, technology, or trend - in more detail, examine its potential applications within your business, and then plot the overall market impact and ease of adoption of those applications.

TEAM NAME AND NOTES:

1 DRIVING FORCE DESCRIPTION

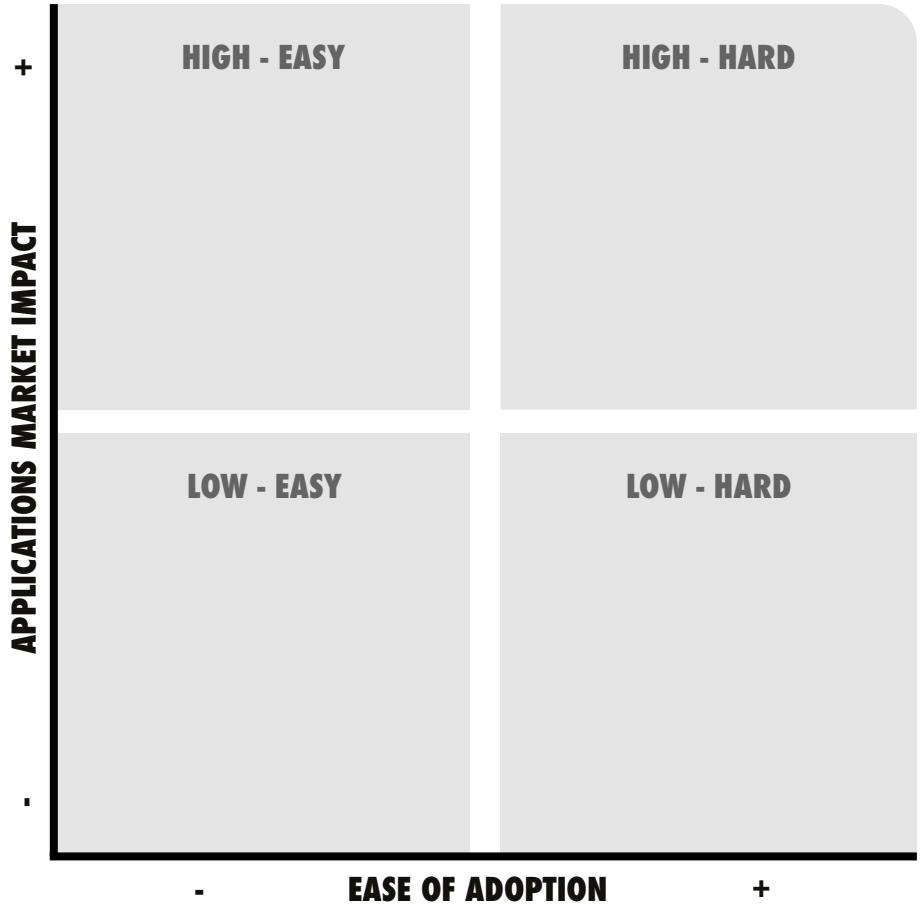
Describe this driving force in detail including its origin and estimated future trajectory.

2 DRIVING FORCE IMPACT

What impact will this driving force have on our business and the markets we care about?

3 POTENTIAL APPLICATIONS

Provide examples or illustrations of its potential applications in your business and then plot their Market Impact and Ease of Adoption on the adjacent chart.



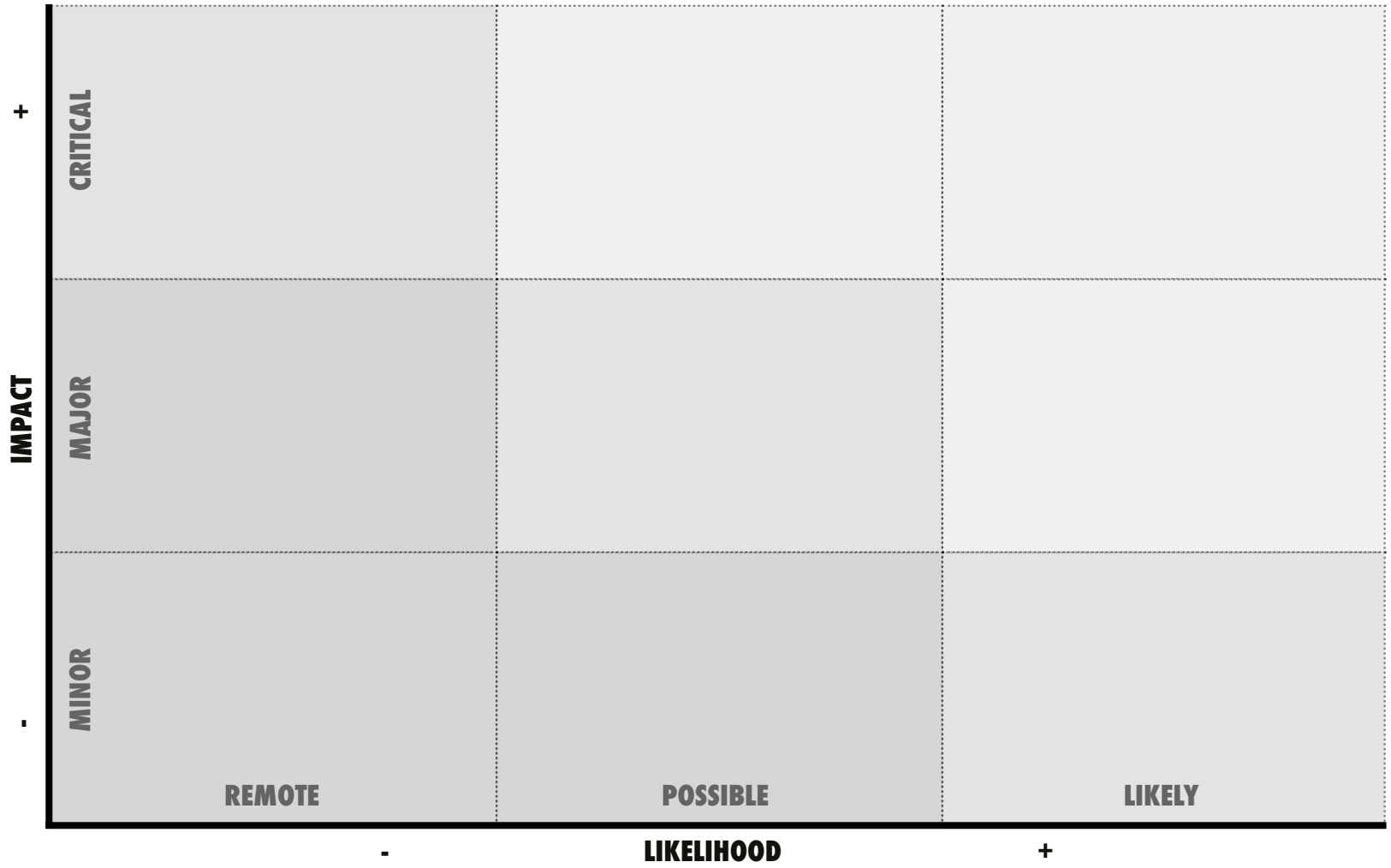
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IT2 IMPACT MATRIX

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : RESEARCH STAGE

Use this sheet to categorise all the insights, technologies, and trends (IT2) you identified during your research according to their likely impact on your organisation and your programs scope.

TEAM NAME AND NOTES:



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FUTURES SCENARIOS

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FUTURE SCENARIOS is the stage that gives organisations the prime opportunity to combat the bias, misguided confidence, and tunnel vision that all too often affects and paralyses day to day business decision making by first identifying trends and uncertainties and then using them, along with other futures research, to create all manner of scenarios that stakeholders can debate, discuss, and explore which can then be used to enrich and inform your organisations near, mid, and long term strategy, thinking, and visions.

Among other things good futures scenarios not only help organisations create compelling shared visions of their preferred futures, but they also help foresight teams and stakeholders compensate for two common errors in futures related decision making and forecasting - namely the under prediction and over prediction of future change.

While most organisations are guilty of making the first error, even though it's evident for everyone to see that the global rate of change and disruption is accelerating, ironically many futurists – even the likes of Isaac Asimov and Alvin Toffler – are guilty of making the second error. All of which, if not properly addressed, could leave your organisation in a quandary, because on the one hand you could have a group of stakeholders who are predisposed to under predict the future and on the other you could have others who might over predict it and expect levels of science fiction like change that, in the case of Asimov and Toffler, for example, many decades later still haven't materialised, such as Artificial Intelligence (AI) where robots don't yet outsmart us, medicine where we are still losing the war against Cancer, and space travel where we are still mostly Earth bound.

This stage is therefore a critical part of your program that allows you to chart a middle ground between these two opposing groups and create views of the future that are more reasonable and more likely to happen.

As an additional benefit the scenarios you craft can also be used to enhance the robustness of your organisations strategic thinking by helping you identify and challenge stakeholders underlying assumptions, as well as its conventional or established wisdom. It can do this in several ways. For example, by helping improve stakeholders awareness of change by shedding light on the complex interplay of underlying trends and uncertainties, by enhancing your organisations sensitivity to early and weak signals of the changes that lie

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ahead and, most importantly, by giving everyone an open platform that lets them think through possible futures and explore and rehearse appropriate responses to them with impunity.

FUTURES SCENARIOS BASIC PRIMER

Now I've detailed the benefits of creating future scenarios let's level set quickly and walk through what futures scenarios actually are.

Scenarios are an important forecasting technique that organisations can use to create narratives about the future that they can use to debate, discuss, explore, and visualise that future.

While there is no creative limit on the methods or tools you can use to create your scenarios or how you present them to stakeholders there are obviously some that are more popular than others.

For instance, you can present your final scenarios to other stakeholders using imagery, presentations, story boards, videos, or even role play. You can even, if you choose to as some organisations are now doing, present them as Virtual Reality (VR) constructs. Unsurprisingly though the format you choose to use will depend on the time and resources you have available so it shouldn't come as much of a surprise that the majority of organisations choose to create text based narratives that can take the form of everything from news articles to short form stories.

Irrespective of the format you choose to use though your futures scenarios must be able to clearly convey to your stakeholders the behaviours and impacts they will have on your organisations objectives as well as, if desired, business, culture, and society.

CREATING YOUR SCENARIOS

When it comes to the methods you can use to develop your futures scenarios there are, again unsurprisingly, more than you can shake a stick at so I've chosen the two that in my estimation are the easiest to follow and yield the best results.

The 6 Future Archetypes

This, the first method, helps you understand the characteristics of all the different driving forces you identified in the Research stage of this program which will all, in one way or another, influence and help shape your futures scenarios. It

Notes:

has three steps.

First, explore your driving forces behaviours and categorise them according to the following six archetypes namely Baseline, Chaos, Collapse, Expansion, Regression, and Transformation - each of which describe their overall expected future behaviour.

Diving into what each of these terms mean Baseline is the continuation of the present status quo as it exists today that, importantly, doesn't change at all in the future. In short you can also think of this archetype as being a never changing "Stable State" hence the term Baseline.

Chaos is just as it sounds, where patterns and trajectories are no longer identifiable and everything becomes chaotic and unpredictable. It's also important to note here that you should not confuse unpredictable for uncertain as these are two very different terminologies.

Collapse is the worst case scenario and represents a future where the driving force or forces you're interested in reach their limits and collapse. In other words they cease to be.

Expansion is the continuation and enhancement of the current trajectory of a driving force. In other words an expansion, or cautiously an evolution, of the present. While this might at first appear similar to the Baseline archetype it's important to note that they are indeed different since this is a continuation of the presents trajectory rather than an unchanging continuation of its current status quo.

Regression is when a present day driving force reverses and returns to a previous state - whether that state is recent or in the deep past.

Transformation represents a radical departure from the present due to a disruptive or transformative event and represents a time of new normals.

Now, having categorised all of your driving forces, secondly you need to give them all weightings according to their overall expected impact on your programs pre-determined objectives within the time horizon you care about.

Thirdly, it's now time to create your futures scenarios using the above categorisations to guide your thinking, and it's important to note that they can't be completely produced by your imagination - you'll need to able to support each of your narratives with quantitative and qualitative information. When we create scenarios using this

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method there are, however, a couple of things you need to pay attention to.

First, you need to take into account all the driving forces you identified in your Research stage, even if their behaviour is counter-intuitive, stretch your imagination to think of alternative counter intuitive futures, and then support such arguments with references. Needless to say though this can be a quite laborious research task.

Secondly, you must remember that the scenario archetypes are generic. They're not necessarily positive or negative, good or bad, so they should be interpreted in both ways, and ideally include both positive and negative elements in order to make your futures scenario more plausible. Indeed, reality is never either completely Utopian or Dystopian it's a mix of both, and the same applies to scenarios.

The Uncertainty Matrix

The next method I'm going to talk about, which has its roots in the popular 2x2 Matrix, pairs the two driving forces of highest importance and greatest uncertainty that you identified during your Research stage with one another to help you craft your futures scenarios. It consists of four steps.

First, taking the top driving forces you identified during the Research stage cluster together the ones that have a high mutual impact on each other. And what I mean by impact, just to be clear, is the degree they alter and influence one another's future behaviours and trajectories.

Second, using a line - a single Y axis - with the labels Plus or Minus determine what the extreme behaviours of these clusters could look like. We call these extreme behaviours "Factors" and once you've come to a conclusion about what these factors could look like give each of them a suitably descriptive name or tag line.

Third, plot these factors against two axes - an X and Y axis - one labelled "Impact" and the other "Uncertainty."

Forth, once you've completed your chart select the level of Impact and Uncertainty you want to base your scenarios on and craft your narratives based on the factors in those areas.

When creating scenarios using this method it's important to remember not to forget all of the other driving forces you identified during your research but

Notes:

chose not to include in your chart. In other words, for each scenario you craft you'll still have to take into account the behaviour of the factors both inside and outside of your chart.

SCENARIO BUILDER

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : SCENARIOS STAGE

Use this sheet to examine different driving forces and craft futures scenarios that you can discuss and explore in more detail.

TEAM NAME AND NOTES:

LIST OF DRIVING FORCES

List the driving forces you care about ranked by importance below then use the adjacent chart to compare them to one another and develop scenarios.

1
2
3
4
5
6
7
8

WRITE NAME OF DRIVING FORCE HERE

\+

\-

SCENARIO 1 HIGH - LOW
Write a description of this scenario

SCENARIO 2 HIGH - HIGH
Write a description of this scenario

SCENARIO 3 LOW - LOW
Write a description of this scenario

SCENARIO 4 LOW - HIGH
Write a description of this scenario

\- WRITE NAME OF DRIVING FORCE HERE \+

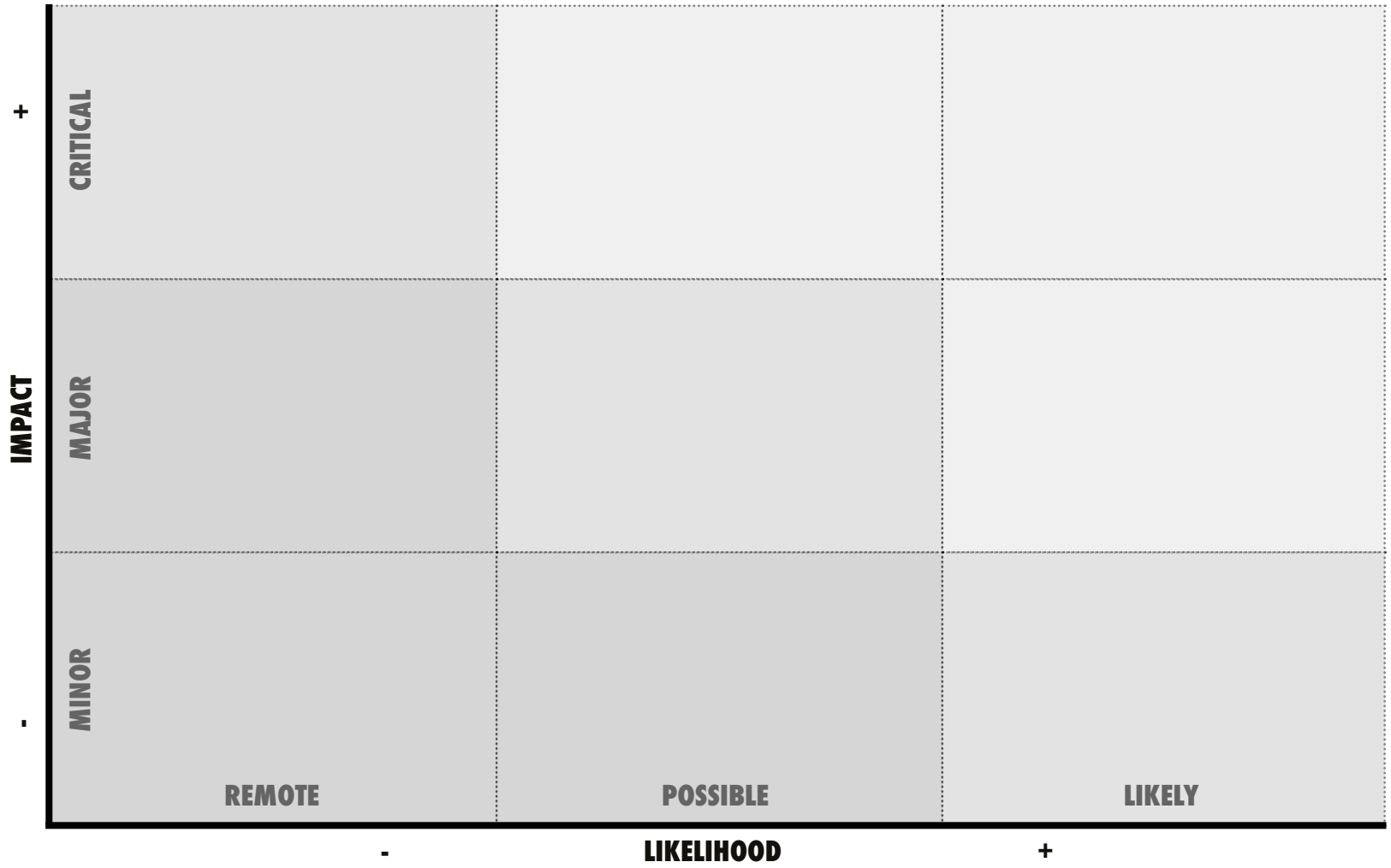
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SCENARIO IMPACT MATRIX

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : SCENARIOS STAGE

Use this sheet to categorise all the futures scenarios you developed according to their likely probable impact on your organisation and your programs objectives and scope.

TEAM NAME AND NOTES:



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FUTURE STRATEGY



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TRANSLATING YOUR future scenarios from the previous stage into actionable future business strategies is an important but often over looked step. Indeed, a lot of organisational foresight work often stops after the creation of the scenarios in the previous stage while in reality they should always be used to help stakeholders create more robust and resilient future business strategies and visions.

Organisations can find the link between these two stages problematic for all manner of reasons. For example, it can be because of the lack of effective communication between the Scenario Team and other stakeholders, the unexpected withdrawal of funding or resources, time constraints, and many other reasons - most of which you'll find are avoidable with proper program management and planning.

You should also not underestimate the importance of having a structured and rigorous methodology you can use that enables your scenarios to be fruitfully used for decision making, and that ultimately helps you translate them into effective business strategies.

That's what I'll be covering in this section, and as I've mentioned previously while I'm going to walk you through some of the most effective methods ultimately the ones you choose should be based on your organisations culture, objectives, and resources.

SCENARIO IMMERSION

The first method we'll take a look at is called Scenario Immersion. Developed by Ralston and Wilson of the Stanford Research Institute in their book "Scenario Planning Handbook" this method involves performing structured mindstorming about the implications of a different futures will have on the organisation.

In scenario immersion, the scenarios are presented to as many organisational stakeholders as possible in a workshop format. Then, for each scenario, each individual in the group is asked to identify as many threats and opportunities that that scenario presents for the organisation without any concern for their probability, and to write them down on sticky notes.

This could take several rounds and should be done until saturation, for instance when no new threats or opportunities are found. The facilitators then cluster the sticky notes into similar categories or groupings.

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Finally, these stickies are placed where everyone can see them in the workshop room, and every member of the group is asked to act like decision maker and identify strategic responses to those threats and opportunities - these responses will be the basis of a strategic plan.

The strength of this method is that it allows an organisation to deepen the scenarios by quickly generating rich feedback to the scenario planning exercise, and the resulting full spectrum of ideas presented in dozens of sticky notes can be useful for decision making.

The downside of this method is that the strategies contained in those stickies might not be implementable because they're not created by the management, but by organisational members who might not be fully aware of the sunk costs and previous plans that are inherently constraining the organisation.

In other words, a limitation of this method is that it is disconnected to the company's strategic past. This limitation is what may lead us to use the next method.

WIND TUNNELLING

Wind tunnelling which is a form of policy stress testing takes its name from wind tunnels - the systems that are used in vehicle engineering to test whether or not new vehicle concepts can withstand all manner of different erratic weather conditions.

In the corresponding foresight method, these erratic environmental conditions stand for the different conditions in the external environment presented in each scenario, while the vehicle stands for the pre-existing strategies of the organisation.

Unlike the previous method this one takes into account your organisations pre-existing strategies before a scenario evaluation exercise because it uses a so called wind tunnelling matrix to stress test all of your pre-existing strategies, such as marketing and research strategies, which are listed as rows, along with any others you wish to include, against each of your futures scenario which are listed in the columns.

More precisely, as with actual wind tunnels your organisations pre-existing strategies can then be evaluated against all of the different "strong conditions" of each one of your scenarios. Then, if they can resist them they are robust and can be retained, and if not then they either have to be redesigned or done away with.

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The strength of this method is that it allows an organisation to pinpoint which pre-existing strategies are not going to be compatible or viable in the future, and thus, helps focus the executives attention on those strategies that prove robust under all scenarios.

Moreover, this method is very flexible, as not only can it be used to test an organisation's pre-existing culture and strategies against different scenarios, but it can also be used to investigate your competitors strategies as well as new "theoretical" strategies such as new business concepts and business models, and other core organisational capabilities.

The major limitation of this method is that whenever we are using it to judge whether strategies are robust under future scenarios, the evaluation of their performance is implicitly carried out in view of a set of organisational objectives in an arbitrary manner. For instance, if an organisation is considering more than one alternative strategy and needs to decide which one to keep and which ones to do away with, the evaluation can be approximate and therefore, misleading.

This limitation may lead us to use the variation of this method discussed as follows.

Wind Tunnelling Variation

In this method, which you can think of as an evolution of the Wind Tunnelling method competing strategies are tested against each of your different futures scenarios against a set of specific organisational objectives inn order to determine the best strategy.

For instance, let's consider a simplified case where an organisation has two scenarios: Scenario 1 and 2; two objectives: Market Share and Customer Satisfaction; and three competing strategies: Differentiate, Expand, and Partner Up. In this example the organisation has to decide which strategy to pursue and which to eliminate.

This method then consists of 3 steps:

In the first step, for each objective we rank each of our strategies against the two scenarios we created from best to worst. This effectively compares, with scores, the performance of each strategy against each scenario.

For instance in our example the "Differentiate" and "Expand" strategies

Notes:

might perform better in Scenario 2 rather than in Scenario 1, but the "Partner Up" strategy might perform better in Scenario 1.

In the second step, for each objective we rank all of the Strategy-Scenario combinations from best to worst. This effectively compares the performance of all of our strategies across all of our scenarios.

For instance, in our example for the "Market Share" objective "Expand" in Scenario 1 might have the best performance, then the "Partner Up" strategy in Scenario 2 might have the second best. And so on.

Finally, in the third step, for each strategy, we then look at the scores obtained in the previous steps for all of our objectives, and we can even sum them up, to determine which strategy has the greatest chance of succeeding.

By using this quantified method we now have a way to discuss and calculate which strategies are the best ones, and we now have information that we can use to adapt and inform our organisations official future strategies and visions.

A limitation of this method though is that it overlooks the qualitative elements of strategy development, as well as the relative importance of each objective, and while you could arguably assign these qualitative factors numerical weightings ultimately you could end up in somewhat of a confusing tangle.

" FORESIGHT IS LESS ABOUT PREDICTING THE FUTURE & MORE ABOUT MINIMISING SURPRISE . "

CONTINUOUS STRATEGY IMPROVEMENT .

AS THE world, and the future, continues to change around you you'll know by know that even when you think you've reached the end of your program that that's just the beginning of the next program, and you have to start it all over again, that is if you want to remain as aligned as possible with the future as it unfurls. After all, as we witness in all of the world's most valuable and visionary companies not only is Strategic Foresight a continuous initiative but it is deeply embedded into their corporate cultures.

As such, when it comes to the continuous development and evolution of your strategy I recommend you follow these stages which, while they're based on a firm foundation of proper execution and governance, are crucial to ensuring you remain on track and achieve your goals.

The five stages are as follows:

1. STRATEGY DEVELOPMENT

Having run your program you should by this point have created and selected your future strategy, but as everyone knows the best strategy is one that is always evolving with future market conditions which, therefore, means that it is a dynamic strategy not one that is set in stone forever.

2. IMPLEMENT YOUR STRATEGY

Having created your final strategy it's imperative you implement it. You can do this by making sure that you create and fund the appropriate organisational initiatives.

3. MONITOR EVENTS

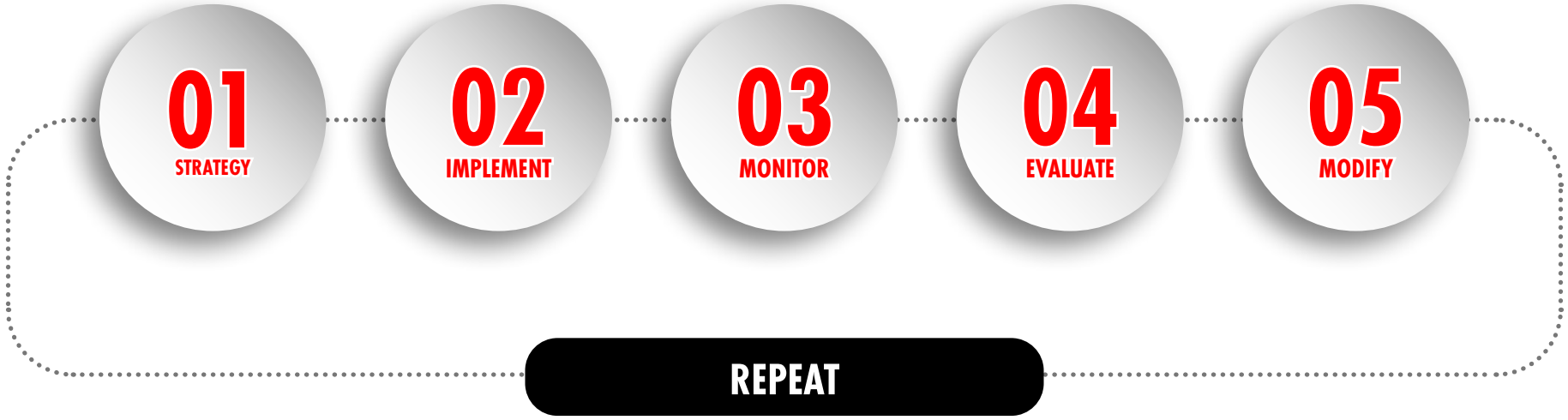
Once implemented make sure you have the appropriate processes and systems in place that let you monitor your organisations progress against your goals.

4. EVALUATE IMPACT

Next, it is imperative that you are able to evaluate and test the impact that each of your initiatives is having against achieving your goals and correct and short falls.

5. MODIFY OBJECTIVES

Then, last but certainly not least, if you have run another strategic foresight program and have determined you need to alter your strategy and its goals then you must be able to do this as quickly and with as little friction as possible.


01
STRATEGY
02
IMPLEMENT
03
MONITOR
04
EVALUATE
05
MODIFY
REPEAT

SCENARIO IMMERSION

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : FUTURE DESIGN STAGE

Use this sheet to explore the strategic threats and opportunities of the future scenarios you created.

TEAM NAME AND NOTES:

1

SCENARIO NAME AND BRIEF DESCRIPTION

This is the name and a brief description of the futures scenario you are going to be exploring.

THREATS

List all the threats that this scenario presents to your business and the markets you care about.

OPPORTUNITIES

List all the opportunities that this scenario presents to your business and the markets you care about.

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SCENARIO SUMMARISER

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : FUTURE DESIGN STAGE

Use this sheet to help you explore the futures scenarios you created in more depth, baseline your thinking, and start thinking about what responses you could or should take to them all.

TEAM NAME AND NOTES:

		1 SCENARIO 1	2 SCENARIO 2	3 SCENARIO 3	4 SCENARIO 4
1	**IMPACT OF SCENARIO** What happens after the scenario occurs?				
2	**UNCERTAINTIES** What is unknown about the scenario?				
3	**QUESTIONS** What questions might you have about the scenario?				
4	**COMMENTS** What comments do you have about the scenario?				
5	**RESPONSES** What responses and actions should you take as the scenario occurs?				
6	**ALTERNATIVE RESPONSES** What other alternative responses are there if your scenario occurs?				

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STRATEGY SUMMARISER

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : FUTURE DESIGN STAGE

Use this sheet to help you figure out what capabilities you need to develop, and what actions you need to take in order to benefit from the trends you identified.

TEAM NAME AND NOTES:

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1 DISCOVER

What are the opportunities and threats when our scenarios occur?
How could these scenarios benefit or jeopardise our business in the future?

2 MINDSTORM

What capabilities do we need to develop, drop, or enhance to profit from these?

3 CAPABILITY BUILDING

What concrete actions must we take to ensure we have these capabilities?
How do our stakeholders understand these scenarios and trends?
What are their expectations of us?

4 STRATEGY DEVELOPMENT

How do our scenarios support or challenge our strategic plans and thinking?

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STRATEGY WIND TUNNEL

311 INSTITUTE : 311 TRENDS AND FORESIGHT CODEX : FUTURE DESIGN STAGE

Use this sheet to evaluate the impact of each of the futures scenarios you created on the strategy of your choosing and then use the output to help you create more robust and resilient future business strategies and visions.

TEAM NAME AND NOTES:

		1 SCENARIO 1	2 SCENARIO 2	3 SCENARIO 3	4 SCENARIO 4
1	STRATEGY 1				
2	STRATEGY 2				
3	STRATEGY 3				
4	STRATEGY 4				
5	STRATEGY 5				
6	STRATEGY 6				

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ANNUAL TRENDS CODEX

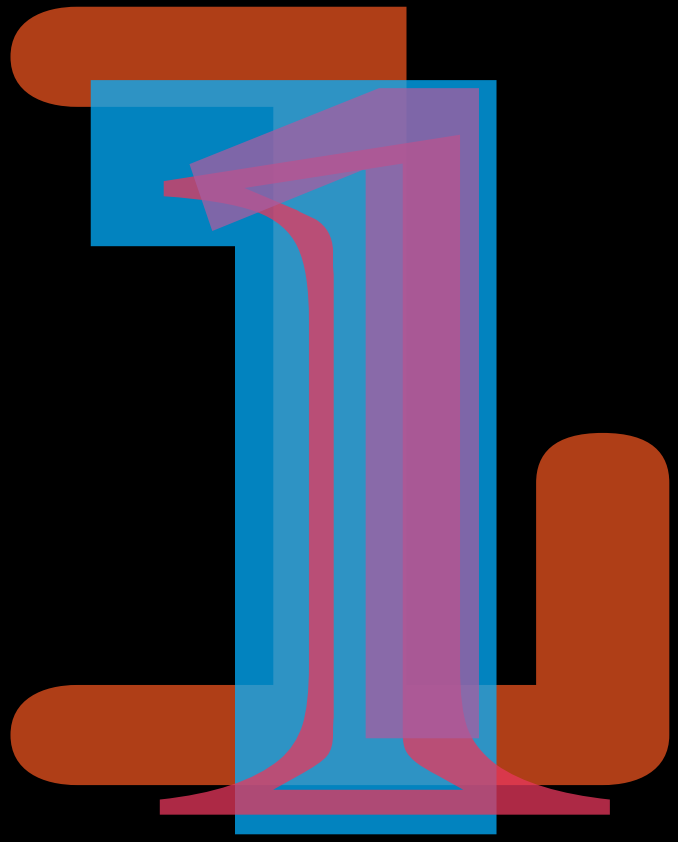
CODEX OF THE FUTURE SERIES

311 INSTITUTE

3RD ANNUAL EDITION . BOOKLET 1 OF 7

ECONOMIC TRENDS

Explore all the latest trends shaping the future of business, culture, and society.



SECTION CONTENTS

... CEO Pay Gaps
... Central Bank Digital Currencies
... Connector Economies
... Corporate Tariffs
... Crypto Cities
... Death of Shareholder Primacy
... Foreign Direct Investment
... Globalisation
... Global Direct Tax Rates
... Global GDP Growth
... Global Household Debt
... Global Indirect Tax Rates
... Global Inflation Rates
... Global Living Standards
... Global Productivity
... Global Public Debt
... Global R&D Spending
... Global Real Wages
... Global Reserve Currency Wars
... Global Trade Flows
... Global Trade Volumes
... Global Value Chains
... Industry Collapse
... Informal Economy
... International Migration
... Megacities
... Meta-Economy
... Non Tariff Barriers
... Price Collapse
... Primary Tariffs
... Rapid Urbanisation
... Sanctions
... Secondary Tariffs
... Solopreneurs
... Sustainable Economies
... Trade Wars
... Unlocking Public Wealth
... Wealth Inequality

STATS THAT MATTER

SUMMARY UPDATE

IN 2022 the global economy started recovering from the COVID-19 pandemic, and we saw notable shifts towards digitisation and sustainability. Despite challenges though, which included supply chain snarl ups, high levels of inflation, and war in Ukraine, the economy showed resilience with a global growth rate of around 3.2%. However, the rate of global recovery varied wildly with developed nations bouncing back faster due to quicker vaccine roll outs and significant fiscal stimuli than developing nations.

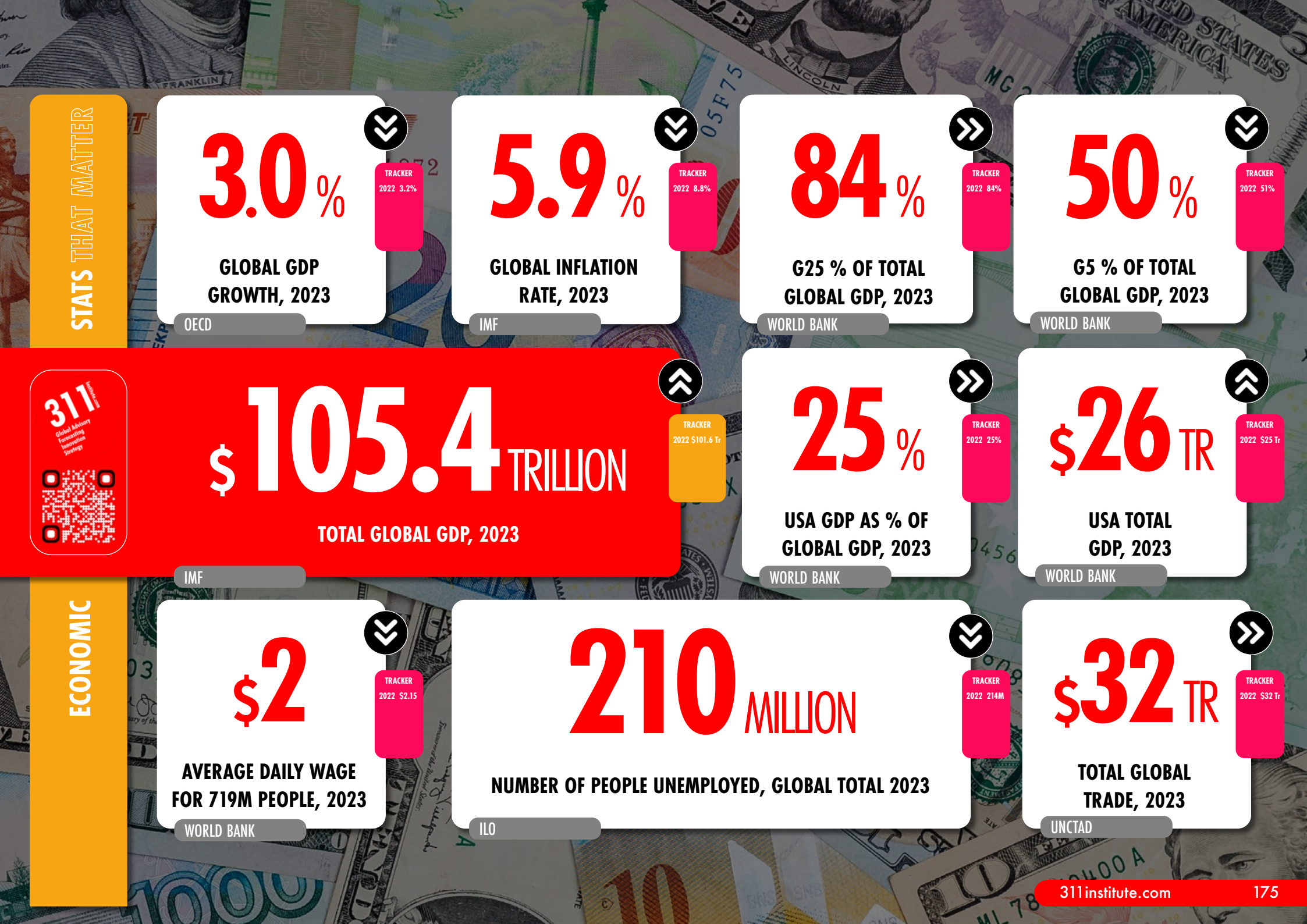
Spurred by the pandemic the year was also a breakout year for digital transformation with the adoption of technologies including Artificial Intelligence and Blockchain grabbing many headlines - a shift that also highlighted the continued need for robust digital infrastructure and cyber security solutions.

The energy sector also continued its transition to renewable energy with increased government funding and prevailing policy tailwinds. This, in turn, coupled with high fossil fuel prices helped stimulate electric vehicle demand and the electrification of energy intensive industries. 2022 also saw Environmental, Social, and Governance (ESG) factors become a critical yardstick for investors, further encouraging companies to embrace sustainable business practises and green financing.

Then, on the geopolitical scene, there were many developments that influenced the global economic outlook. Turbulent US-China relations and post-Brexit Europe affected trade dynamics, as well as the technological landscape, while at the same time central banks tried to balance their regions economic recovery with the difficulty of quashing rampant inflation. Cryptocurrencies also continued to dominate discussions, raising further questions about their regulation and future role in finance.

In summary, the year marked a transformative phase in the development of the future global economy with digitisation, the energy transition, strategic dislocation, and sustainability, to name but a few themes all priorities.

BOOK AN EXPERT CALL



STATS THAT MATTER

3.0%
GLOBAL GDP GROWTH, 2023
OECD
TRACKER 2022 3.2%

5.9%
GLOBAL INFLATION RATE, 2023
IMF
TRACKER 2022 8.8%

84%
G25 % OF TOTAL GLOBAL GDP, 2023
WORLD BANK
TRACKER 2022 84%

50%
G5 % OF TOTAL GLOBAL GDP, 2023
WORLD BANK
TRACKER 2022 51%

311 Global Advisory Forecasting Innovation Strategy

$105.4 TRILLION
TOTAL GLOBAL GDP, 2023
IMF
TRACKER 2022 $101.6 Tr

25%
USA GDP AS % OF GLOBAL GDP, 2023
WORLD BANK
TRACKER 2022 25%

$26 TR
USA TOTAL GDP, 2023
WORLD BANK
TRACKER 2022 $25 Tr

ECONOMIC

$2
AVERAGE DAILY WAGE FOR 719M PEOPLE, 2023
WORLD BANK
TRACKER 2022 $2.15

210 MILLION
NUMBER OF PEOPLE UNEMPLOYED, GLOBAL TOTAL 2023
ILO
TRACKER 2022 214M

$32 TR
TOTAL GLOBAL TRADE, 2023
UNCTAD
TRACKER 2022 $32 Tr

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EXPLORE STARTUPS & MORE

CEO PAY GAPS

3RD YEAR ON THE LIST



QUICK TAKE

Over the past decade this trend has been subject to greater scrutiny and attention, driven in part by the fact that many regular workers around the world have seen their own wage growth failing to keep up with **Global Inflation**, and as a result seen their wages in real terms falling. While some argue this trend is a storm in a tea cup some stats are staggering. From 1978 to 2020, for example, CEO pay grew 1,322% compared to just 18% for the average worker - a figure that also dwarfs the 817% S&P market growth rate against which many CEO's remuneration packages are measured.

IMPACT

While there are many impacts of this trend, including increased **Shareholder Activism**, many see this trend as a primary driver of **Wealth Inequality** even though that specific trend is driven by a great variety of other trends as well. Perhaps this trends greatest impact though is its apparent flagrant assault on what people regard as "fair," which then in turn helps fuel the "Them versus Us" debate and contributes to our **Polarised Society** and societal discord.

While CEO pay is almost always linked to value creation and the performance of the organisations they oversee, with a high percentage of remuneration packages linked to share price, among other factors, it's fair to say that today this trend is a literal lightening rod for many stakeholders - a fact that isn't helped when CEO's, as we've seen many times recently, are rewarded for failure which of all the cardinal sins is seen as the main one. And, with the ratio of CEO pay to median worker pay in higher paying companies sitting at 351-1, and that ratio being almost double at 670-1 for low paying companies, it's easy to see why this trend drives so much discussion.

EXAMPLES

It's would be relatively easy to argue that the impact of this trend are driven by a lack of transparency around CEO remuneration packages and by what many see as an imbalance in those packages, which is why experts say we shouldn't pay attention to the value of the CEO's package but rather to what they're paid for and how they're paid. Then, of course, there's still the matter of fair - even for CEO's. After all why shouldn't Jeff Bezos, who took the personal risk to found a company that now employs almost one million people not be paid, or rewarded, well?

Whatever your opinion though we're all more likely to oppose packages that promote bad CEO behaviours, such as share heavy remuneration packages that could see them embrace **Job Automation** as a primary strategy, rather than those linked to more beneficial initiatives such as **CSR**, **D&I**, **ESG**, **Ethical Capitalism**, job growth, human capital development, and others. Ironically though today's median CEO salaries are still just below those in 1934, or $882,000 in current value. And, for every $1,000 change in the market value of a company the median CEO remuneration is just 6.7 cents.

ACT NOW

As they say remuneration drives behaviour and so boards, owners, and the shareholders of organisations should be careful how they incentivise their top executives, not just their CEO's. Incentivised correctly CEO's can create organisations that capture people's imaginations, change the world for the better, and inspire people's support, but done incorrectly the opposite can happen.

EXPLORE:

- Best practises and case studies
- Board diversity
- Business and impact assessments
- Ethical Capitalism
- Future of Work
- GRC, policy, and regulation reform
- New business and operating models
- Remuneration reform

Data sources: Bloomberg, Economic Policy Institute, HBR, and various.

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EXPLORE STARTUPS & MORE

CENTRAL BANK DIGITAL CURRENCIES

3RD YEAR ON THE LIST



QUICK TAKE

The emergence of Blockchain and Bitcoin heralded in a new era of decentralised cryptocurrencies which existed outside of state control and with limited to no oversight. As the number of private cryptocurrencies increases countries increasingly see them as a threat to their sovereignty and their own central bank currencies, which is why some countries ban or temper their use. But, given the inevitability of the crypto trend, and its advantages, several countries are now developing and trialling CBDC's with the eventual aim of rolling them out.

IMPACT

The impact of CBDC's would be wide ranging they would have a significant impact on the formulation and implementation of monetary policies.

On the one hand state issued and controlled CBDC's would enable faster, less costly, and more secure financial transactions that, in addition, could improve financial inclusion because citizens would no longer need to have their own bank accounts to hold such currencies. On the other hand, however, there are concerns about the high level of control that states would be able to wield over the blockchain network they base their CBDC on.

From a state perspective though the allure of CBDC's is significant because in addition to the above the elimination of cash would help states reduce the costs and risks associated with cash, as well as fraud and tax evasion. Furthermore, the real time nature of CBDC's would also give states unprecedented real time insights into their citizens spending habits at a granular level and allow them, for the first time, to analyse their economies in real time and apply real time, innovative, financial policies accordingly.

EXAMPLES

A CBDC is defined as any electronic, fiat, liability of a central bank that can be used to settle payments as a store of value, and generally they will be universally accessible, interest bearing, exchangeable for bank notes and central bank reserves on a one for one basis, linked to real world identities and not tokens, and withdrawable from your bank accounts via a digital wallet.

As the use of cash in many countries dwindles and is superseded by contactless card payments it is inevitable that governments will adopt the CBDC model with many countries already trialling them or planning trials.

One of the most progressive countries in the field is China who has already run significant trials of the technology as they see CBDC's as both a means to increase the state's level of control and surveillance, but also see the benefits of being able to use it to analyse and course correct their economy, at both a national, regional, and local level, quickly and efficiently. And, increasingly, where China leads others follow so it's not surprising that many countries are now experimenting with their own CBDC's.

ACT NOW

CBDC's would represent a titanic shift in government monetary policy and would have wide ranging global implications for both citizens and industries alike. They also signal the start of a new financial era which would see cash, as many people are saying, bought into the 21st Century.

EXPLORE:

- Banking and credit access for the financially excluded
- Disintermediation of traditional financial services organisations
- Future of Financial Services
- Real time government monetary policies
- Retail and Wholesale CBDC solutions

Data sources: Bank of England, Consensys, ECB, PBOC, and various.

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EXPLORE STARTUPS & MORE

CONNECTOR ECONOMIES

3RD YEAR ON THE LIST



QUICK TAKE

As we head into a **Bi-Polar and Multi-Polar World** where **Geopolitical Fragmentation** and the relationships between different economic blocs and countries, such as **BRICS 2.0**, become increasingly complex and strained there are inevitably going to be those governments that choose one side over the other - and then there are going to be those who don't appear to choose sides at all and who instead seemingly try to cosy up to everyone. These are the Connector Economies, and not only are they growing in number but they're also assuming a greater geopolitical and economic role within the world.

IMPACT

Connector Economies increasingly act as gateways between different economically, ideologically, societally, and technologically aligned trading blocs or countries. And while some of them are inevitably trying to benefit from this trend by "playing the field," others such as India might using it as part of a long term strategy to put themselves in a prime position to challenge China and the US in the end for global dominance.

An attractive target for **Foreign Direct Investment** (FDI) because of their favourable investment environments and strategic locations these economies can provide companies with convenient access to multiple markets, facilitate **Global Trade Flows, Global Value Chains**, and reduce **Trade War** barriers, as well as help improve the resilience of supply chains while mitigating geopolitical risks. The downsides, however, include cultural and operational differences, the immaturity of their infrastructure and own supply chain ecosystems, potential over dependence on key partners who might oppose their gateway status, regulatory uncertainty, and high levels of competition for mindshare and space.

EXAMPLES

Around the world there are many examples of this trend in action. Some are obvious, such as the positioning of countries including Indonesia, Mexico, Morocco, Qatar, Saudi Arabia, Singapore, the UAE, and Vietnam. And some are curious such as the positioning of Europe, especially Poland, which has a difficult on off love affair with the likes of China, and India which seems to align with the G7 and G20 as well as China and Russia, despite its tumultuous relationships with both, and the wider **BRICS 2.0** bloc.

As a result in the past year we've seen "West and the Rest" FDI in Indonesia increase by 20% to $58.8Bn, Mexico by 17% to $72Bn, Morocco by 14% to $14.4Bn, Poland by 12% to $44Bn, and Vietnam by 15% to $47.4Bn - all of which are significantly above normal baseline trends, even if we account for a pivot to Asia. The biggest projects included a $5Bn and $1.2Bn investment in Indonesia by Hyundai and LG, and a Japanese geothermal consortium, we also saw a $5Bn and $1Bn Tesla and BYD investment in Mexico, a $1.7Bn Intel investment in Poland, and a $1.3Bn and $1Bn investment in Morocco by OCP, Mitsubishi, and Stellantis.

ACT NOW

Today Connector Economies offer companies and governments alike a useful gateway between increasingly divided economic, ideological, and societal blocs. But how these economies will stand the test of time and how they will adapt and react to a world where we see **Economic Decoupling**, **Strategic Decoupling**, and **Technological Decoupling** all accelerating is unclear because whether these countries like it or not in time it seems inevitable that one or more of their larger trading partners will encourage or force them - directly or via **Soft Power Plays** - to either outright pick a side or at least choose a "dominant" partner.

EXPLORE:

- Business and impact assessments
- Geopolitical, investment, and trade dependencies, flows, and risks
- Infrastructure development initiatives
- Regulatory and legal frameworks
- Supply chain strategies

Data sources: Atlantic Council, Breton Woods Committee, IMF, Informedi, and various.

CORPORATE TARIFFS

1ST YEAR ON THE LIST



QUICK TAKE

We're used to **Primary Tariffs**, **Corporate Blacklisting**, and **Sanctions**, as well as increasingly the concept of **Secondary Tariffs**, but the idea of Corporate Tariffs - tariffs that target individual companies both foreign and domestic rather than countries - are also catching on as governments, such as the US government, do their utmost to retain dominance in an increasingly **Bi-Polar and Multi-Polar World**. At first take this trend seems like an odd one, but when you consider that many mega cap companies have greater revenues and more economic heft than many countries it makes more sense.

Data sources: Various.

IMPACT

While Corporate Tariffs are highly contentious in most circles - especially when governments apply them to their own country's companies - it can't be denied that if used properly they can be an effective tool of choice to change company behaviours. They also reflect a growing trend, namely that of moving away from broad brush tariff policies that target everyone indiscriminately - like dropping a big bomb - to the practice of applying tariffs on a more specialised basis that help governments achieve their objectives with more sniper-like precision. They also have no definition under current WTO rules which makes this trend all the more interesting to watch.

Ultimately though, by tariffing individual companies in this way the impacts include higher prices for consumers, which can contribute to increased **Global Household Debt** and **Global Inflation Rates**, and can also have a dramatic, even existential, impact on a company's competitiveness, Earnings Per Share (EPS) and shareholder value, and its ability to grow and invest in the future while all the while disproportionately disadvantaging one company over another.

EXAMPLES

As a fairly new phenomenon this trend has very few examples to speak of, and so far most of the press coverage of it revolves around its threat of use rather than actual use.

Nevertheless the most prominent example of this trend in play was President Trumps threat to put Corporate Tariffs of 25% on Apple for every iPhone that they imported into the country. As Trump ratcheted up his **Trade Wars** with the rest of the world, and especially China, he was unhappy that despite a $500 Bn pledge from the company to invest in the US the company was still planning to manufacture its products in India then export them to the US market. So, in order to try to force their hand and re-shore manufacturing - which is no small feat for the company - he bought in this "nuclear option."

Unthinkable even just a few years ago this trend, and others like it, added yet another complicated twist in the US's fight to stay dominant on the global stage and also perfectly highlighted the unpredictability of today's world.

ACT NOW

Increasingly companies shouldn't take it for granted that their governments are acting in their best interests and this can be thought of as a prime example to force even the world's largest companies to do their governments bidding - and there's no easy fix.

EXPLORE:

- Business and Impact assessments
- Domestic manufacturing and sourcing
- Lobbying
- Local ecosystem and partner development
- Pricing strategies
- Strategic re-evaluation of market focus
- Supply chain re-alignment, diversification, and flattening
- Tariff Engineering

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CRYPTO CITIES

3RD YEAR ON THE LIST



QUICK TAKE

Crypto Cities are not what you think - probably. If you're thinking they're cities that prioritise the development of crypto startups and ecosystems then you're off the mark. What they are is much more interesting than that, and they're also potentially much more revolutionary. Crypto cities is the name of a relatively new trend where the cities income, which it can then use to pay for the development and provision of public services, comes from the dividends and profits from **Cryptocurrencies** and crypto mining. It also gives cities and governments alike a clear path to eliminating all the tax on their citizens.

Data sources: CityCoin, IMF, World Bank, and various.

IMPACT

The premise that crypto cities are based on, namely that the city - or government - can fund its entire operations from the dividends and profits they make on cryptocurrencies and crypto mining, and then use those profits to eliminate the need to tax their citizens, is very a bold one that's worth watching very closely.

Today the average tax revenue from social contributions as well as direct and indirect taxes in countries such as France, the UK, and the USA, have been rising steadily since 1980 with the tax revenue as a percentage of GDP for those countries now sitting between 25% and 45%. Furthermore, when we take a global view today tax revenues represent more than 15% of global GDP and that figure has been rising since 2009, and it's likely to continue rising as countries try to pay off the debts they accrued during the global pandemic.

As a consequence of this increasing debt burden today it's not surprising there's growing resentment towards governments and that people all around the world are finding the cost of living increasingly difficult to afford, which then leads to unrest. This trend is therefore potentially transformative.

EXAMPLES

While there are unsurprisingly very few examples of this trend the most notable by far is the MiamiCoin project by the City of Miami who so far have used it to generate revenues equivalent to 25% of the cities annual expenditure, or $80 Million, which in their case then means they can use this return to reduce the tax burden on their citizens. Furthermore, ultimately the city's ambition is to generate all their income in this way so that they can eliminate all of the taxes on their citizens which would be game changing.

The project works like this: First the citizens of Miami, referred to as "Stackers," mine crypto to create MiamiCoin (MIA) tokens - this is done by forwarding CityCoin Stacks (STX) Protocol tokens into the smart contract in a given Stacks block. The stackers then receive 70% of the mining rewards in the form of Bitcoin (BTC) or STX, and the city of Miami receives the other 30% of the rewards which they then bank in their "Crypto Treasury." The city can then cash these out as US Dollars and spend them in whatever way they see fit whether it's to fund events or infrastructure, or all manner of other things.

ACT NOW

Imagine being able to eliminate all of the taxes on your community or citizens and you'll realise the transformative power of this nascent trend. But while the upsides are remarkable organisations should be careful to do all they can to understand and mitigate any downsides such as market volatility and other unfavourable market conditions which could impact returns.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Government and Financial Services
- New business and operating models
- Partner ecosystems and solutions
- Policy and regulation reform

DEATH OF SHAREHOLDER PRIMACY

3RD YEAR ON THE LIST



QUICK TAKE

The story of public companies putting short term gains over long term gains, and putting their shareholders interests over those of their stakeholders to boost profits is a common one. Since its origins in Roman law the corporation has been legally bound by public duty and social responsibility, but over the past few decades the Shareholder Primacy rule has given execs the permission to prioritise profits at the expense of other responsibilities - including even greater long term profits. However, after revolts and market failures now more CEO's than ever before are abandoning shareholder primacy as their North Star.

Data sources: Oxford Said, and various.

IMPACT

Today many blame capitalism and the shareholder primacy rule for companies putting profits first, and for treating people and the planet as commodities - with the consequences and unrest that causes. This is why the **CEO Pay Gaps** and **Ethical Capitalism** trends are both prominent today, and why many executives - who've largely been encouraged by their shareholders to put short term profits over long term gains and their **CSR** and **ESG** responsibilities - are increasingly abandoning the shareholder primacy rule with many CEO's telling shareholders to get out of their stock if they don't like it.

However, while this sounds positive there are other reasons for the change in heart. As the **Accelerating Rate of Change** brings more disruption it's abundantly clear to most execs that focusing on the short term at the expense of the long term is short sighted and puts their businesses at a long term disadvantage, with the result being that they often fail to capitalise on big long term market shifts which can cost them billions in lost revenues, market share, and in the case of incumbents sometimes their market position. Which then, ironically, tanks their share prices.

EXAMPLES

One of the first CEO's to tell Wall Street that he was going to prioritise long term growth over short term profits was Amazon's Jeff Bezos. Armed with a seven year plan he firmly told investors not to expect the company to make any profits for seven years because it was building and investing for the future. However, he said, at the end of that period investors would have a company that would print them money. And it did.

Unsurprisingly this strategy didn't go unnoticed either. In 2019 the New York business round table, a collection of the world's most powerful Fortune 250 CEO's led by Jamie Dimon, announced they were abandoning the shareholder primacy rule in the pursuit of building and investing for the future as well. And, every year Larry Fink, CEO of Blackrock with over $13 Tr AUM, has penned a letter urging his portfolio CEO's to prioritise long term thinking.

Meanwhile RWE, Europe's largest energy company, has also embraced this trend, spending $15 Bn to build out future renewable energy generation capacity even though, while they know it will be needed, there is no especially strong business case yet to support it.

ACT NOW

As we see not one but many structural global shifts that affect all industries in all countries it's clear to many that organisations who put their shareholders over their stakeholders and the planet, and who prioritise the short term over the long term will be the losers in the long term. And no board wants to be in that position. As a consequence more executives than ever before are investing more money, resources, and effort in building out their Horizon 2 and 3 innovation capabilities in order to prime themselves for when the new market shifts become the status quo.

EXPLORE:

- Business and impact assessments
- Company culture
- Emerging technologies and technology roadmaps
- Forecasting and scenario planning
- Risk appetite

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EXPLORE STARTUPS & MORE

FOREIGN DIRECT INVESTMENT

1ST YEAR ON THE LIST



QUICK TAKE

Driven by economic slowdowns, global geopolitics, and protectionism in 2023 we saw $1.3 Tr of global Foreign Direct Investment (FDI), a 2% YoY decline. However, when adjusted for distortions from Conduit Economies, which facilitate and artificially inflate the financial flows between countries for tax advantages, the decline was greater than 10%. India declined 43% but greenfield investments remained strong, Europe 14%, Asia and China 8%, the USA 5%, Africa 3%, and LATAM 1%, with investment into the UK up 1.4%. **Global Value Chains** (GVCs) intensive sectors, minerals, and **Green Energy** remained resilient.

IMPACT

There is no question that we're in a complex global investment environment and that **Belt and Road Initiatives**, **Bi-Polar and Multi-Polar World**, **BRICS 2.0** along with general **Economic Decoupling**, **Technological Decoupling**, **Shadow Standards Wars**, **Strategic Derisking**, and other trends all muddy the picture. Despite this though many experts expect a moderate up tick in global FDI volumes in the years to come which is good because the impact of FDI on economies and societies is profound.

FDI helps finance businesses in all stages of maturity allowing them to grow, invest, and create direct and indirect jobs. Investors also often aide knowledge and technology transfer which boost innovation and productivity, but which can also affect the culture and ideology of companies. FDI can also boost country's Corporate Tax receipts and infrastructure development, increase exports, GDP, and improve their balance of payments and skills pools. However, it can also exacerbate foreign dependency and **Soft Power Plays**, and environmental concerns, while profit repatriation results in capital outflows.

EXAMPLES

Providing detailed impact stats can be tricky. In 2024 €356 Bn of investment in Europe's energy, financial services, manufacturing, and tech sectors mainly from China, the UK, and US, helped create over 7 Ml jobs, and accounted for 12% of Ireland's GDP. In other regions UK FDI of £92 Bn in the energy, financial services, and real estate sectors supported 2 Ml jobs. In Asia $519 Bn of FDI in digital economies and manufacturing, especially from China and Singapore, saw FDI account for 15% of Vietnam's GDP. Then in India $83 Bn of FDI investment into the energy, pharmaceutical, and technology sectors contributed to the creation of over 6 Ml jobs.

Meanwhile, specific examples include CATL's $1.4 Bn Bolivian Lithium mining investment with long term impacts of $9.9 Bn, Nissan's $1.4 Bn UK EV manufacturing investment which created 6,200 jobs and represents 50% of UK vehicle exports, Google's $850 Ml Singapore data centre investment supporting 3,000 new jobs, and Tesla's $2 Bn Chinese Gigafactory which created 10,000 jobs and which produces over 700,000 EVs - or over half of Tesla's global production.

ACT NOW

Global investment flows can be the life blood of economies and when managed well they can benefit everyone and have a significant impact on a country's global competitiveness, GDP, and living standards. They can also be seen as a vote of confidence in the future of a business, sector, or country. However, while investment is almost always welcome countries can also find themselves being exploited and failing to reap some of the more impressive and lucrative gains with an example of this being some governments, such as China, often demanding that Chinese workers not local workers are employed to work on projects - thereby limiting the local economic and societal benefits.

EXPLORE:

- Asset value, Dependency, Economic, Impact, Risk, and Tax analysis
- Emerging technologies and technology roadmaps
- Industry diversification, ecosystems, and supply chain strategies
- Strong 'Country First' negotiation stance

Data sources: China Briefing, Finance Asia, Fortune India, UNCTAD, and various.

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EXPLORE STARTUPS & MORE

GLOBALISATION

3RD YEAR ON THE LIST



QUICK TAKE

As our world becomes increasingly connected, especially as we see the roll out of **Satellite Internet** and other technologies, it has never been easier to collaborate with, communicate with, and trade with anyone on the planet. Furthermore the increasing **Power of the Individual** also means that it is easier than ever before for individuals and organisations to benefit from globalisation - provided of course government policies don't restrict it. Today there are three main types of globalisation: Cultural, Economic, and Political, and all of them are generating heated and often polarising discussions.

Data sources: IMF, and various.

IMPACT

As you would expect the impact of globalisation, where systems that let people collaborate, communicate, trade, and travel with relative ease, has its benefits and disadvantages.

However, how you view the trend of globalisation very much depends on your own viewpoint. For example, on the one hand it's now easier for multi-nationals to provide new jobs and skills and boost regional economies, it's easier for people to take holidays in far off lands, and it's easier for governments to collaborate to resolve important issues. But, on the other hand it mostly benefits richer countries, migration is escalating ideological and social tensions, and global development and progress seems unbalanced. And there are many other impacts.

Culturally it is believed that globalisation both benefits societies, by exposing people to different cultures, but can also dilute local culture. Economically it can help level up the world, but also increase economic inequality. And politically it can give politicians a global platform, while also marginalising others. So, as you can see the impacts are as complex as they are diverse.

EXAMPLES

Cultural globalisation can be seen everywhere as global brands and icons, such as Alibaba, Apple, Arm, British Airways, Disney, Dyson, Emirates, Facebook, Huawei, Intel, McDonalds, Samsung, Starbucks, Tesla, Twitter, TikTok, and many others spring up everywhere. And, in some cases these brands are increasingly being used as platforms to control and shape cultural narratives, as well as directly and indirectly promote the ideologies and values of the cultures they represent.

Economic globalisation, which refers to the increasing interdependence of global economies on one another, has also had many impacts, such as helping decrease the cost of manufacturing which, in turn, has helped improve global living standards and choice, but it has also led to mass **International Migration** which has caused numerous political and social rifts.

Meanwhile, politically we see global coordinated action on **Climate Change**, but also looming **Protectionism**, and **Shadow Standards Wars** and **Trade Wars** - especially as we confront a new **Bi-Polar and Multi-Polar World** order.

ACT NOW

While globalisation is overall beneficial for all of us, whether it's because it makes it easier for us to apply for jobs in foreign countries, buy goods, have holidays, expand into new markets, and many other reasons, governments and organisations alike need to be acutely aware of the impact that globalisation has on individuals and how they see and process the negatives.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Government
- Social trends
- Unilateral global accords and coordinated global action

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EXPLORE STARTUPS & MORE

GLOBAL DIRECT TAX RATES

3RD YEAR ON THE LIST



QUICK TAKE

Global direct tax rates, which are generally increasing globally, are levied on companies and individuals based on their income, profits, and or wealth and are generally highest in advanced economies. While the rates vary wildly by country in OECD countries the average share of direct taxes as a percentage of total tax revenue is around 51%, and represents on average 14% of GDP whereas in low income countries this figure is just 5%. And, while these taxes are designed to be progressive the top 1% of earners pay an effective rate of just 7.5% compared to 20.7% for the bottom 50%.

Data sources: CEIC, IMF, OECD, Oxfam, UN, and various.

IMPACT

Direct taxes include Capital Gains Tax (CGT), Corporate and Individual Income tax (CIT and IIT), dividend tax, estate and inheritance tax, payroll tax, property tax, wealth tax, and others. However, while they play an important role within society, helping promote economic incentives, redistribute income, and revenue generation, unlike **Global Indirect Tax Rates** they are often seen as parental - taxes that none of us can choose to partake or not partake in - so it's little surprise that many people see them as a blunt instrument wielded by the governments whose data and opinions might differ from our own.

As an important government revenue stream though, used to support everything from education and healthcare to infrastructure development, pension schemes, and social welfare programs, it's little surprise that trying to get the balance between fairness and the current and future needs of the society right is difficult. Today global direct tax revenues account for approximately 8% of global GDP, or half of all global tax receipts, and the majority of governments use them as a tool to promote economic growth and stability.

EXAMPLES

In OECD countries, where there is good data, on average individuals pay 8.4% of their income in IIT with CIT at 2.8%.

In the USA at the federal level in 2020 direct taxes accounted for 52.4% of all tax receipts with IIT 50% of that, CGT accounting for 10%, CIT 7%, and estate and inheritance tax 0.6%. However, the picture's very different at the state level where property taxes accounted for around 72% of revenue - showing just how dependent local economies are on essentially just one tax type. This is also a pattern that's repeated in other developed countries. In Nigeria though the picture is flipped with the percentage of government income coming from CIT ranging between 40% to 60%, and from IIT 20% to 40%, with the rest coming from other taxes including the Petroleum Profits tax.

Meanwhile, in 2020 in China direct taxes represented 21.2% of all tax revenue, which is low compared to most countries where in Australia this is 64.5%, India 45.6% increasing over time, UK 35.4% reducing over time, France 28.6% increasing over time, Brazil 26.9% increasing over time, and Germany 17.3% increasing over time.

ACT NOW

Developed economies, who have a higher per capita income, broader tax bases, and better tax enforcement, as well as less reliance on cash transactions and almost no **Informal Economy**, often generate more of their tax revenues through direct taxation rather than relying heavily on indirect taxes. Not only can this strategy help shield them from sudden shocks, but the use of tax breaks, such as R&D tax breaks, can also be used as an effective tool to stimulate favourable economic activities.

EXPLORE:

- Economic growth and public finance goals and projections
- Emerging technologies and technology roadmaps
- Future of Education, Government, Financial Services, and Work and the Workplace
- Progressive and proportional tax policies, and robust data collection and tax reporting
- Tax simplification

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GLOBAL GDP GROWTH

3RD YEAR ON THE LIST



QUICK TAKE

Overall global GDP growth, as a percentage figure, steadily declined from an average of 6% in 1960 to 3% in1985 after which its growth started levelling off until the global recession of 2009 and the global pandemic of 2020 which saw global GDP growth go negative and hit -2% and -4% respectively. Despite these fluctuations though GDP has grown exponentially since records began, even as **Global Productivity** flattens and stagnates, but as we look forwards most estimates put future global growth, excluding the rebound from shocks, at between 2.5% and 4.5% per annum.

Data sources: IMF, Nasdaq, World Bank, and various.

IMPACT

In 1AD it is estimated that global GDP was $187 Billion in real terms, doubling in 1500 to $430 Billion, and doubling again in the 1700's. By 1870 thanks to the Industrial Revolution it had doubled again to over $1.92 Trillion, doubling again by 1900 to $4.74 Trillion, after which growth continued to accelerate exponentially to hit $113 Trillion today. While this is partly due to **Population Growth**, it's also thanks to technology driven productivity and proliferation.

By 2050 it is estimated that global GDP will double again with 20% of that coming from China, 15% from India, and 12% from the US, with the EU's share of global GDP shrinking from 15% today to 9%. It's also expected that the world's 32 largest economies will account for over 85% of world GDP.

Boosted by technology driven productivity and improvements the future rate of GDP growth is expected to far outweigh the rate of population growth with emerging markets (E7) growing twice as fast as advanced ones (G7). As a result by 2050 six of the seven largest economies are expected to be emerging economies including China, India, Indonesia, Brazil, and Russia.

EXAMPLES

Today, over 85% of all GDP is generated in cities and **Rapid Urbanisation** is expected to continue to fuel this trend far into the future, which therefore means that countries wanting to maximise GDP growth will need to have robust urban development and planning strategies.

By 2050 some of the greatest gains in global GDP rankings could come from Nigeria, the Philippines, and Vietnam who it's believed are set to all outperform the growth of many other developing countries to claim 14th, 19th, and 20th in the rankings respectively, while France and Italy, if they don't manage their economies carefully, could slide out of the top 10.

Today, some of the fastest growing economies are those that are stable, have buoyant domestic demand and strong exports - whether that's natural resources, technology, or other goods - which is why we see countries such as Bangladesh, Benin, Egypt, Ethiopia, Guyana, and South Sudan also rising. And, as for consequences, all these will impact the **Bi-Polar and Multi-Polar World**, **Global Reserve Currency Wars**, and other trends.

ACT NOW

The changing global economic landscape will have a significant impact on future world order as the countries with the largest economies continue to use **Hard Power Plays** and **Soft Power Plays** to influence the global agenda and politics, and as their populations spending power increases. However, it is the continued investment in technology R&D and STEM skills which will produce the greatest GDP productivity gains so it can be argued that the countries best able to leverage technology for growth will have the upper hand in growth.

EXPLORE:

- Borderless trading policies
- Emerging technologies and technology roadmaps
- ESG investments
- STEM education and technology R&D investment and reform
- Urban investment and planning

GLOBAL HOUSEHOLD DEBT

3RD YEAR ON THE LIST



QUICK TAKE

Global Household Debt, which is the combined debt of everyone within a household, including consumer debt and mortgages, has been increasing consistently for the past fifty years. Partly driven by **Population Growth**, as well as changes in consumer spending behaviours and **Global Demographic Shifts**, today it is at record highs standing at over $57 Trillion. While the global COVID-19 Pandemic added an extra $8 Trillion to this amount though, fuelled by cheap debt, many households finances are now in better shape than they were pre-pandemic. But there are exceptions.

Data sources: CEIC, Experian, IMF, Moody's, OECD, and various.

IMPACT

Different from **Global Public Debt** and Nonfinancial Corporate Debt global household debt has increased by over 58% in the past 50 years, albeit that during the late 2010's that rate was so low as to be almost flat.

During the early 2020's, however, there was a surge in debt levels driven by a variety of factors including the global pandemic and its associated workforce re-balancing and redundancies, as well as Russia's war in Ukraine which was a major factor in driving historically high **Global Inflation** rates.

While debt in itself is not a bad thing we all know that the crunch is people's ability to pay and while interest rates were at historic lows during the pandemic post-pandemic those rates started to surge to uncomfortable levels - albeit not quite to historic highs.

While household debt can boost economic growth in the short term in the medium term when a country's Debt-to-GDP ratios exceed 60% we often see softer consumer spending and recessions - we also see a drop in **Global Living Standards** and a drop in consumers ability to weather shocks.

EXAMPLES

While there are always going to be differences in the figures between regions and demographic groups developed countries are almost always likely to have significantly higher Debt-to-Net Disposable Income (DNDI) ratios. For example, when we look at the G7 their ratios range from 90% DNDI for Italy to 185% for Canada, with the remainder being 101% for the USA whose household debt levels now exceed $15 Trillion, through to 102% for Germany, 115% for Japan, 124% for France, and 148% for the UK.

However, when we look outside of the G7 countries at the higher rates Sweden's DNDI level is 203%, South Korea's is 206%, Australia's 211%, the Netherlands and Switzerland's 222%, Norway's 241%, and Denmark has the highest at 255%. What's interesting here though is that some of these countries top the world's the **Global Happiness** indeces. Coincidence?

At the lower end of the scale we have Mexico at just 24% DNDI, South Africa 42%, Brazil 55%, Poland 59%, Chile 70%, and China 99%, but we also have a huge abscence of data especially with regards to Africa, Asia, and LATAM.

ACT NOW

While household debt now equates to almost 40% of global GDP and rising the rate at which it grows, outside of system level shocks, is quite gradual. There is, however, a growing disparity between rural and urban levels of debt, as you might expect, with urban debt levels often being double those of people living in rural areas. This is something to keep an eye on when we consider the trend of **Rapid Urbanisation**. The abscence of data in many regions, for traditional forms of debt as well as emerging "shadow debt classes," such as **Cryptocurrencies** and so on, also gives policy makers and other stakeholders problems.

EXPLORE:

- Central Bank Digital Currencies
- Emerging technologies and technology roadmaps
- Future of Financial Services, and Work
- Improved financial data gathering, analysis, and reporting

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GLOBAL INDIRECT TAX RATES

3RD YEAR ON THE LIST



QUICK TAKE

Global indirect tax rates, which in 2022 hit $10.4 Trillion, and are generally increasing globally, are what consumers pay as a result of the taxes levied on goods and services before they reach them. They're also used as a lever to alter market demand and influence consumer behaviours. With historically high levels of **Global Public Debt**, global supply chain transformation, and as consumers embrace new behaviours, services, and trends including **E-Commerce**, the **Green Energy Transition**, and **Vehicle Electrification**, and others, today governments are reforming their taxes.

IMPACT

Indirect taxes such as carbon taxes, customs and excise taxes, Goods and Services Taxes (GST), luxury taxes, sugar taxes, transaction taxes, Value Added Tax (VAT), and others are all important government revenue streams, and the introduction of **Central Bank Digital Currencies** could one day see them monitored and altered in real time according to market conditions.

While many people believe these taxes are regressive, in other words they disproportionally affect low income earners who end up paying a larger proportion of their income on them compared to high income earners, which affects **Wealth Inequality**, they have multiple impacts. High indirect taxes increase prices and reduce consumers purchasing power, often leading to an increase in savings activity which can lead to a slowdown in economic activity, make recession more likely, and impact regional and **Global GDP Growth**, **Global Inflation Rates**, and **Global Interest Rates**. Furthermore, how they're applied can also have a positive impact on trade relations if they're low, and make locally produced goods more competitive if they're high.

EXAMPLES

In OECD countries VAT represents on average 20.2% of total indirect tax receipts, while the actual VAT rates vary from a low of 5% for Canada, 10% for Australia and Japan, and scale to a high of 27% in Hungary, most countries sit in the 15% and above category.

As a means to change consumer behaviours indirect taxes have been a useful lever. In the UK the introduction of a 10% sugar tax, which raises over £240 Million per year, has seen over 50% of food manufacturers reduce the sugar content of their products and eliminate the equivalent of 45 Million kg of sugar per year - with the health benefits that brings. Meanwhile across Europe Single Use Plastic (SUP) taxes, which aim to reduce the **Plastic Planet** trend, have resulted in a 90% reduction in SUP use in most countries.

It's also estimated that carbon taxes, whose primary aim is to curtail **Climate Change** and the **Warming Planet** trends, and which average $75 per ton of CO2 today but are increasing to above $125, will help reduce global greenhouse gas emissions by 28%. So, as you can see there's more to these taxes than meets the eye.

ACT NOW

Indirect taxes can be a very effective tool when it comes to helping control and shape market demand, alter the competitive landscape, and change consumer behaviours. Furthermore, unlike **Global Direct Tax Rates** they can also capture a lot of the trade that takes place in the **Informal Economy** which is predominantly cash driven and hard to monitor. However, implemented incorrectly they can also create and drive **Black Market Economies**, on top of which governments need to ensure that their policies are equitable and fair and don't unnecessarily benefit one group of consumers over another. They also need to avoid tax by stealth.

EXPLORE:

- Economic growth and public finance goals and projections
- Emerging technologies and technology roadmaps
- Future of Education, Government, Financial Services, and Work and the Workplace
- Progressive tax policies and tax simplification

Data sources: Bloomberg, BMJ, Grant Thornton, PWC, OECD, Vertex, and various.

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GLOBAL INFLATION RATES

3RD YEAR ON THE LIST



QUICK TAKE

While global inflation rates have generally been predictable and steady for the past decade or so, staying within a low of 3.2% in 2020 and a high of 5.1% in 2011, and averaging 3.45% during the period, as the result of numerous global events including **Epidemics and Pandemics**, energy and food price inflation and increasing **Resource Scarcity,** and as a result of supply chain snarl ups, **Trade Wars**, and wars, in 2022 the global rate broke 8.8% with emerging economies faring worse than their advanced economy counterparts. It then started reducing again in early 2023.

Data sources: Economist, IMF, OECD, WEF, World Bank, and various.

IMPACT

High inflation rates have many economic and societal impacts including increased **Global Household Debt** as consumers have to pay more for energy, food, goods, and services, and higher **Global Public Debt** as the cost of running countries increases and as, in some cases, governments step in to financially subsidise and protect consumers and industries from the worst price increases.

High inflation also erodes purchasing power, which impacts **Global Trade Volumes**, and is detrimental to **Global Real Wages** and **Wealth Inequality**. The associated uncertainty can also suppress investment activity, affect income and wealth distribution - especially as it relates to individuals and businesses whose assets or investments, such as pensions, are or are not linked to inflation - and can result in central banks increasing interest rates to combat rising prices which can push economies into recession, and weaken a country's currency, financial reserves, and international competitiveness.

And then there's the fiscal pressure on governments who experience reduced tax receipts, which can lead to austerity, civil unrest, and rising unemployment.

EXAMPLES

Some of the worst examples of rising inflation rates include Zimbabwe which in 2008 saw inflation reach a staggering 89.7 Sextillion percent which was a combination of poor fiscal policies, political instability, and the collapse of the country's agriculture sector. During the darkest moments this rate also meant that the price of goods were doubling every day, and despite the Zimbabwean government issuing the world's first Trillion Zimbabwe (ZWL) dollar note in 2009 the country had to abandon its currency and adopt the US Dollar and South African Rand.

Elsewhere in Argentina, whose inflation rates have been historically the highest in the world in 2021 the rates hit 50% which saw the Argentine Peso loose 75% of its value against the US Dollar and made most imports prohibitively expensive, and their interest rates hit 38% while GDP collapsed by 9.9%.

However, in South Sudan in 2021 we temporarily saw deflation of -11.6% which increased consumers purchasing power, but resulted in a slow down of consumer spending as people expected prices to continue to fall, as well as significant social and political instability.

ACT NOW

Inflation has a significant impact on the economic, political, and societal health of a country, and in every case high inflation has always bought with it hardships. As a result governments and organisations should do their utmost to keep inflation in check and under control, but they should also do their utmost to shelter themselves from countries who seek to weaponise it for their own advantage and use it as an extension of their **Soft Power Plays**.

EXPLORE:

- Anti-corruption initiatives
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Agriculture, Education, Energy, Financial Services, Manufacturing, and Work and the Workforce
- Global value chains and supply side controls and improvements
- Monetary, interest rate, tax, and wage control policies

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GLOBAL LIVING STANDARDS

3RD YEAR ON THE LIST



QUICK TAKE

Global Living Standards have risen consistently for more than three decades, but during the early 2020's the living standards of more than 90% of the world's countries declined multiple years in a row as the combination of **Climate Change**, the COVID-19 Pandemic, debt burdens, raging inflation, and war, took their toll and erased more than five years of global progress. Putting this into context even at the height of the 2007 global recession the living standards of 'just' 10% of the world's countries were impacted, so now the world has to work extra hard to reclaim the gains its lost.

IMPACT

There are alot of factors that impact people's living standards, and over the decades there's been constant debate about the impact of various global ideologies and systems on the trend, such as Autocracy versus Democracy, Capitalism versus Socialism, consumption versus materialism, as well as the prioritisation of GDP growth at all costs versus the environment and the rising **De-Growth Agenda** debates.

Since 2000 though democracy is under threat, and negative views about the world has surged, reaching all time highs - even when set against the backdrop of past world wars and **Global Recessions**. The number of adults experiencing high levels of stress is also at its highest level with 37% experiencing high levels of stress, up from 32% in 2005, and, unsuprisingly, political and **Social Polarisation** has also increased in over 75% of countries.

Since 1990 **Global Life Expectancy** has increased by 8% and globally people in extreme poverty has fallen from 36% to 10%, illiteracy from 24% to 13%, child mortality 9% to 4%, and over 7 Bn people, an increase of 3 Bn, have had a Secondary education.

EXAMPLES

Today, according to the UNDP when it comes to improvements in global living standards we are experiencing more "drivers and layers of uncertainty" than ever before which means we all need to remain vigilent and be working hard to build on the gains we've seen in the past. In terms of global life expectancy the greatest increase has been in Singapore where since 1800 life expectancy has jumped to 85 years on average - an increase of 193%.

We are also living in the best fed times in history with global per capita calorie intake increasing on average by 30% since 1940 when 57 people per 100,000 died from famine compared to todays figure of 14, with the biggest gains being seen in India where calorie intake increased from 2,020 per day to 2,549 and in China where it rose from 1,427 to 3,375.

We've also seen vaccines helping save billions of lives and reduce infant mortality, global access to safe water and sanitation increase from 62% to 72% and 29% to 54% respectively, and we've also seen global GDP per capita increase from $1,102 in 1820 to over $15,000 today.

ACT NOW

While improvements in global living standards were reversed in the early 2020's overall there are lots of bright spots. But, despite the good news, there are remaining areas of concern such as the racheting back of people's freedoms, especially as we see autocrats and dictators become bolder, and other challenges such as **Climate Change**, **Job Automation**, **Polarised Society**, **Wealth Inequality**, and others - all of which have obvious and non-obvious impacts that we need to be on guard against.

EXPLORE:

- Access to education, financial services, healthcare, and job markets
- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Financial Services, Government, Healthcare, Transportation, and Work
- Global accords, and policy, and regulation reform

Data sources: Gapminder, Our World in Data, UNDP, World Bank, and various.

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EXPLORE STARTUPS & MORE

GLOBAL PRODUCTIVITY

3RD YEAR ON THE LIST



QUICK TAKE

When it comes to Global Productivity it is normally measured using labour based metrics. Overall the trend appears that global productivity growth has remained relatively flat for nearly four decades, despite technological progress and the diffusion of digital technologies which many believe should have boosted it - something that economists attribute to a deceleration in working population growth, the stabilisation of educational attainment, and the slowing pace of expansion into more diverse and complex forms of production as the growth of Global Value Chains (GVC) has stalled.

IMPACT

While average global productivity has grown modestly since 1981 from 0.75% to 2%, when it comes to Advanced Economies (AE) versus Emerging Market and Developing Economies (EMDE) there are significant differences.

During this period AE's productivity has declined steadily from 1.75% to just 0.5% today, while in EMDE's, which includes China, it's grown from -0.5% to 3.75% with a peak in 2007 of 6% and a marked slow down after the 2009 global recession - most of which is attributed to significant reductions in business services and manufacturing activity. Productivity growth was also 1% to 3% higher in countries with strong macroeconomic fundamentals and favourable demographic trends, such as in financial development, life expectancy, tertiary education, and participation in GVC.

However, despite this overall softness many believe technologies such as **Additive Manufacturing**, **Artificial Intelligence** (AI), and other **General Purpose Technologies** (GPT) will provide a productivity boost in the future, but first they have to be adopted, and then there will be a lag.

EXAMPLES

What is most striking about this period of low productivity is that it coincides with enormous advances in technology. An extra 3.5 Billion people have gained access to the internet, computers and smartphones are ubiquitous, and online businesses and software have all flourished. And that's before we discuss how AI, **Digitisation**, and other trends are re-shaping the world. Despite all these apparent advances though as Robert Solow famously remarked: "You can see the Computer Age everywhere but in the productivity statistics."

However, while economists ponder over the causes and implications of the "Solox Paradox" there are some notable examples bucking this trends overall malaise which, when you dig deeper highlights some interesting data points ... The top five countries on the global productivity rankings Luxembourg, Ireland, Norway, Switzerland, and Denmark, have some things in common - 40 hour working weeks, good vacation policies, and so on. However, notably they all rank high on the Happiness Index and Quality of Life Scale, and all their citizens all have the greatest sense of life satisfaction. Coincidence?

ACT NOW

Not only does slow productivity growth have an impact on **Global GDP Growth**, but it also slows the rate at which we can solve global **Wealth Inequality**. There's also a growing belief that **Climate Change** and **Extreme Weather** will adversely affect this trend. However, with happiness, life satisfaction, and quality of life, all seeming to help improve a country's overall productivity one could argue that business leaders should re-double their efforts to make their employees feel "happy and fulfilled."

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, HR, Manufacturing, and Work
- Health and well being policies

Data sources: Brookings, Bureau of Labor Statistics, OECD, World Bank, and various.

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GLOBAL PUBLIC DEBT

3RD YEAR ON THE LIST



QUICK TAKE

Today global debt stands at over $300 Trillion, or 256% of GDP, an increase of over 28% on pre COVID-19 pandemic levels and double 2016 levels. Of this 40%, the highest value in more than six decades, or 95% of GDP and over $120 Trillion is Global Public Debt, with the remainder being **Global Household Debt** and Nonfinancial Corporate Debt. With over half the 28% rise being the result of increased government borrowing it should therefore come as little surprise that many governments now face an uncertain future, and are raising taxes while tightening spending.

Data sources: ECB, IIF, IMF, OECD, World Bank, and various.

IMPACT

While the global pandemic had a significant impact on countries debt levels it was different for different markets. In advanced economies where governments were empowered to help their citizens more, debt levels increased by 33% year on year to support initiatives. In emerging middle income economies this was 16% and in low income economies it was 8%. As a result the proportion of low income countries in debt distress and at high risk of debt distress doubled to over 60% from 2015 levels. However, while low income economies were hardest hit it's China and the US who have the highest public debt levels, standing at $9.7 Trillion and $31 Trillion respectively, with the USA alone spending $48 Billion or 12% of all US Federal spending, to maintain it and that figure is increasing.

High levels of public debt can decrease **Global Living Standards**, create an environment of higher income taxes, inflation, tariffs, and unemployment, as well as increase trade deficits and intensify wage pressure. They can also reduce disposable income, business confidence, investment, and profits, suppress consumer and government spending and usher in recession.

EXAMPLES

In the past we have seen multiple countries affected by their public debt loads and since 2000 several countries have gone bankrupt including Argentina in 2001 with $145 Billion of debt, Iceland in 2008 with $85 Billion, Lebanon in 2020 with $90 Billion or 170% GDP, and Sri Lanka with $51 Billion. Meanwhile, in the past two centuries Brazil, Chile, Costa Rica, Russia, Spain, and Uruguay have all declared bankruptcy more than nine times, with Ecuador's tally being ten.

While today Japan still has the highest debt to GDP ratio at 246%, Greece has the second highest at 181%. And, in Greece's case in 2010 their looming default triggered the biggest financial rescue of a bankrupt country in history. But, despite the $290 Billion bailout by the ECB and the IMF, which they'll be repaying until 2060, living standards collapsed with a third of Greeks falling into poverty, wages fell 20%, unemployment hit 25% overall with youth unemployment hitting 50%, and the country entered a severe recession. And even now Greece still under performs the OECD Better Life Index in all areas except health, so they have a long way to go before they recover.

ACT NOW

Buying and selling public debt is big business, and while there's no denying that public debt plays a vital role in helping economies develop and grow, as well as help control inflation and stabilise unemployment levels, as we've seen many times when debt becomes unmanageable the results can be disastrous for countries and their citizens.

EXPLORE:

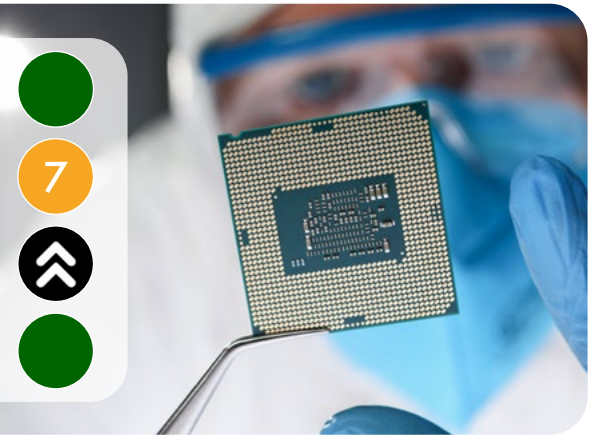
- Alternative borrowing mechanisms
- Financial restructuring and stabilisation
- Future of Financial Services and Governments
- Global accords, and policy and regulation reform
- Improved financial accountability, management, and resilience
- Prepare for shocks
- Tackle debt vulnerabilities

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GLOBAL R&D SPENDING

3RD YEAR ON THE LIST



QUICK TAKE

R&D spending has always gone hand in hand with **Global GDP Growth** but as we enter into an **Innovation Cold War** global R&D spending is soaring. In the past decade global spend has increased from $1.99Tr per year to $2.63Tr, an average increase of 2.84% per year, with the world's top 1,000 companies spending an estimated $858Bn. However, as various countries look to supercharge their future growth and security we've seen staggering increases in spending from countries including China which now accounts for 24.8%, of the global total, up from just 4.9% in 2000, and others.

Data sources: China NBS, FAS, PWC, World Bank, and various.

IMPACT

The impact of R&D spending can be seen everywhere, from the hospitals you visit to the technologies you use, and it drives growth, jobs, prosperity, and of course underpins national security. Unsurprisingly though the amount of money that governments and companies spend varies by region and sector.

Globally hardware and software dominates spending with for 31% share of the total global corporate spend, followed by health at 17%, chemicals at 13%, transportation at 12%, energy at 7%, and aerospace and defence at 2%. However, as we transition to a **Bi-Polar and Multi-Polar World** and **Net Zero** it's highly likely that the latter two will increase dramatically - all of which will have major consequences for business and society in the future.

While corporate spending enriches private companies public R&D spending plays a vital role in helping de-risk and kick start new industries and industry R&D initiatives, as well as accelerating the transition from the old to the new - whether it's supporting **AI** and **Web 3.0**, building supercharger networks to support **Vehicle Electrification**, rolling out **5G**, or many other bold transitions.

EXAMPLES

When we look at some interesting examples of this trend we can split them into two categories - public spending and private sector spending.

Globally the top 10 countries represent $1.99 Trillion of spend - or 85% of the global total with the top five being the US at $721Bn, China at $582Bn - which has almost tripled in a decade, Japan at $174Bn, Germany at $146Bn, and South Korea at $112Bn.

It's also interesting to see where some governments are putting their money. The US, for example, recently announced a $325Bn package to support climate, digital technologies, energy, and health R&D, and $280Bn to support semiconductor development. Meanwhile the EU's $100Bn Horizon package aims to make European economies and societies healthier, greener, and more digital, and the UK's $30Bn package included creating its own ARPA program as part of the **ARPA Everything** trend. Then, looking to Asia China placed a massive $1.4Tr bet on next generation technologies as it looks to leap frog the US and, as part of a **Standards Shadow War**, dominate the future of global tech.

ACT NOW

Increasingly R&D spending is being seen by many governments as a sign of competitiveness, intent, and national pride so it's little wonder that with the whole world economy to play for the biggest economies are announcing raft after raft of aggressive spending packages and essentially weaponising ithis trend in their quest be top dog. However, while this is interesting in itself I would advise you to pay close attention to the standards wars because whoever owns the global standards often controls the technology and its future development direction - often to the detriment of their adversaries.

EXPLORE:

- Belt and Road Initiatives
- Common global standards
- Emerging technology and technology roadmaps
- Future of Aerospace and Defence, AI, Communications, Creativity and Innovation, Cyber Security, Energy, Government, Healthcare, Manufacturing, Materials, and Transportation

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GLOBAL REAL WAGES

3RD YEAR ON THE LIST



QUICK TAKE

While it varies by region and sector, and the devil is always in the details, Global Real Wages have been growing at between 1% and 3% per year since 2000, and even though that's dwarfed by the **CEO Pay Gaps** trend, maintaining that growth in spite of economic shocks and global crises has not been easy. In the early 2020's multiple shocks such as the global COVID-19 pandemic, the Ukraine War, and historically high **Global Inflation Rates**, and turbulent FOREX markets, which all had an impact on **Global Living Standards**, saw global real wages fall for the first time by 0.9%.

Data sources: ILO, ONS, TUC, and various.

IMPACT

While G7 economies were worst hit during this period, seeing real wages decline by 2.2%, the remainder of the G20 countries fared better with 0.8% growth. However, despite this seemingly good news that was still 2.6% less than their average real wage growth rate in 2019.

Real wage growth often causes price inflation and higher **Global GDP Growth**, which then often has a positive impact on **Global Living Standards** and **Global Happiness**.

Correspondingly, a fall in real wages - especially large falls like we saw in the early 2020's - can fuel social unrest, strikes, make **Wealth Inequality** and the **Mental Health Crisis** worse and fuel the **Polarised Society**. These negative changes in real wages also often impact the lowest income workers the hardest and reduce consumers purchasing power and disposable income, which can tip countries into recession. It also sometimes means consumers have to make tough choices, such as between "eating or heating," which in turn can then also increase **Global Household Debt** which then comes with its own issues.

EXAMPLES

While the figures are dynamic, according to global and regional conditions, during the unprecedented period of crisis in the early 2020's on average we saw Canada and the USA's real wages decline by 3.2%, the EU's decline by at least 2.4% and up to 3.3% for Eastern Europe, and LATAM's decline by 1.7%, and Africa's by 1.4%. However, interestingly not all the figures were negative, Central and Western Asia's real wages grew between 2.5% and 12.4%, Asia and the Pacific's grew by between 0.3% and 3.5%, and the Middle East saw an increase of 0.5%.

While these figures change on a quarterly basis the trends of the G7 versus the G20 versus the remainder of the world's results are interesting and show a strong contrast between mature and emerging markets. It also has implications for the cost and distribution of manufacturing and other services in the future.

Meanwhile, in the UK the worst real wage declines on record triggered mass strike action across almost all groups and areas of society, and in some instances almost bought the country to a standstill economic and social standstill.

ACT NOW

People have always demanded fair pay for a fair days work, but unlike yesteryear when very few people were knowledgable about actual real wage growth rates today everyone has access to them on demand, and a more informed worker is a more empowered worker as we saw with the high levels of activism, strike action, and unrest when after decades of growth we saw some of the worst declines on record.

EXPLORE:

- Adjusting minimum wage rates
- Energy, food, and manufacturing security
- Future of Agriculture, Education, Energy, Financial Services, Healthcare, Manufacturing, and Work.
- Levelling up initiatives
- Targeted economic packages

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

GLOBAL RESERVE CURRENCY WARS

3RD YEAR ON THE LIST



QUICK TAKE

The first US dollar, as we know it today, was printed in 1914 and six decades later, under the Bretton Woods Agreement and backed by the world's largest gold reserves at the time, it became the world's default reserve currency. Today, 40% of the world's debt and more than 61% of all foreign bank reserves are denominated in dollars and many of the reserves are in cash or US bonds, such as US Treasuries. Despite this though a growing club of powerful countries, unhappy with the US using the dollar as a trade and **Sanctions** tool, are starting to steer away from it and undermine it.

Data sources: IAGS, IMF, and various.

IMPACT

For decades the US dollar has been the world's reserve currency and has been a symbol of stability and strength, but today China, the EU, and Russia are moving to "De-dollarize" their economies in order to remove themselves from being subject to the "whim" of US jurisdiction if they transact in dollars, as well as increase the importance of their own currencies.

Prompted by repetitive sanctions on their countries and citizens, as well as geopolitical reasons, it's easy to see why China and Russia want to reduce the dollars global importance. However, the EU's impetus to move came when in 2018 Washington withdrew from the Iran nuclear deal, which was then followed by the restoration of sanctions on Tehran - an unpalatable situation which left many European organisations vulnerable to punishment from Washington if they transacted with Iran.

If, or when, the dollars influence declines then other currencies will fill the void, and while the Yuan was originally the prime contender China's behaviour and capital flow policies in recent years have now put that in question, with a "Eurodollar" now looking more likely.

EXAMPLES

Countries like the BRICS are increasingly calling the US Dollar the past and are working to replace it. In China's case, for example, they've created a "Petro-Yuan" - Yuan denominated crude oil futures - and they're now paying for crude oil, which has always traditionally be paid for in dollars or Euros, in Yuan.

The BRICS are also creating their own digital currency networks, with China and Russia also building their own global transaction networks, such as China's CIPS which rivals SWIFT. They pair have also managed to reduce the use of the dollar in their bilateral trade dealings with the dollar now accounting for just 46% of all bilateral trade, down from 90% in 2015. Of the remaining balance 30% of it is now in Euros, and 24% is a combination of the Ruble and Yuan. And all BRICS and authoritarian countries are following a similar trend.

The movement against the US dollar, especially in Sanctions hit countries, is gathering pace, and in a sign of the times even investors like Warren Buffet, have started buying gold as opposed to debt, which is an odd patriotic commitment to a nation that's been off the Gold Standard since 1971.

ACT NOW

The use of sanctions, and the use of **Global Trade Volumes** and the use of the global CHIPS and SWIFT payment networks as trade weapons, has created increasing alarm and a lack of confidence in US dollar usage in China and Russia, and now this alarm has spread to Brazil, Europe, India, Iran, and Turkey. As a consequence, if the US is not very careful and continues to weaponise its financial power, it could end up throwing petrol on the fire and accelerate the undermining of its own currency.

EXPLORE:

- Business and impact assessments
- Future of Governments, and Financial Services
- Soft power plays and trade wars
- Strong global institutions

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

GLOBAL TRADE FLOWS

3RD YEAR ON THE LIST



QUICK TAKE

As **Global GDP Growth** and **Global Inflation Rates** and interest rates stabilise, and as we see changes in **Global Trade Volumes**, **Geopolitical Fragmentation**, caused in part by the **Bi-Polar and Multi-Polar World** trend and regional conflicts, continue to impact intra-bloc trading patterns - especially West-East trading patterns - Global Trade Flows are also changing because of the trends of **Strategic Dislocation**, as well as in some cases by **Climate Change** and **Extreme Weather** which is not only making some major rivers unnavigable but also damaging vital infrastructure.

Data sources: McKinsey & Co, State Street, UNCATD, and various.

IMPACT

The tracking of this trend gives us important insights into the state of **Global Living Standards**, **Global Productivity**, and also into economic and political alliances. Conflicts, geopolitics, and **Trade Wars** are just a few of the trends that affect it, and while changes take time to materialise today we can clearly see trade flow patterns changing - part out of necessity and as the result of different disruptive events, and partly as they re-align along primarily geopolitical lines.

Not only does this trend affect long term infrastructure and investment decisions in different countries, as we see with the continued re-imagining of China's and the EU-US **Belt and Road Initiatives**, but these patterns can also have a significant influence on consumer preferences, currency valuations via trade deficits, inflation rates, market access, regional competitiveness and innovation scores, as well as government policies and regulations, and regional GDP. It also impacts the availability, price, and supply of consumer and industrial goods, as well as energy, food, and raw materials, as well as also affecting employment, wages, and market sentiment.

EXAMPLES

Examples of this trend in action include the continued animosity between the world's two largest economies - China and the USA - which have both been embroiled in **Corporate Blacklisting**, **Sanctions**, and **Trade Wars**. In recent years a 14.5% decline in US imports from China has seen the US diversify its imports to favour Mexico and South East Asia, meanwhile China has also been diversifying by ploughing more effort into its **BRICS 2.0** and **Global Reserve Currency Wars** and by increasing exports to ASEAN countries by 9% and to Africa by 2.5%, both of which are expected to grow.

Meanwhile, as Intra-Asian trade grows, with trade within Asia now accounting for approximately 60% of the region's total, and showing a clear pivot towards regional trade over global trade, India has also been growing its exports to ASEAN countries by 7%. Elsewhere, the UK's post Brexit trade with the EU has seen a 14% decline, and while Intra-EU trade remains stable the bloc has been increasingly looking to South East Asia and NAM as alternative trading partners to China, with exports to these regions growing by 3.4% and 3.6%, but exports to Africa dropping by 5%.

ACT NOW

Change in Global Trade Flows affects everything from infrastructure and investment, including Direct Foreign Investment (FDI) decisions right through to the development of new economic trading blocs, trade agreements, political alliances, and much more. Therefore it is imperative that executives have a good understanding of this trend and its future direction, as well as have the people and processes in place to assess the risks.

EXPLORE:

- Business and impact assessments
- Business resilience strategies
- Geopolitical, investment, and trade dependencies, flows, and risks
- Infrastructure development initiatives
- Regulatory and legal frameworks
- Supply chain strategies

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

GLOBAL TRADE VOLUMES

3RD YEAR ON THE LIST



QUICK TAKE

On average global trade has grown at 5% per year since the 1990's, with estimates suggesting 2050 volumes will be three to four times current volumes with most of the growth coming from global services trade which has risen from $4.4 Trillion in 2011 to $6.0 Trillion in 2019, with a 20% decline during the global pandemic.

Meanwhile, global merchandise trade which is seen as the more resilient of the two, with only a 5.3% pandemic fall, has averaged $18.26 Trillion over the past decade with highs of $19.3 Trillion in 2019 and lows of $16 Trillion in 2016.

Data sources: BGMEA, ITC, UNCTAD, World Bank, WTO, and various.

IMPACT

Global trade has many impacts on the global economy, politics, and society. Economically, it allows countries with advantages in particular fields to capitalise on them and open up new global markets, thereby growing GDP, inward investment, and jobs. Today an estimated 1.5 Billion people, or 29% of the world's population, rely on global trade for their livelihoods, meaning that it can be an effective tool to reduce **Global Wealth Inequality** and **Global Poverty**. It also helps maintain price stability and keep **Global Inflation Rates** in check by providing consumers access to a wide range of competitively priced goods and services. Societally it increases access to essential resources such as food, medicines, and raw materials, as well as promoting cultural exchange and facilitating innovation. And, politically, it can boost cooperation between nations, and lead to the creation of new international alliances and institutions. However, as we transition to a **Bi-Polar and Multi-Polar World**, trade is increasingly being weaponised resulting in today's **Belt and Road Initiatives**, **Global Reserve Currency Wars**, the **Innovation Cold War**, and the **Trade Wars** that affect so many of us.

EXAMPLES

While there are many examples I could cite these are some of the more interesting ones. In Bangladesh, whose export market is predominantly driven by cheap labour, the textiles and apparel sector has seen staggering growth since the 1980's and now accounts for more than 80% of the country's total exports with the Ready Made Garment (RMG) sector alone accounting for over 4.4 Million jobs. However, this also means that the country's economy is also at high risk as increasingly sophisticated **Robotics** increase the likelihood of mass **Job Automation**.

Trade agreements like NAFTA signed in 1994 and which by 2017 had boosted Mexican exports into the USA to over $110 Billion, as well as its replacement the USMCA worth an estimated $1.3 Trillion, TPP worth $356 Billion, and the EU-South Korea Free Trade Agreement worth $90 Billion, are all good examples of the benefit of strong political alliances and collaboration. But agreements can also be used as a tool to advance and strengthen geopolitical ambitions and extend **Soft Power Plays** such as the China-Russia pacts worth an estimated $200 Billion.

ACT NOW

While many experts and professionals use global trade and GDP as a measure of the health of the global economy there are those who believe continued **Global GDP Growth** is detrimental to the well being of the environment and society with the result being that they advocate a **Degrowth Agenda**. However, while this is an interesting point of view, and perhaps accurate, it is highly unlikely that any government will abandon their focus on growing GDP and using this trend as a tool to bolster their economies and societies.

EXPLORE:

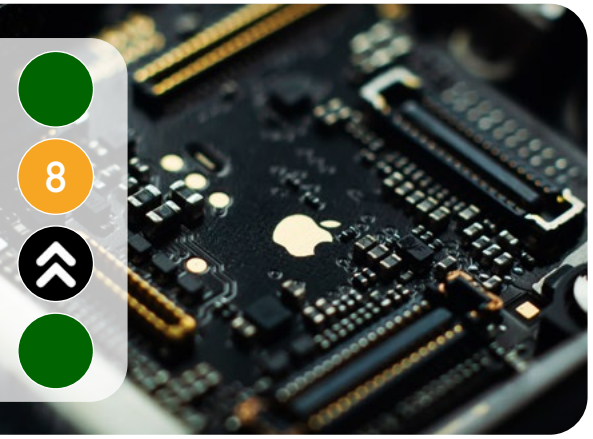
- Emerging technologies and technology roadmaps
- Future of Education, Governments, Logistics, Manufacturing, Work and the Workplace
- Infrastructure, investment, and policies that promote stability
- Global accords, legal, and market access reforms
- Trade weaponisation

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

GLOBAL VALUE CHAINS

1ST YEAR ON THE LIST



QUICK TAKE

Today 70% of all **Global Trade Flows** occur in Global Value Chains (GVCs) such as components, materials, and services, boosted by low trade barriers - which are now rising thanks to **Geopolitical Fragmentation** and **Selective Decoupling**. GVCs have a great impact on economic growth, income equality, and living standards. Today 45% of GVC value is captured by the USA, 30% by China - up from 7% in 2000, 12% by Japan, and 8% by Germany, with the rest bringing up the rear. GVC activities include Distribution and Logistics, Manufacturing, Marketing and Sales, R&D, Sourcing, and Support.

Data sources: UNSD, World Bank, WTO, and various.

IMPACT

The impact of being high up a value chain which ultimately boosts a brands profit margins and profitability can be significant. Not only does it give companies more strategic control over their supply chains and partners, including greater bargaining power and the ability to influence key decision making at every level - including the government level - but they also more likely to experience greater brand loyalty and are much less vulnerable to price competition. Additionally, greater profitability also improves companies resilience to shocks, gives them ability to invest in new assets, facilities, and operations, as well as their workforce and experimentation, and plays a vital role in helping them capitalise on new markets and opportunities quicker than their competitors.

Given the dynamics it is no surprise therefore that most companies in this bracket outsource their non-core activities, such as manufacturing and assembly, to third parties which helps them focus on higher value activities such as branding, the customer experience, design, ecosystem development and lock in, ESG, R&D, and service expansion to name a few.

EXAMPLES

While there are many companies that have done well to create and capture premium value Apple is perhaps the best example with an estimated 42% of the value or the price premium being created and captured by the company directly through branding, design, services, and software, 30% being captured by their component suppliers especially those in Japan, South Korea, and Taiwan such as SK Hynix, Samsung, and TSMC, and just 3% being captured in China by Foxconn their assembly partner.

Increasingly though, in a major shift we are seeing Chinese companies, especially those in the automotive sector working hard to create and capture more value. Traditionally the country that companies outsourced low value manufacturing and assembly to today Chinese companies are becoming experts at branding, distribution and logistics, marketing, sales, and support and they are getting so good at it that in 2024 the German government, seeing a flood of Chinese Electric Vehicles entering Europe and challenging their own automotive manufacturers status quo called the development an "Existential threat."

ACT NOW

With middle and low income countries only capturing 15-20% of value and <5% respectively there is clearly opportunity which goes to show that few companies and countries truly manage to create and capture a large amount of premium value from their activities. Increasingly in the future those who can though will be among the most influential and successful on the global stage. However, while most focus today is on physical GVCs executives should examine "Digital GVCs," with good examples being the tech giants who are trying to dominate the **Artificial Intelligence** (AI) GVC where AI itself is the value and the service, and also the creator of value as we see with **Creative Machines**.

EXPLORE:

- Brand led value capture
- Emerging technology and technology roadmaps
- Identify high value activities
- IP protection and vertical integration

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

INDUSTRY COLLAPSE

1ST YEAR ON THE LIST



QUICK TAKE

While we often think of industries persisting in one form or another forever the fact is that entire industries can fade away and be superseded quite quickly. While it takes a lot to undermine and collapse an entire industry the main causes are because of changing consumer trends and regulations, then more recently environmental and technological disruption, including automation and digitisation, which have become the leading cause. In the past 30 years estimates suggest this trend has increased and therefore accelerated by 67% with one popular indicator being the shrinkage of corporate lifespans.

Data sources: Bloomberg, Deloitte, Innosight, and various.

IMPACT

The collapse of entire industries often has disastrous impacts on individuals, regions, and countries which can persist for decades or more, with the industries that replace them - if there are any - often seeing rapid growth. Impacts of industry collapse often include massive job displacement and job losses, economic decline, increased corporate turnover, and have huge regional and societal consequences which include the decline of local economies, infrastructure, and well being - which has an impact on **Global Life Expectancy**. Additionally, there can also be corresponding increases in crime rates and on the dependency of social safety nets which can put pressure on **Global Public Debt** values and countries **GDP Growth**.

However, while industry collapses can be catastrophic especially if nothing fills the void, this trend can also spur innovation, lead to the development of new industries, and reinforce the need for company's leadership teams to undertake the process of **Creative Destruction** which, if managed correctly can put them in a better long term position to survive and outpace any new competition.

EXAMPLES

As we continue to see an **Accelerating Rate of Change** in the world, driven in part by increased access to capital and the **Bi-Polar and Multi-Polar World**, as well as **Digitisation**, hyper connectivity, and increasingly advanced **General Purpose Technologies** such as **Artificial Intelligence** (AI) - which in some cases accelerates and amplifies **Price Collapse** which fuels this trend - we have many examples.

Recent ones include the collapse of the printing and publishing industry and consumer postal services, as well as the traditional global taxi industry, which felt the brunt of Uber, and the global coal industry collapse caused by the **Green Energy Transition** and **Net Zero pledges**. Furthermore, as AI reduces the cost of producing content to almost zero we could soon see the global economic collapse of the Media and Entertainment industry. And back in 1950 we saw the historic collapse of the Detroit automotive industry with the city loosing 48% of its manufacturing jobs and filing for bankruptcy in 2013 - 63 years later, and the collapse of the US steel industry in the Rust Belt saw 75% of jobs lost, a 50% population decline, and a 10% increase in poverty rates.

ACT NOW

Using the S&P500 as a bell weather for this trend is interesting, but doesn't give us the whole picture. That said though, the longevity of companies in the index has fallen from on average 33 years in 1965, to 20 years in 1990, to currently 18 years with it expected to fall further to 15 years by 2030 with more than 50% of the index being affected - all of which, in part, is also accelerated by the **Power of the Individual** trend.

EXPLORE:

- Adaptive and agile business models and organisational structures
- Business and impact assessments
- Creative Destruction, Disruption, Foresight, and Innovation programs
- Emerging technology and technology roadmaps
- Geographic and market dispersion
- Industry diversification
- M&A strategies
- Market, risk, and trend analysis

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

INFORMAL ECONOMY

3RD YEAR ON THE LIST



QUICK TAKE

The Informal Economy, which represents over 15% of global GDP, is the part of any economy that is neither taxed nor monitored by any form of government. While it encompasses a broad range of economic activities, enterprises, and jobs, that have market value, this also means that workers often work in sub par conditions and are neither regulated nor protected.

Today, an estimated 2 Billion people, or 60% of the world's adult labour force, work informally with 93% of them being in developing and emerging countries.

IMPACT

In low and middle income economies it's estimated that 35% of their GDP is informal, and therefore untaxed, with that falling to 15% in advanced economies. And, globally people living in rural areas are twice as likely to be informally employed than those in cities - a ratio that could change with **Rapid Urbanisation** - with the highest levels of informal employment, or 90%, being in the agricultural sector.

In Africa an estimated 85% of employment is informal, with that being 68% in Asia and the Pacific, 67% in Arab states, 40% in the Americas, and 25% in Europe and Central Asia, and it's often the 740 Million women workers that are in the most vulnerable situations. Additionally, asides from dangerous working conditions and a lack of meaningful legal protection or economic security for workers, as well as having a major impact on **Global Living Standards** and **Wealth Inequality**, this trend is also a breeding ground for corruption and criminality, and the economies of countries with the highest rates of informal workers are not onl held back but are also the least capable of recovering from shocks.

EXAMPLES

While in time we can see the rise of new business models, technologies, and trends, such as **Crypotocurrencies**, **Decentralised Finance**, the **Gig Economy**, **Virtual Nations**, and **Web 3.0**, potentially bringing more people and new demographic groups into the Informal Economy - legally or illegally - from a traditional perspective we all know the kinds of jobs that people in the informal economy occupy, which include everything from beach and street vendors, to shoe shining and shanty town businesses, farming, and even increasingly co-ordinated cyber crime.

At its most basic level the informal economy is made up of collections of people who, whether it be beacuse of a lack of education, government support, or just plain options, try to make a living in any way they can, the net result of which meant that during the COVID-19 Pandemic an estimated 70% of people didn't earn anything. In India specifically though, for example, it's estimated that the Informal Economy is responsible for between 80% and 90% of all recycling activities, as well as between 40% and 70% of the country's total manufacturing output which is a giant proportion.

ACT NOW

While in time we can see new ways for people to participate in the Informal Economy currently its size is shrinking globally as new policies, technologies, and tools have a positive impact. However, while this trend has a significant impact on people's living standards, as well as their own economic and personal security, as you can see there is still alot to be done.

EXPLORE:

- Access to education, financial services, healthcare, and job markets
- Emerging technologies and technology roadmaps
- Future of Education, Financial Services, Government, Healthcare, and Work
- Global accords, and policy, and regulation reform

Data sources: ILO, IMF, OECD, WIEGO, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

INTERNATIONAL MIGRATION

3RD YEAR ON THE LIST



QUICK TAKE

There are many reasons why people want to leave their native countries and migrate including economic ones, famine, persecution, violence, war, and many others. But whatever the reason they all have a common goal - a quest for a better and decent life - something that many of us take for granted. After all, in many cases your future is determined by the country you're born in. Today, there are more than 272 Million international migrants, or 3.25% of the global population - a figure which has increased on average by 4.5% every year since 1970 when it was 84 Million.

IMPACT

While there is an economic cost of international migration, for example the EU estimate managing migrant inflows, securing borders, and stemming migration, costs them at least $7 Billion a year before any social "integration" costs, and the US estimates they have spent $333 Billion "tackling the issue" since 2003 there is no doubt that the desire to migrate is only going one way - up. And that's in spite of the difficulties migrants face which includes all manner of dangers, including death.

Mostly driven by **Climate Change**, war, and **Wealth Inequality**, as well as the other aforementioned factors stats show that the most "Diasporas" come from India, then Mexico, China, Russia, and Syria and that unsurprisingly their top destinations are the US, Germany, Saudi Arabia, Russia, the UK and the UAE, with over 80% of the UAE's population now being migrants.

Today 48% of migrants are male and 52% are female with over 40% being between the ages of 25 and 45, and since 1996 at least 75,000 people are confirmed to have died attempting dangerous crossings.

EXAMPLES

Examples of international migration are everywhere and in general there are very few good stories and the numbers are staggering.

To put the scale of the issue into perspective if the number of migrants were a country then they would be the world's forth largest behind the US. Of the 272 Million or so migrants the UNHCR estimate that 26 Million are refugees, and 46 Million are internally displaced people - with the remainder, almost 200 Million, being mostly climate or economic migrants.

After the war in Syria over 13.5 Million Syrians were displaced - more than half the country's entire population with nearly 11.1 Million needing humanitarian assistance to survive. And, in Europe politicians talk of a "Migrant Crisis" with wars in Afghanistan, Libya, the Middle East, and Syria, and economic troubles in Africa, seeing over 5.2 Million people trying to cross their borders since 2016.

Elsewhere, in the US border arrests of migrants topped 1 Million for their first time in 2021, and everywhere you look migrant numbers are increasing.

ACT NOW

With the number of migrants increasing globally, with no end in sight, governments and societies everywhere have a herculean task ahead of them - on the one hand to manage and stem the inflows, but on the other to avoid the harmful loss of human capital and skills that developing economies so desperately need to grow and prosper.

EXPLORE:

- Future of Education, Healthcare, Sustainability, Work and the Workplace
- Reducing inequalities
- Unilateral global accords and coordinated global action

Data sources: Europa, DHS, Europa, OECD, UNHCR, UNILO, World Bank, World Futures Forum, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

MEGACITIES

3RD YEAR ON THE LIST



QUICK TAKE

We are entering the age of Megacities, cities that have more than 10 Million inhabitants. In 1975 there were only 4 and today, thanks in part to **Population Growth** and **Rapid Urbanisation**, there are 28 with another 13 expected by 2030, with half of all those expected to be in China and India. However, while these sprawling urban centers will be among the largest consumers and economies on the planet there are still substantial proportions of residents in especially South Asian megacities who lack basic services including electricity, water, and sewerage.

IMPACT

As the number and sheer size of megacities continues to grow everything about them is enormous including their consumption. Today it's estimated that the world's megacities account for more than 10% of global electricity and gasoline use, and produce more than 13% of all the worlds solid waste, which then goes to show the important role they will continue to have in helping us fight trends such as **Climate Change** and **Resource Scarcity**, among others.

Furthermore, as cities grow studies show that their GDP grows disproportionately larger as well. Today megacities are home to 6.7% of the global population but account for 14.6% of global GDP. Consequently, with over 700 Million people living in megacities by 2030, and 2.5 Bn by 2050, many of them will have economies bigger than many countries, such as Chicago whose GDP in 2030 is expected to exceed $596 Bn, Bogata with $109 Bn, and Chennai with $50 Bn.

Additionally, by 2030 Tokyo will be the world's largest megacity with 38 Million people, followed closely by Delhi with 36 Million, Shanghai with 28 Million, and then many more.

EXAMPLES

When it comes to megacities nothing is as straight forwards as perhaps it could or should be.

Take, for example, Jakarta by 2030 it's estimated that its population will exceed 11 Million people, but as **Sea Level Rise** becomes an increasing issue for the city in 2019 the Indonesian government took the decision to move its capital city, as well as many of its inhabitants as possible from the island of Java to the province of East Kalimantan on Borneo.

Then there's Mexico City which, along with its 22 Million inhabitants, has sunk more than 10 meters in a century and which is sinking at a rate of 50cm a year because so much water has been pumped out of its aquifer, a trend that's being further exacerbated by increasing **Water scarcity and Stress** in the region - the consequence of which is increasing social disquiet and collapsing infrastructure.

And these issues are all before we shine a spotlight on the increasing pressures on local education, healthcare, and transportation systems, as well as other precious resources and services.

ACT NOW

As more people move to urban areas governments are going to have to have a radical re-think in how they avoid and alleviate many of the problems these megacities are experiencing today as well as the ones they'll experience tomorrow, such as the phenomenon of the **Warming Planet** which in itself is already turning many of these urban areas into furnace like death traps. Megacities it seems come with mega opportunities, economically speaking, but they also come with mega problems, which makes proper forward planning and urban planning essential.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Agriculture, Communications, Construction, Energy, Healthcare, Manufacturing, Media and Entertainment, Technology, Transportation, and Work
- Urban planning initiatives

Data sources: Carnegie Mellon, UNESCO, United Nations, and various.

META-ECONOMY

3RD YEAR ON THE LIST



The world's first meta bank branch, JP Morgan

QUICK TAKE

With all the hype it's easy to forget that the **Metaverse**, as well as all of our other digital and virtual worlds, are all extensions and reflections of the real world.

They are also economies in themselves but often without the physical constraints or limits of the physical world such as experiences, space, and even time. The result of which is that many people over look the fact that in time these economies, the Meta-Economy, could dwarf today's reality based economy. And this alone makes this trend incredibly interesting.

IMPACT

Increasingly the term Meta-Economy is being used as a catch all phrase for all of the new economies that exist in the digital and virtual worlds - in all their forms and formats.

When it comes to the Metaverse alone the size of the opportunity that analysts are putting forwards varies wildly, with organisations such as Bloomberg labelling it as the "next big technology platform" and saying that by 2024 it'll be an $800 Bn market, and JP Morgan suggesting it will "infiltrate every sector" and be worth over $1 Tr.

Looking at the entire Meta-Economy though, which also includes the related "non Metaverse" markets, Goldman Sachs and Morgan Stanley boh estimate the entire Meta-Economy could exceed $8 Tr. Putting this into context the Indian government alone also sees **Web 3.0**, which can also be included in Meta-Economy statistics, as a $1.1 Tr opportunity for just India let alone other countries. And all these figures are before we extrapolate out the economic impact of **Crypto Cities**, **Non-Fungible Tokens** (NFTs), **Robo-Customers**, **Tokenisation**, and many other trends.

EXAMPLES

With analysts expecting four primary sectors, namely the so called "Meta" platforms such as Meta, Roblox, and Take Two, the entertainment industry, the Metaverse itself, and Web 3.0, to lead the charge and capture a lot of the early value of this trend it's little surprise that that's where a lot of the activity is.

At the moment some of the most notable examples of organisations embracing this trend include Roblox who are actively investing in what they call the **Creator Economy** with initiatives such as their Builders Club and who now have over 200 Million active monthly users and who play an increasingly significant role in more than two thirds of children's "digital lives."

Then, of course, we have Meta who so far have burned through over $10 Bn in cash to build the foundations of the Meta-Economy, including the Metaverse as well as Web 3.0, and thereby create a vertical stack that helps them "own the future." We also even have the likes of JP Morgan who created the world's first meta bank branch which they hope will ultimately help position themselves as the prime lender of choice for all your future Meta-Economy lending needs.

ACT NOW

With the digital and virtual economies now increasing in value at an almost exponential rate, which will only accelerate as complimentary trends such as **5G**, **Internet of Things** (IoT), and **Satellite Internet** bring more people and things online, it's clear that a lot of people are excited about the opportunity the Meta-Economy presents. However, that said organisations must remember that this is a marathon and not a sprint, and that many of the foundational technologies that underpin this trend are still relatively early stage and far from mass adoption.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Financial Services, Media and Entertainment, Retail, and Work
- New business and operating models

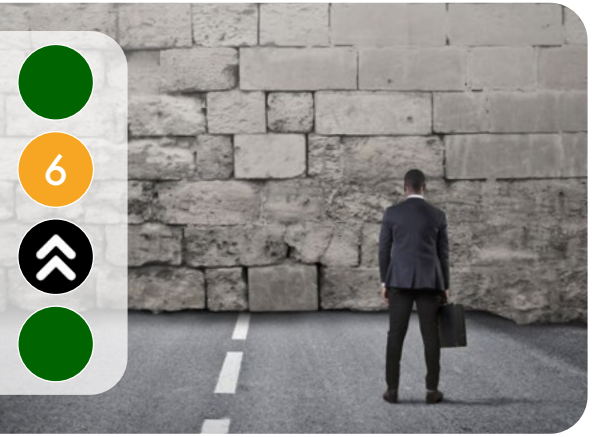
Data sources: Bloomberg, Goldman Sachs, JP Morgan, Morgan Stanley, and various.

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EXPLORE STARTUPS & MORE

NON TARIFF BARRIERS

1ST YEAR ON THE LIST



QUICK TAKE

As the world becomes more fractious, and as we continue to see tariffs, in all their forms, being used to coerce and change the behaviours of countries increasingly governments are zeroing in on what they see as unfair practises that limit their own country's ability to sell into given markets. Known as Non Tariff Barriers (NTBs) these include many things such as complex certification procedures, discriminatory charges and taxes, import quotas, IP rights, murky protectionism measures, product regulations and standards, restrictive licensing agreements, rules of origin, security criteria, subsidies, and more.

IMPACT

In even the best case scenarios NTBs load extra costly burdens on companies, and in the worst case scenarios they can act as the equivalent of shadow banning to block those companies from accessing markets they value, and their impact is often more heavily felt by developing countries than developed ones. As such they are now often the subject of heated debates during political trade debates and negotiations - and their prominence is growing. However, while some NTBs are designed to address public interest concerns such as environmental protection, health, and safety, their broader economic consequences vary.

Over the years as tariff trade barriers have fallen - with a few exceptions - we have seen a marked increase in the use of NTBs to throttle market access, and today they often constitute a more significant trade barrier than **Primary Tariffs** with experts estimating that the trade costs imposed by NTBs can be 3x to 4x higher than those from tariffs - with over 50% of products worldwide being affected by them. As a result it's estimated that they reduce **Global Trade Volumes** by around 12%, with the EU especially favouring NTBs as their trade tool of choice.

EXAMPLES

With many examples to choose from these are some of the highest profile. In the EU the ban on hormone treated beef over the decades, according to the US government, cost US farmers over $116 Bn in lost trade - a dispute that ultimately led to the WTO allowing the US to impose retaliatory tariffs on EU products up to the same value. And then in China NTBs, again according to the US government, cost 40% of US companies business.

Turning to post Brexit increased EU customs regulations and paperwork reduced overall UK goods trade with Europe by 15% compared to when the UK was part of the single market, and then in India NTBs associated with healthcare products impacted over $206 Bn of its imports. Then, back to China, subsidies especially for state owned enterprises and preferred sectors that helped keep prices artificially low helped Chinese companies dominate domestic and international markets unfairly with subsidy margins ranging from 10% to over 200% which led to other countries, from the EU and US to Malaysia and India, imposing stiff tariff penalties on everything from Chinese EVs to steel and solar panels.

ACT NOW

Often more damaging than tariffs, despite less prominence, NTBs are increasingly used by countries to disrupt trade and influence corporate competitiveness. The result of which means that companies should pay especially close attention to them and then orientate their investments, product development road maps, supply chains, and strategies accordingly.

EXPLORE:

- Business and impact assessments
- Embed "Designed for Compliance" from conception
- Invest in continuous NTB intelligence and risk mapping
- Optimise customs and logistics operations
- Proactive government and industry advocacy
- Supply chain re-alignment, diversification, and flattening

Data sources: BCG, LSE, OECD, UNCTAD, World Bank, WTO, and various.

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EXPLORE STARTUPS & MORE

PRIMARY TARIFFS

1ST YEAR ON THE LIST



QUICK TAKE

Primary Tariffs are import taxes imposed by governments on foreign goods. Historically, the US is a prime example of a country using them as an economic weapon after the Trump administration famously implemented sweeping tariffs of at least 10% against all countries overnight with China facing 145%, and other countries facing between 20% to 50%, which raised the average US tariff rate from 2.5% to 27% - the highest in over a century. The suddenness with which tariffs can be implemented can have massive repercussions for global supply chains, trigger retaliatory measures, and cause market volatility.

IMPACT

Often used as a tool to protect local markets, as well as to coerce and force countries to change their behaviours, and sometimes used in concert **Corporate Tariffs** and **Secondary Tariffs**, Primary Tariffs are becoming an increasingly common economic weapon as we enter into a **Bi-Polar and Multi-Polar World** with the total amount of goods being covered as well as the number of individual tariffs being applied all increasing by over 300% in the past 10 years - at a minimum. Tariffs affect almost everything - they incite **Trade Wars**, disrupt and reshape global supply chains, interrupt the flow of trade between countries, and increase **Global Inflation Rates** through the passing on of increased costs to businesses and consumers, which in turn affects **Global Household Debt**, **Global Living Standards**, and **Global Real Wages**. They also often lead to retaliatory measures, decrease **Global Trade Volumes** and have a direct impact on **Global Investment Flows**, affect consumer behaviours and strain international diplomatic relations - which can then lead to accelerated global decoupling, which over the long run changes the entire global order.

EXAMPLES

In the most extreme example of the use of this trend in 2025 President Trump triggered a massive global economic crisis after he levied steep tariffs, ranging from 10% to 145% on all countries with Canada, China, the EU, Mexico, and Vietnam being the worst hit which sparked retaliation, strained military and political alliances, and saw recession risks surge from 40% to 60% with some countries actually falling into recession almost immediately. Global GDP in year growth forecasts were also slashed from 2.1% to 1.4%, with forecasts suggesting a 6% reduction in US GDP over the long term and 0.9% reduction over the short term, and companies everywhere panicked.

Global import volumes declined at least 16%, while at the same time global financial markets suffered extreme volatility with $6.6 Trillion in value wiped from major exchanges in days which caused pension values to fall disastrously by 30% or more. But the fall out doesn't stop there, consumer prices in developed countries surged 17% with US households expected to be $3,800 worse off per year, while at the same time unemployment rates rose 0.6% resulting in 740,000 fewer jobs.

ACT NOW

While different countries use Primary Tariffs to achieve different goals it is widely believed that the US use of tariffs - including additional Secondary and Corporate tariffs as an economic weapon - hands China the advantage in the long term who will inevitably point to their use as an indicator of US bullying and untrustworthiness which will only add fuel to their **Soft Power Plays** especially with the **BRICS 2.0**.

EXPLORE:

- Bonded warehouses and Free Trade Zones
- Business and Impact assessments
- Domestic production and sourcing
- Optimise Free Trade Zones, and the use of Rules of Origin
- Review supplier contracts
- Scenario planning
- Supply chain re-alignment, diversification, and flattening

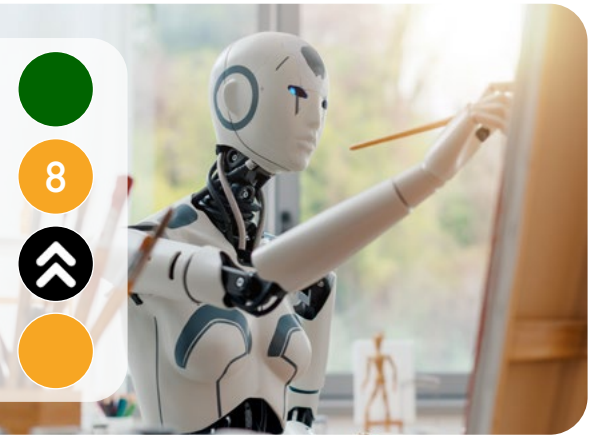
Data sources: Guardian, IMF, OECD, Penn, World Bank, WTO, and various.

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EXPLORE STARTUPS & MORE

PRICE COLLAPSE

1ST YEAR ON THE LIST



QUICK TAKE

As we continue to see certain **General Purpose Technologies** such as **Artificial Intelligence** (AI), **Creative Machines**, and **Robotics** stoke **Job Automation** fears one of the major and often and less spoken about side effects is Price Collapse which, as the name suggests, is the partial or total collapse in the price of performing certain Blue or White Collar jobs, tasks and or skills, which then affects the cost of the outputs. In extreme cases this trend can lead to **Industry Collapse**, with an example today being the use of AI and **Creative Machines** to reduce content production costs by over 97%.

IMPACT

While this trend is sometimes spoken about it's often marginalised in conversations because unless you're directly affected by it it can be difficult to spot and monitor. Despite this though the impact, on individual jobs as well as on entire industries and even whole countries can be very real, and over the past decade, driven by **Geopolitical Fragmentation**, increased market volatility, and technological disruption it has become 30% to 50% more frequent according to estimates.

With multiple levels of economies affected impacts include the depression of wage growth, wage values and **Global Real Wages**, and spending power, as well as impacts on **Global Direct Tax Rates** and **Global Household Debt**, as well as **Global Public Debt** as governments spend to combat it. It can also lead to significant company and inventory devaluations, and profit collapses, and be a contributory factor in price and **Trade Wars**, and industry contraction. At a country level it contributes to currency devaluation and deflation, trade imbalances, capital flight and financial instability, drag on GDP, and be a major cause of strikes and social unrest.

EXAMPLES

While causes can be economic, societal, and or technological, or a combination, today we have many cross sector examples including the foreseeable price collapse that recently affected the German automotive industry when cheap Chinese EV imports undercut the majors by 30% or more and caused them to undertake massive 'Make or break' restructuring exercises. Today, other examples include AI generated content that's collapsing content creation costs by 97% with freelance writers seeing revenues decline by 40% with sector based job losses of 20%. For graphic designers this is 30% and 15%, and for audio producers, and videographers and editors, this is 25% and 15% respectively. And even software developers aren't immune with 30% and 25% reductions respectively - and all these numbers are growing.

In 2016 the oversupply of oil due to increased US shale production and OPEC's refusal to cut output led to a 70% collapse in oil prices, wiping out $1 Tr in revenues and saw 440,000 jobs lost. And, in 2018 **Cryptocurrencies** collapsed by 80% wiping out over $700 Bn of market value with 1,700 Alt coins and over 40 exchanges going bankrupt.

ACT NOW

Price Collapse can have a serious impact on the prosperity and future outlook for individuals, companies, industries, and entire countries, and it can be caused by a variety of factors, some of which are difficult to predict and others which are preceded by tell tale signals. With proper forethought and careful planning though the impact of even sudden price collapse events can be de-risked albeit never entirely.

EXPLORE:

- Business and impact assessments
- Creative Destruction, Disruption, Foresight, and Innovation programs
- Emerging technology and technology roadmaps
- Future of Education and Work
- Industry diversification
- Market, risk, and trend analysis
- Political and regulation monitoring
- Re-training programs

Data sources: BCG, Deloitte, HatchWorks, McKinsey & Co, and various.

RAPID URBANISATION

3RD YEAR ON THE LIST



QUICK TAKE

Today more than 55% of the world's population lives in cities, and over 1.5 Million people are added to the global urban population every week with around 90% of this growth taking place in African and Asian countries.

While this puts huge demands on the climate and the environment, as well as urban infrastructure, jobs, and services, it also presents significant opportunities with vast potential for emerging cities to act as powerful and inclusive development tools which, in some cases, can be funded through **Public Wealth** initiatives.

Data sources: OECD, United Nations,, World Bank, and various.

IMPACT

Cities have always been the drivers of economic growth and productivity, with 85% of global GDP being generated in them, and while rapid urbanisation can cause issues as local infrastructure, jobs, and services strain to meet the needs of their inhabitants, it is possible for governments to capture "Urban Dividends" that creates jobs, increases productivity, reduces infrastructure costs and environmental impact, supports new enterprise and shares this widely.

However, while these dividends are attractive they are not guaranteed and poor urban infrastructure especially could rapidly derail the pace at which cities grow and prosper. The overall growth in urban populations also means that in the next 10 years alone cities including Beijing, London, New York, and Shanghai alone will need to invest over $10 Trillion in infrastructure.

By 2050 it is estimated that over 68% of the world's population will live in cities with rural populations reaching their peak in the next few years, and the number of **Megacities**, those with more than 10 Million people, has more than doubled in two decades to 37, with many more on the horizon.

EXAMPLES

The global urban population has grown from 751 Million in 1950 to over 4.2 Billion in 2018, with the most urbanised regions being North America at 82%, LATAM at 81%, Europe 74%, and Oceania 68%. And in general all these numbers are set to increase in the years ahead.

Dubai is a prime example of a city whose leaders identified a physical gap in the world map and made its mark. Sheikh Mohammed bin Rashid Al Maktoum and his advisors saw the potential in a role for a modern tier one hub city connecting East and West capturing the age of global travel that was made possible by the extended range of modern aircraft.

And while there are many examples of cities that are rapidly expanding, including Delhi, Shanghai, Dhaka, and Lagos, perhaps one of the most ambitious future city projects to watch is Neom in Saudi Arabia, a $500 Billion automated and car-less **Smart Cities** gigaproject which aims to be the model for future city development and be home to anywhere between 1 Million and 15 Million people.

ACT NOW

With the global population set to increase significantly in the future the rate of urbanisation is going to accelerate. Developed intelligently and with future proof strategies cities can be a powerful enabler for human collaboration and GDP growth, but left to their own devices the negative consequences of unplanned urban sprawl can have the opposite effect.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Energy, Education, Financial Services, Healthcare, Transportation, and Work
- Urban management and planning strategies
- War for investment and talent

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EXPLORE STARTUPS & MORE

SANCTIONS

3RD YEAR ON THE LIST



QUICK TAKE

Sanctions have been wielded as the ultimate economic weapon for decades and today they are more prevalent than ever as different countries disagree and fall out with others over unfavourable actions and behaviours. However, as we see the rise of the **Bi-Polar and Multi-Polar World** as well as trends such as **Blockchain**, **Cryptocurrencies**, **Splinternets**, and many others, it's increasingly clear that while they're still effective they're also accelerating the splitting global of standards and systems, and creating parallel ones, as autocratic and autarky systems and democratic ones diverge and separate.

Data sources: World Bank, and various.

IMPACT

Historically sanctions have been used as a the ultimate economic weapon to show disfavour and punish countries and influential individuals who have behaved in a way that is odds with the international communities expectations and interests.

Today though many states who are the subject of sanctions are as belligerent as ever, such as Iran, bolder than ever, such as Russia, and in the cases of the likes of North Korea flourishing - militarially at least.

Furthermore, cut off from global financial markets, supply chains, and other institutions and systems many of these countries, including the likes of China, are increasingly collaborating to create their own "Sanction Proof" systems and work arounds such as the development of the CIPs payment network which disintermediates SWIFT, ratcheting up the **Global Reseve Currency Wars** and **Shadow Standards War**, embracing **Selective Decoupling**, and all that's before we discuss the weaponisation of trends such as **Ransomware** to covertly fund economies, and the use of **PsyOps** to sow division in their foes.

EXAMPLES

As the number of examples of this trend increase we're also seeing a rise in the number of ways to diminish and eliminate its impact - the latter of which will only increase in time as **Exponential Technologies** help countries circumvent their impact by leveraging new AgTech and FinTech trends, as well as the likes of **Additive Manufacturing** and **Artificial Intelligence** (AI) to develop and print medicines on demand, and many others.

North Korea, for example, an autarky cut off from the majority of the world, asides from just a handful of countries such as China, seems to have embraced cyber attacks and the use of Cryptocurrencies and Ransomware to fund its ambitions - especially its military ones. Then we have Iran, whose country has arguably been crushed by crippling sanctions on oil exports and the provision of basic staples including food and medicines because of its pursuit of its nuclear program, among other reasons. And then there's Russia, whose banks were not only disconnected from the SWIFT payment network - itself a nuclear option - for invading Ukraine, but was also on the end of some of the world's most swingeing sanctions.

ACT NOW

While sanctions are seen by many as still being an effective economic weapon in time their impact will be increasingly diminished until we reach a point where they are no longer a weapon but a blunt bureaucratic instrument. As such governments should think carefully about their use, explore **Soft Power Plays**, and find new ways to coerce and influence countries who behave at odds with humanitarian and international interests.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology trends
- Future of Agriculture, Communications, Financial Services, Government, Healthcare, Manufacturing, Technology, and the Workforce
- Policy and regulation reform
- Selective decoupling

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EXPLORE STARTUPS & MORE

SECONDARY TARIFFS

1ST YEAR ON THE LIST



QUICK TAKE

Secondary Tariffs are a newish trade weapon, along with **Corporate Tariffs**, are designed to penalise third party countries trading with a targeted nation - unlike **Primary Tariffs** which directly target specific countries imports. One of the first examples of their use saw Trump implement Secondary Tariffs in of 25% on any country buying Venezuelan oil. A softer version of **Sanctions** they cause additional chaos in an already fractious global marketplace with countries often facing steep tariffs if they don't change their buying behaviours, with the ultimate consequence being the potential loss of market access.

Data sources: IMF, World Bank, and various.

IMPACT

Secondary Tariffs can create unprecedented trade uncertainty by introducing sanctions style measures to the global trading system. Unlike traditional Primary Tariffs that target specific countries they instead punish countries for their trading relationships and force nations to choose between specific countries and markets.

This economic statecraft can intensify **Geopolitical Fragmentation**, affect economic co-operation, and force partners to reconsider their alliances and trading relationships. They also affect **Global Foreign Investment**, **Global Trade Flows**, and **Global Value Chains**, as well as cause companies to scramble to re-orientate themselves and their supply chains in response - with market volatility and **Global Inflation Rates** also increasing. Additionally, nations with limited trade alternatives can face severe pressure to restructure their economic relationships, disrupting established commercial patterns and forcing difficult choices between sovereignty and market access, with the rush to find alternative trading partners also disrupting long-term development plans.

EXAMPLES

Venezuela became one of the first targets of Secondary Tariffs when President Trump imposed 25% duties on any country buying and importing Venezuelan oil - directly or indirectly. China, receiving 503,000 barrels per day and representing 55% of Venezuela's total exports, faced the immediate prospect of 45% tariffs on all goods and 70% on its Aluminium and Steel exports to the USA. Meanwhile, in Europe, Spanish companies had to confront difficult choices between established energy relationships and US market access, while Indian refiners similarly weighed cheap Venezuelan crude against American trade consequences - all of which only complicated an already complicated Primary Tariffs picture of the time.

Trump also floated Secondary Tariffs against Russia and Iran as diplomatic leverage tools. For Russia, proposed 25% to 50% tariffs would target countries buying Russian oil unless Moscow agreed to Ukraine ceasefire terms and, again, China and India, as large buyers of Russian crude faced extra duties on top of existing trade measures, with Iran facing similar threats tied to nuclear negotiations.

ACT NOW

Secondary Tariffs cause chaos because our world is so inter-linked, and while they are an imaginative new form of leverage many experts feel that in America's case they only add fuel to China's argument that the USA is abusing its economic and market privilege and bullying others into submission - which China will likely use to their advantage as they look to improve the effectiveness of their **Soft Power Plays** especially with the **BRICS 2.0** and other blocs.

EXPLORE:

- Assess points of leverage, improve business resilience and flexibility
- Bonded warehouses and Free Trade Zones
- Business and impact assessments
- Product re-classification and Tariff Engineering
- Review supplier contracts
- Supply chain re-alignment, diversification, and flattening

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EXPLORE STARTUPS & MORE

SOLOPRENEURS

3RD YEAR ON THE LIST



QUICK TAKE

An unfamiliar term for some the this trend is increasingly front of mind for many governments, and for good reason. Solopreneur is a term used to describe one person businesses, and increasingly they make up the majority of entrepreneurs and start ups globally.

What's most interesting about this trend is its interplay with the **Diversity and Inclusion** and **Wealth Inequality** trends, with the data showing that women solopreneurs are the most numerous globally, and that there are more male solopreneurs, by number, in richer countries.

Data sources: Forbes, and various.

IMPACT

The increasing interest and reporting of so called non-employer firms as contributors to national economies is significant, and it turns out that solopreneurs are everywhere with 81% of small businesses in the US alone being run by solopreneurs who now represent over 17% of the US workforce and whose companies generate on average $47,000 compared with $6 Million for employer firms.

Furthermore, with the number of non-employer firms increasing by 58% since 1997, from 15.4 Million to 24.3 Million today, while the number of employer firms has only increased by 6%, this means that many governments are now having re-think their definitions of entrepreneurship and adapt their policies to be more supportive - with the economic benefits that brings.

Globally women are more likely to own sole proprietorships than men with women owning 37.6% and men 27.8%, but gender representation varies by country. In the US 32% are men versus 29% for women, and in MENA 20% are women and just 12.4% are men, which then highlights differences between cultures and support structures.

EXAMPLES

Only five countries are considered to have gender parity in solopreneurship, they are Brazil, Estonia, Latvia, the Republic of Korea and Slavonia. And of all of these in Brazil, which leads the world in self-employment, women solopreneurs account for 83% of all of the country's entrepreneurial activity, and men account for 81%. Brazil is then followed by Ecuador, where those rates are 63% and 52% respectively.

Another interesting data point is that over a third of all these businesses, globally, are run by minorities.

While solopreneurs are by definition one person businesses and don't employ people the fact shouldn't be lost on you that they do still, nevertheless, create jobs that support the economy.

From the interior designer who works alone to the person who makes and sells elegant pottery products, to the caterer who arranges food for parties, there are many examples of solopreneurs. And you probably know some yourself, maybe you are one ...

ACT NOW

Not to be confused with the **Gig Economy** this trend is increasingly becoming a force to be reckoned with, especially as the cost of starting, operating, and scaling a global business, even as a solopreneur, falls by thousands fold. As a result governments should find a way to leverage this trend and find new ways to support it.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Government, and Work
- New business and operating models
- Policy and regulation reform

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EXPLORE STARTUPS & MORE

SUSTAINABLE ECONOMIES

3RD YEAR ON THE LIST



QUICK TAKE

Over the centuries the pursuit of economic growth has often come at the expense of the natural environment, and we are now literally reaping the whirlwind. And, as trends such as **Climate Change** and **Resource Scarcity** intensify, it is clear that this historic progress at all costs strategy is unsustainable.

As a result more governments and organisations around the world are now trying to find fresh ways to grow their economic top lines but do it in balance and harmony with nature.

Data sources: Bloomberg, HBR, IMF, LSE, and various.

IMPACT

The impact of the policy of economic growth at all costs is clear for everyone to see today - we are nearing runaway Climate Change and crossing climate tipping points, with all the problems those entail. And, at the rate of current resource consumption we need two Earths and will run out of essential resources that include everything from fish and wood, to cobalt and lithium within the next 100 years.

The upshot of all this is that while we can stay on our current path on the one hand economies will likely still grow in line with **Global GDP Growth**, but on the other there will come a point where all these gains have to be spent building cities that can resist **Extreme Weather** events, larger flood and sea defences, and that they'll have to spend more on importing food and water as droughts become more severe. Etc. And that's all before we discuss the money they will have to spend on managing global and societal discomfort and stress which, in some cases, could lead to outright war.

Today it is estimated that it will cost over $92 Trillion to "solve" Climate Change alone - so it would be better if it didn't need fixing in the first place ...

EXAMPLES

In general Sustainable Economies are those that provide the greatest amount of general well-being for the least amount of resource use and environmental harm, and at the moment it appears to be Europe who are leading the "green" revolution via a number of initiatives that include the post pandemic EU Green Deal and **Net Zero Pledges**.

Today the EU represents over 15% of global GDP and transitioning their economy to a sustainable one will be no easy task which is why they have developed several policy pillars to help them achieve it.

These pillars include: a zero pollution pledge, accelerating the shift to sustainable and smart energy and mobility systems, development of a sustainable food system, sustainable building and renovation programs, mobilising industry to create a **Circular Economy**, **Polluters Pay** policies, net zero pledges, preserving and restoring bio-diversity and ecosystems, and supplying clean, affordable and secure energy. All of which are then underpinned by trillions of dollars worth of new green **ESG** financing initiatives.

ACT NOW

Promoting an economic system that degrades and rapes the planet is in noone's favour. However, while it will cost huge sums of moneys creating sustainable economies not only could it be good business, as governments and organisations find new ways to profit from solving some of the worlds greatest challenges, but it could also mean governments and tax payers don't have to spend huge sums of money on damage limitation measures.

EXPLORE:

- Emerging technologies and technology roadmaps
- Circular Economy
- Financing initiatives
- Future of Agriculture, Energy, Manufacturing, Smart Cities, Sustainability, Transport, Work and the Workplace
- Partner ecosystems and solutions

TRADE WARS

3RD YEAR ON THE LIST



7

QUICK TAKE

Trade disputes are common place. Trade wars though are an entirely different matter, and they are increasing in frequency as various countries and governments flex their trade muscles.

However, in spite this almost everyone sees Trade Wars, which inevitably increase the amount of **Protectionism**, as Lose-Lose with the general belief being that an increase in global protectonism of this form would lead to a permanent loss of 4% GDP for the EU and 3% for the US.

IMPACT

Trade wars have a variety of far ranging impacts on everything from GDP growth, jobs, profits, share prices, and supply chains, to trade volumes, wages, and much more.

It's estimated that the 2019 China-US trade war, as well as Europe and other countries who got sucked into it, cost the US economy nearly 300,000 jobs and between 0.3% to 0.7% of GDP with organisations loosing at least $1.7 Trillion in the price of their stocks as a result of US tariffs imposed on imports from China. Numerous studies have also shown that US organisations primarily paid for the tariffs, with the cost estimated at $46 Billion, by accepting lower profit margins, cutting wages and jobs for US workers, deferrals of potential wage hikes and expansions, and raised prices for US consumers.

As for the Chinese the trade war caused a 25% export loss, inflicting a $35 Billion blow to Chinese exports, and many organisations, including Chinese companies, have since looked to improve their long term supply chain resilience by building factories and distribution centers, and sourcing goods, outside of China.

EXAMPLES

Undoubtedly the greatest example of a trade war in recent times was the China-US trade war which caused chaos and concern around the world as the world's two largest economies traded blows and implemented tariffs of between 10% and 25% on $550 Billion worth of Chinese goods and $185 Billion of US goods - with neither side being able to claim any kind of victory, political, pyrrhic, or otherwise.

While the trade war had a significant economic impact, seemingly more on the US than China, it undermined long term confidence in both countries with organisations all around the world doing their utmost to source goods from alternative countries and re-route global supply chains.

As we enter a period of transition, and look towards a **Bi-Polar and Multi-Polar World**, it is not inconceivable to think that we will see a repeat of at least some of these activities again in the future.

ACT NOW

Trade wars are almost always Lose-Lose which is likely why we so few of them, even though the number of trade wars has increased in recent years, and the general lesson to learn is avoid them if you can. Unless, of course, you can guarantee you can win ...

EXPLORE:

- Free trade policies
- Future of Government
- Strong global institutions
- Unilateral global accords and coordinated global action

Data sources: Bloomberg, Brookings, Federal Reserve, Moody's, UNCTAD, and various.

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UNLOCKING PUBLIC WEALTH

3RD YEAR ON THE LIST



QUICK TAKE

Every government has publicly owned real and operational assets that have a market value which, under the right circumstances, can be financially unlocked and benefited from. In the main though the majority of governments don't have a record of all their assets or their value which, in some cases, can run into the billions or even trillions of dollars - which hampers their ability to develop or realise their value. Ultimately public wealth initiatives give governments and public authorities a way to build and repair infrastructure and develop new services without having to raise taxes.

Data sources: Detter, IMF, OECD, UCL, and various.

IMPACT

Generally Public Wealth Funds (PWFs), which can include National Wealth Funds, Public Climate Funds, Public Venture Capital Funds, Regional Development Funds, and Urban Wealth Funds, are seen by governments as a way to support the economic recovery and sustainable growth of local communities, regions, and countries. And in many respects they are seen as an idea whose time has come of age because not only can they be used to "level up" regional inequalities, but they can also be used to "build back better" after the global pandemic.

In general it is believed that the better financial management of public assets could add up to 3% of GDP in public revenues which could then be used to benefit society as a whole.

Today, the sum of public assets owned by governments is an estimated $75 Trillion which is twice as big as total pension savings and ten times as big as the holdings of sovereign wealth funds, and some argue that if they were properly managed governments could raise $2.7 Trillion from them which is more than the world's annual infrastructure spending.

EXAMPLES

There are three simple steps that governments and other public authorities can take to unlock and maximise the benefits and returns from their public assets. The first is to catalogue and value them, the second is to create a Public Wealth Fund holding company, and thirdly - and arguably the most important - is to develop the assets not privatise them. Only by doing all three can officials realise the benefits of this trend and use public assets for public good.

PWFs can be short or long term, and some of the best examples include those from Hong Kong, Singapore, South Korea, the UK, and the USA where they've been used to develop everything from railways and roads to ports and beyond. In Hong Kong the Mass Transit Railway (MTR), and in London the London Underground, both develop mixed real estate including office, residential, and retail space, to fund future construction projects. In both cases their strategy has been to develop the land in connection with the build out of infrastructure and thereby not only fund their projects without using taxes, but also contribute to the public purse through the dividends of the company.

ACT NOW

Governments and public authorities all own a huge amount of real and operational assets which, if managed correctly, can be used to unlock new value and fund future infrastructure projects an services without the need to raise taxes. As a result they can be very attractive and lucrative investment vehicles.

EXPLORE:

- Asset mapping, measuring, monitoring, and reporting
- Future of Financial Services, Government, and Infrastructure
- Public Wealth Funds

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WEALTH INEQUALITY

3RD YEAR ON THE LIST



QUICK TAKE

While global GDP has grown steadily for centuries today the world's richest 1% have twice the wealth of 6.9 billion people, and the world's 20 richest men have more wealth than all the women in Africa. The world's first trillionaire will also likely emerge within our lifetimes.

Furthermore, while over half the world's population lives on less than $5.50 a day, the world's billionaires increased their net worth by over $3.9tn during the pandemic, to a total of $11.95tn, at the same time that global workers combined earnings fell by $3.7tn.

IMPACT

Irrespective of where you live or the economic system you live under there is no getting away from the fact that in the majority of cases you need money to survive, let alone thrive, and if you don't have money, or don't have enough of it then your future prospects, as well as your future health and wellness are all in jeopardy. A prime example of the impact of this is the fact that each year over 100 million people are pushed into extreme poverty due to healthcare costs and struggle with basic food provision.

Made possible by the rise of the connected society and multi-sided platform businesses that make it easier than ever before to create, sell, and distribute all manner of products globally at low cost wealth inequality is surging.

It also affects individuals ability to invest, obtain credit and bear risk, creates undue stress and societal divisions, and also has a variety of under-explored impacts as well on accentuated and uneven power and status distributions, disproportional representation, self-image and self-worth, social cohesion, and is detrimental to the ability of countries to develop and prosper.

EXAMPLES

Wealth inequality is an issue for every country and every society, but overall it is the enormity of the figures that make your eyes pop.

While the wealth gap, interestingly, is narrowing between countries, the absolute gap between average individual incomes is widening for more than 70% of the global population with the rising inequality benefiting the wealthiest.

While lots of factors accentuate wealth inequality, including differences in education provision, human rights, internet connectivity, and the continued automation and digitisation of industries and jobs, researchers have found that climate change is also accelerating the trend with the gap between the richest and poorest 10% of the global population is 25% larger than it would be in a world without global warming.

Additionally, on the tax front top income tax rates have fallen in all countries, which has made tax systems less progressive than they could, or should be, with the top rates falling from 66% in 1981 to 43% in 2018. And there's much more data we could lay bare ...

ACT NOW

While leaders, politicians, and the world's richest individuals discuss solving this trend they're making little or no headway - a fact that's starkly represented in whatever figures you choose to pay attention to.

EXPLORE:

- Access to, and the development of, alternative job markets
- Access to digital, educational, and technology initiatives
- Corporate and government led diversity, education, equality, ESG, health, mobility, and monetary policies
- Decentralised work, gig economy, and telepresence technologies
- Distributed Autonomous Organisations and blockchain based Co-Operative company structures
- Future of Work

Data sources: Forbes, IPPR, OECD, Oxfam, United Nations, and various.

311 INSTITUTE

ANNUAL TRENDS CODEX

CODEX OF THE FUTURE SERIES

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3RD ANNUAL EDITION . BOOKLET 2 OF 7

ENVIRONMENTAL TRENDS



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STATS THAT MATTER

SUMMARY UPDATE

IN THE midst of the still-unfolding anthropogenic environmental crisis, the latest data indicates that our battle against escalating climate change and all its impacts remains significantly challenged. As of now, atmospheric carbon dioxide (CO2) levels, a critical driver of global warming, have reached an alarming concentration of around 420 Parts Per Million (PPM), up from pre-industrial levels of about 280 ppm. This increase, the greatest in the past 800,000 years, points to the unprecedented rate of human-induced carbon emissions and is responsible for almost 1C of warming since the 1950's.

Meanwhile, global greenhouse gas emissions, another dire indicator of the crisis, continue to surge, with a 1.4% increase in 2022 alone to reach 37 Billion tonnes. Such unabated emissions not only threaten the balance of our climate but also our health. According to the World Health Organisation (WHO), air pollution is currently responsible for an estimated 6.7 million premature deaths annually.

Our forests, considered the lungs of our planet, are not faring any better. Deforestation rates, especially in the Amazon rainforest - the largest of its kind - are soaring. In 2022, we lost an area larger than Belgium, exacerbating the already troubling CO2 levels and endangering countless species, and a 10% increase on 2021.

The cry of our planet resonates from the polar ice caps as well. Data shows that the Antarctic and Greenland ice sheets are melting at the rate of at least 1 million tonnes of ice per minute which could see sea levels rise by 1 meter by 2100, threatening coastal communities worldwide and causing mass migration.

While the data paints a bleak picture, it also underscores the urgency for action. What we do now - the choices we make, the technologies we adopt, the policies we enforce - will dictate the course of our shared future. As we stand on the precipice, it is time to push back against the precipitous decline of our global environment because the stakes have never been higher.

BOOK AN EXPERT CALL

STATS THAT MATTER

0.9 C

GLOBAL AVG TEMP INCREASE SINCE 1950

COPERNICUS EU

37 BN

2022 GLOBAL CO2 EMMISSIONS, TONNES

IEA

4.1 ML

2022 TROPICAL PRIMARY FOREST LOSS, HECTARES

GLOBAL FOREST

5.3 TR

PIECES OF PLASTIC IN THE WORLD'S OCEANS, 2023

NAT GEO



421 PPM

GLOBAL ATMOSPHERIC CO2 PPM, 2023

NOAA

5 ML

GLOBAL DEATHS FROM EXTREME HEAT, 2022

BLOOMBERG

6.7 ML

GLOBAL DEATHS FROM AIR POLLUTION, 2022

WHO

ENVIRONMENTAL

68 %

ANIMAL POPULATION AVG DECLINE SINCE 1970

WWF

1.6 BILLION TONNES

GLOBAL ANNUAL FOOD WASTAGE OR LOSS PER ANNUM - ENOUGH TO FEED 3 BILLION PEOPLE

UN FAO

68 BN

GLOBAL ANNUAL TOP SOIL EROSION, TONNES

UN FAO

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

AIR POLLUTION

3RD YEAR ON THE LIST



QUICK TAKE

No matter where you live, whether it's at the North Pole or in the middle of the Atlantic, there's no escaping air pollution and particulates that are over PM2.5µm, which then means it just becomes a question of how harmful is it to the environment and your health.

While air pollution is one of the world's leading causes of death the good news is that it's been declining at a global level for decades now, the bad news though is that most of those improvements have been restricted to certain geographies, such as the developed world.

IMPACT

The extent and impact of air pollution on the world is extensive with 99% of the world's population now living in areas where air quality exceeds World Health Organisation (WHO) limits, and the human toll is staggering.

Every year air pollution is the attributed cause of death for more than 11% of all global deaths with over 4.2 Million people dying as a result of exposure to outdoor air pollution and a further 3.8 Million dying from indoor exposure to smoke from dirty cooking stoves and fuels - both of which the **Green Energy Transition** trend is trying to help phase out. It's also unlikely too be a surprise that these death rates are highest in low to middle income countries. And, as if this wasn't bad enough this trend is one of the world's leading risk factors in disease burden and results in increased mortality from COPD, heart disease, lung cancer, strokes, and other acute respiratory conditions, which then contributes to overloading local healthcare providers.

Despite the bad news though in Europe and the US air quality in the past two decades, for some metrics, has improved by as much as 60%.

EXAMPLES

The global pandemic clearly showed the world the impact human activity is having on our air quality, our cities, and our environment, and around the world as factories were shuttered and as air traffic and street traffic ground to a halt countries everywhere saw their air quality especially with respect to CO2, NO2, and SO2 gases and particulates, improve by anywhere between 20% to 61% with France, Italy, Portugal, Spain, and the UK benefiting the most. Furthermore, when we look at the impact the pandemic and lock downs had on particulate matter in the PM10µm and above range again it fell everywhere by between 9% and 30%.

Today though some of the countries with the worst air pollution, where the rates of PM2.5µm in some regions are at least ten times the WHO's safe limits, include China, India, Kazakhstan, Nepal, and Pakistan, and while many of these countries are now curbing emissions by embracing new technologies, introducing new legislation, and shuttering polluting plants, there is still much to be done.

ACT NOW

While policies such as **Net Zero Pledges**, the global energy transition, and the electrification of homes and industries is helping move the dial on air pollution some of those gains are going to be offset against increases in **Desertification** as well as **Global Population Growth** and other factors. As a result tackling this trend, while apparently simple on the surface of things, is a more difficult than people might imagine and requires a much more comprehensive approach than some countries might think.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Manufacturing, Transportation, and Work
- Policy and regulation reform

Data sources: IQAir, World Bank, World Health Organisation, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

BIO-DIVERSITY COLLAPSE

3RD YEAR ON THE LIST



Bleached coral on the Great Barrier Reef

QUICK TAKE

Climate change, human activities, and pollution are just some of the factors having a negative impact on the world's ecosystems with the United Nations citing nature's decline as unprecedented, and species extinction rates accelerating as many warn that we are headed towards the **Sixth Extinction Event**.

Since 1900 the average abundance of native species has declined by at least 20%, with almost all ecosystems and species now deteriorating, shrinking, or vanishing altogether.

IMPACT

While humanity might often believe nature is there to serve us we could easily argue it should be the other way round. After all, we don't just live on this planet it's our home, and unless we develop a more symbiotic relationship with nature then ultimately it is us who will loose out in all manner of ways. However you slice or dice the information the message is the same - we need to do better, faster.

The loss of coastal habitats and natural protections have put over 300 million people at increased risk of floods and extreme weather events, such as hurricanes, and it is estimated that annually over $577bn worth of crops are now at risk from pollinator loss which will then subsequently lead to reductions in food availability and quality.

Asides from just these two notable impacts bio-diversity loss also has significant direct human health impacts, and indirectly it can affect food availability, income, livelihoods, local migration, water availability, and even cause or exacerbate political conflict and war.

EXAMPLES

While many people need go no further than their window to see a decrease in bio-diversity there is no getting away from the fact that nature is in retreat, and the stats are staggering.

While the following is by no means an exhaustive list it should serve as a stark enough warning: over 75% of freshwater resources are dedicated to agriculture which covers more than 30% of the lands surface; 75% of the world's land and 66% of the marine environment have been significantly altered by human activities; 47% of all land based mammals have been negatively impacted by climate change; 33% of marine fish stocks are being harvested at unsustainable levels; land degradation has reduced the productivity of 23% of the world's land surface; pollution in all forms has increased dramatically since 1980; urban areas have more than doubled in area since 1992; and the number of invasive species per country has risen by over 70% since 1970 ...

ACT NOW

The vast majority of bio-diversity problems have been cause by human factors over a long period of time and reversing them, while not impossible, isn't easy and requires innovative thinking and interventions.

EXPLORE:

- ESG, GRC, policy, and regulation reform
- De-Extinction initiatives
- Environmental monitoring initiatives
- Future of Agriculture
- Genetically engineered organisms
- Invasive species eradication and management strategies
- Sustainable planning initiatives
- Tree planting drone initiatives

Data sources: United Nations, and various.

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EXPLORE STARTUPS & MORE

CLIMATE CHANGE

3RD YEAR ON THE LIST



QUICK TAKE

Scientists saw it coming in the 1950's. They called it out and made films about it in the 1980's. And now, over forty years later individuals, governments, and organisations are starting to take unilateral global action to tackle Climate Change with many scientist arguing that we are now too late to avoid a "life altering" 1.5C increase in average global temperatures, and that we are within years of crossing a climate tipping point which will see its devastating global effects accelerate and create a run away cascade of **Extreme Weather** and devastation.

IMPACT

The impact of Climate Change can be seen everywhere - from the changes of the seasons, and the subtle changes in the flora and fauna in peoples gardens, to the tree covered mountain slopes that used to be buried by glaciers and snow, to the expanding deserts of the Sahara, and the deep of the oceans. It impacts every living thing and every natural system on Earth.

From longer frost free growing seasons, to changes in global rain patterns, longer droughts and more intense heat waves, and more extreme weather, to more powerful hurricanes and higher sea levels, the consequences are as varied as they are acute.

If the world warms by 1.5C then the Arctic Ocean will become ice free once every 100 years, with extreme hot days in the mid-latitudes being at least 3C hotter than pre-industrial levels, and sea levels could rise by up to 0.77m, with a further decrease in global bio-diversity of between 5% and 8%. Meanwhile corals could decline by at least 70% with marine fisheries annual productivity declining by at least 1.5 Million tons. And a 2C rise would be exponentially worse for people and planet.

EXAMPLES

Earth is mission critical for humanity and all life on Earth. And as the rate of Climate Change accelerates we continue to see a variety of records being set and smashed with climactic events that used to be once in a century becoming once a decade, and then the norm. And examples of these are plentiful.

Greenland's ice sheet, the world's second largest after Antarctica, is now melting 12 times faster than in the past 12,000 years and loosing over 532 Billion tons of ice a year - and that rate is accelerating. Not only does this melt account for almost 25% of today's sea level rise, but in 2021 the melt rate accelerated even further when, during a time when temperatures in the region were already 18C higher than average, three days worth of rain - where the rain itself was a first for the region - dumped over 7 Billion tons of rain water onto the ice sheet.

And, from the world's biggest, deadliest, and most damaging floods, to the world's biggest, deadliest, and most damaging droughts, heatwaves, hurricanes, and wildfires almost every country on the planet is now feeing the damaging impacts of climate change.

ACT NOW

As we see elsewhere in our universe, from the dust dunes of Mars to the acidic oceans of Venus, our planet will always be able to adapt to new climactic conditions. But life on Earth will find it increasingly difficult as Climate Change accelerates and its effects become more extreme and pronounced. Therefore, ironically, tackling this trend is more about saving humanity's future than the planets.

EXPLORE:

- Carbon Capture and Storage
- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Government, Manufacturing, Sustainability, Transportation, and Work
- Net Zero Pledges
- Unilateral global accords and coordinated global action

Data sources: IPCC, National Geographic, WWF, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

DEFORESTATION

3RD YEAR ON THE LIST



QUICK TAKE

Deforestation, the loss of trees and other vegetation, can have a significant impact on all manner of other trends including **Bio-Diversity Collapse**, **Climate Change**, **Desertification**, land degradation, flooding, **Warming World**, and also create a host of hardships for indigenous people.

Today the rate of deforestation shows no signs of slowing down, and while many people focus on the environmental damage being caused in the Amazon there are many other examples of deforestation that, in some cases, warrant even more attention.

Data sources: Imazon, LSE, NASA, WWF, and various.

IMPACT

In the time it takes to say the word "Deforestation" another chuck of forest the size of a football field is destroyed. That's every two seconds, every day, all day, with the net result being that today there's only about half the number of trees on the planet that there were when humans first evolved. It should also come as no surprise that the fastest rate of forest destruction has been in the past couple of decades with an estimated 15 Billion trees now being cut down every year across the world. Not only is this unsustainable, but it's exacerbating all manner of other issues.

Most deforestation is carried out to clear land for food production with the majority of deforestation being linked to meat, Palm oil, and Soya production, and every year clearing forests contributes 10%, or 1.5 Billion tonnes, of global CO2 emissions. This is a double edged sword though because while deforestation increases emissions those same forests, if left alone, sequester up to a billion tonnes of carbon every decade, and secondary forests - those growing back after deforestation - sequester 40% as much which makes them another important natural climate change solution.

EXAMPLES

Some of the best known examples of deforestation include what's known as "Slash and Burn Agriculture" where trees are cut down and burned to make way for agriculture or livestock which is especially prevalent in the Amazon Rainforest where the rate of deforestation is now faster than its ever been with the rate now exceeding 10,476 square kilometers a year - an area 7 times bigger than London and 13 times the size of New York city.

But the Amazon isn't alone. In Nigeria trees used to cover 50% of the land but more than 90% of those have been felled and the country has less than 1% left of its frontier forests, with 36% of the deforestation happening in the last two decades. Meanwhile, elsewhere in Ghana trees used to cover two thirds of the country, but now that figure is below 10% and nothing remains of the frontier forests, then in Indonesia more trees were felled on Borneo between 1985 and 2000 than all of Africa and South America combined.

Unfortunately, these countries and examples are not unique and there is a long list of similar stats for many more countries.

ACT NOW

With the global rate of deforestation accelerating and showing no signs of letting up, until at least most of the forests are gone, worldwide there is now an impetus to reforest the world and plant a trillion trees by the year 2050. However, while such projects are admirable a better approach perhaps would be to stop the slash and burn culture, and the culture of clearing land for agriculture, by exploring new AgriTech trends, as well as introducing new "Environmental" taxes on goods that have a negative toll on nature and the planet.

EXPLORE:

- Emerging technologies and technology roadmaps
- ESG and green finance
- Future of Agriculture, Financial Services, Leisure and Tourism, Manufacturing, and the Workforce
- Impact assessments
- Policy, regulation, and tax reform

DESERTIFICATION

3RD YEAR ON THE LIST



QUICK TAKE

Desertification is defined as a process of land degradation in arid, semi-arid and sub-humid areas, which account for more than 40% of the Earth's landmass, due to various factors including **Climate Change** and a **Warming Planet**, and other human activities.

Today 75% of the worlds landmass is already degraded and the rate of desertification is now 35x the historical rate with a total of 1.61 million square miles of land, or 4.18 million square kilometers, being degraded every year, with Africa and Asia being the most affected.

IMPACT

In short desertification is when land that was of another type of biome turns into a desert biome because of a variety of changes, and it's an increasingly serious issue for an increasing number of countries and economies.

While overgrazing is the major cause of desertification globally other factors that can also cause desertification include climate change, **Deforestation**, **Extreme Weather**, **Rapid Urbanisation**, **Water Stress and Scarcity**, and agricultural practises that make soils more vulnerable to wind.

Not only does desertification affect groundwater reserves and topsoil, and increase surface run off, but it also has a number of negative impacts on communities including loss of earnings, which contributes to **Wealth Inequality**, as well as harming human health by contributing to **Air Pollution** and exacerbating food insecurity. Today it's estimated that a third of the world's landmass is at risk of desertification, and that up to 2 Billion people could be affected by it, and that by 2030 over 50 Million people could be displaced by it, which in turn will affect **International Migration** patterns.

EXAMPLES

As global temperatures rise and as **Population Growth** gains momentum today the planet is more vulnerable to desertification than ever before. However, while desertification is an issue, if the world hits 2C of warming then it's also estimated that up to 30% of the world's surface is also prone to **Aridification**, or drying out, which would mean, for example, that southern Spain would become a desert from 2050 onwards, so we shouldn't forget that these two phenomenon are linked.

When it comes to desertification specifically though the biggest areas being affected include the Sahel Region in Northern Africa, a 5,900km wide transitional strip between the Sahara Desert and the African savannah, which has been in an almost permanent state of desertification now for more than five decades because of drought and over grazing, and which is now warming 1.5x faster than the global average. Then, we have the Ningxia Hui province in China which has already seen desertification on an alarming scale with over 57% of it's 3 Million hectares already having been devoured by deserts, displacing 3 Million people, and there are many other examples.

ACT NOW

Desertification has many impacts on the people and the planet, but it's not an irreversible phenomenon. With initiatives such as the Big Green Wall, which aims to create a 15km wide green barrier between the southern edge of the Sahara Desert and the Sahel, and other innovative solutions including new Hydrogel based soils, countries have been able to show that we can make progress to tackle it. The danger therefore comes when no action is taken, at which point the impact of this trend becomes more wide ranging and severe.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Agriculture, Communications, Energy, and the Workforce
- Small farm initiatives
- Policy and regulation reform
- Re-Greening incentives

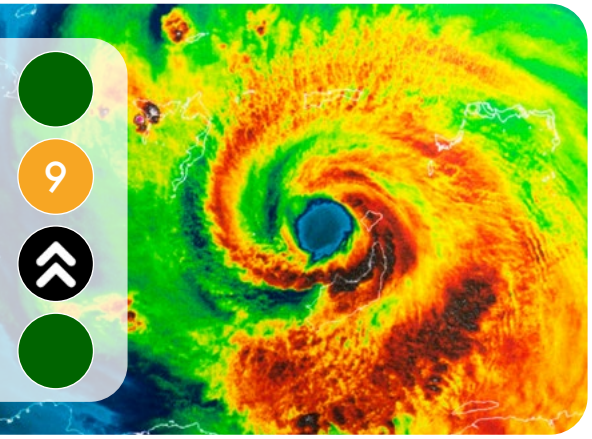
Data sources: National Geographic, UNESCO, United Nations, World Bank, and various.

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EXPLORE STARTUPS & MORE

EXTREME WEATHER

3RD YEAR ON THE LIST



Satellite image of a Category 5 hurricane

QUICK TAKE

Extreme weather events, which are likely related to human activity, are extreme weather events that include unexpected, unusual, severe, or unseasonal weather - whatever its form.

Data consistently shows that all manner of events are becoming more frequent and intense, with almost everywhere experiencing hotter heat extremes and less frigid cold extremes, as well as more severe and persistent drought and precipitation events. There is even debate in Japan, for example, about adding a Cat 6 hurricane ranking ...

IMPACT

Extreme weather events can lead to substantial impacts including damage to agricultural production, buildings, and infrastructure, loss of life and natural capital, as well as a myriad of longer term economic impacts including increased human migration and an increase in human stress and illness.

In 2020 the 10 most destructive extreme weather events alone cost an estimated $140bn, with the number of events causing losses in excess of $1bn increasing from an annual average of 7.1 between 1980 to 2015 to 16.2 by 2020, with a record breaking 44 recorded in 2020 alone.

Furthermore, since the year 2000 over 7,000 extreme weather events have claimed the lives of over 1.23 million people, affected more than 4.2 billion people, and caused over $2.93tn worth of damage. And that excludes the indirect impacts ...

Meanwhile, observations of weather extremes show the expected long-term trend is in line with the increase in global average temperatures, which mean they will get even more frequent and even more extreme.

EXAMPLES

Finding examples of extreme weather events with global or continental level impact, as well as that incur costs of over $1bn is, unfortunately, simple.

The most extreme recent events include the record breaking Atlantic hurricane season and a rare five storm system; the Chinese floods which caused over $32bn in damage and caused the evacuation of 1.2 million people; the Indian floods which affected over 42 million people; the worst drought in South Africa in over a century; the 2018 US wildfires which incurred $149bn or 0.7% of GDP's worth of direct and indirect damages ...



A helicopter battles fires in California, USA

ACT NOW

Solutions to negate and reduce the severity and impact of extreme weather events vary. While some organisations are focused on trying to mitigate their impact on society others are focused on trying to solve the problems driving the trend.

EXPLORE:

- Reviewing regulations affected by extreme weather including building codes, urban planning, and H&S
- Direct Air Capture, geo-engineering, and other mitigation solutions
- Incorporating the indirect costs of extreme weather in government investment and policy formulation
- Industry de-carbonisation and the adoption and enforcement of sustainable business practises
- De-investing in organisations harming the environment
- Unilateral global accords and coordinated global action

Data sources: AON, Ecowatch, NOAA, UCL, United Nations, and various.

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EXPLORE STARTUPS & MORE

GLOBAL SEA LEVEL RISE

3RD YEAR ON THE LIST



QUICK TAKE

Long term Global Mean Sea Level (GMSL) measurements and satellite data show that sea level has risen by an average of 3.6mm per year over the last decade, with 0.8mm a year of that being attributable to **Ocean Warming**. And that rate of increase has more than doubled in the past few decades.

In fact, sea levels have risen faster in the last 100 years than the last 3,000 and this acceleration is expected to continue, because of **Climate Change** and other contributory factors, with a further 15 to 25cm sea level rise expected by 2050.

Data sources: Royal Society, and various.

IMPACT

When sea levels rise as fast as they have been even a small increase can have a devastating impact on society and the environment.

On the one hand saltwater ingress can contaminate important freshwater aquifers and farm land with toxic salts, affect and destroy inland habitats and flood wetlands, and cause destructive erosion. But, on the other, they can completely obliterate low lying communities and countries and trigger mass human migration events.

The impact of sea level change is even more pronounced in many coastal cities - especially those built on or near river deltas - many of which are not only experiencing higher sea levels but also record levels of subsidence of up to 10mm a year.

Today, over 600 Million people live in around 570 low lying coastal cities that are less than 10 meters above sea level, and 2.4 Billion people live within 100 km of the coast, and not only could increases in sea levels drown some of those cities, but it will create economic and social havoc.

EXAMPLES

Cities on America's East coast, for example, are especially vulnerable to sea level rise. When Hurricane Sandy struck New York in 2012 coastal floods, which were the highest ever recorded, affected over a million buildings, cut power to 2 million people, and caused over $19 Billion worth of damage.

In Miami the sea level has risen a staggering 8 inches since 1981 and is projected to rise by a further 40 inches by 2070. And while the city is confident it can adapt by spending over $4 Billion on new coastal defences since 2000 tidal related flooding has increased by 352% with Miami Beach now being dubbed "Ground Zero" for sea level rise.

However, while cities like Miami build defences, 275 Million other city dwellers won't be as fortunate with cities including Alexandria in Egypt, Mumbai in India, Osaka in Japan, and Rio de Janeiro in Brazil, expected to be under at least 3 feet of water by 2070. And, as for the Maldives they'll vanish - which is why their government became the first in the world to announce they're building the world's first ocean city to re-home their citizens.

ACT NOW

Sea level rise is just one in an increasingly long line of challenges facing the world, and it's impacts are accelerating. It's also a challenge that doesn't have any single solution and needs a co-ordinated global response. However, it's also a prime example of how inaction by governments and organisations in the short term will have huge economic and social consequences in the long term as countries, especially those in Asia, have to grapple with mass migration and flooded cities that become uninhabitable.

EXPLORE:

- Climate Migration
- Coastal defence strategies
- Future of Construction, Energy, Manufacturing, Smart Cities, and Sustainability.
- Ocean cities
- Unilateral global accords and coordinated global action

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EXPLORE STARTUPS & MORE

GLOBAL WASTE

3RD YEAR ON THE LIST



QUICK TAKE

In 2022 the world produced 2.1 Billion tons of solid waste, but driven by **Population Growth** by 2050 this is expected to rise to 3.4 Billion tons, with each person on average generating 0.74Kg of waste per day - with a range of between 0.11Kg and 4.45Kg depending on the country. While the world's high income countries account for 16% of the worlds population they produce 34% of all the worlds waste, and recycle a third, compared to East Asia which produces 23% and recycles just 4%. Then, looking ahead, by 2050 Africa's waste is expected to triple and West Asia's to double.

Data sources: WHO, World Bank, and various.

IMPACT

Waste comes in many forms, 50 to be precise, from food waste and **Global E-Waste** to **Ship Scrapping**. Food waste represents 44% of all solid waste, fibrous waste 17%, plastic 12%, glass 5%, metal 4%, and then the remainder, but of all these plastic waste the most problematic to deal with and accounts for more than 242 Million tons. Then, looking at liquid waste every year we produce over 400 Million tonnes of hazardous waste - almost 13 tonnes per second and a 400 fold increase in just one generation. And that's a lot.

However, while we talk stats, the impact of all this is on human society and the environment especially when we factor in the impact that burning waste has on **Air Pollution**, the impact that waste by-products leaching into the soil has on **Soil Degradation** and **Water Scarcity**, and the impact that 13 Million tons of plastic flowing into the oceans every year has on our **Plastic Planet**, is immense. And that's before we factor in the impact of decomposing waste which, in the case of landfills accounts for 91% of global Methane emissions which impacts our **Warming Planet**. Then, on the human healthcare front, well, I need more pages ...

EXAMPLES

Today this trend means we all live with more than 700 man made chemicals in our bodies which aren't supposed to be there. But perhaps most worrying is the fact that we only have safety data on 14% of them despite the evidence that they can cause everything from cancer and reproductive problems to birth defects, DNA damage, and more.

Our waste problem is also growing in front of our faces - literally. Today, the world's largest landfills stagger belief with the Las Vegas Apex dump being the world's largest covering over 2,200 acres and holding more than 50 Million tons of municipal garbage. However, while not the largest Mexico's Bordo Poniente landfill is the fastest growing with over 4.4 Million tons of garbage being added to it annually.

And, as for the consequences, from people in Indonesia having to leave their homes as landfills grow, to toxic fumes literally leaving locals in Delhi gasping for breath, to contaminated ground water killing millions, and the growing dumps supporting opportunistic organised crime groups there appears to be no upside to this trend.

ACT NOW

The environmental and human impact of this trend is increasingly becoming incalculable as humanity's growing waste problem changes animal behaviour, and affects the health and well being of every living thing on the planet, and even the planet itself as this trend helps exacerbate **Climate Change**. A global crisis in need of a truly global solution noone can turn a blind eye to this trend and noone is immune from its consequences.

EXPLORE:

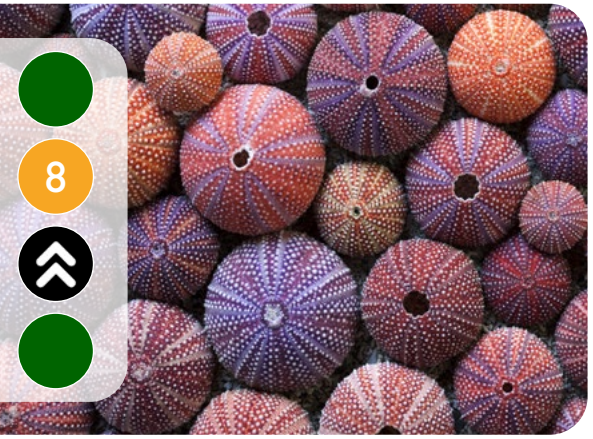
- Business and impact assessments
- Circular Economy, recycling, and Sustainable Procurement
- Emerging technologies and technology roadmaps
- ESG best practises, policy reform, rankings and ratings
- Materials innovation
- Partner ecosystems and solutions
- Zero Waste Pledges

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EXPLORE STARTUPS & MORE

OCEAN ACIDIFICATION

3RD YEAR ON THE LIST



QUICK TAKE

Ocean acidification is the ongoing decrease in the pH value of the Earth's oceans and it's mostly caused by the increased uptake of Carbon Dioxide from the atmosphere which has now reached historic levels.

Not only does this reduce the amount of carbonate in the oceans, which is a key building block in seawater, but it makes it much more difficult for marine organisms, such as corals and some plankton, to form their shells and skeletons which then has negative consequences for the wider marine ecosystem, including fisheries.

Data sources: EPA, Europa, NOAA, and various.

IMPACT

Over the past 20,000 years the acidity of the world's oceans has remained relatively stable, but with rapid increases in the levels of Carbon Dioxide in the Earth's atmosphere, which are now 40% higher than their pre-industrial levels, ocean acidity has increased by over 30%, from a pH of 8.11 to 8.06, in the same period.

To put this into perspective this decrease in pH has occurred at a rate about 100 times faster than any change in acidity experienced during the last 55 million years and without any changes in global greenhouse gas emissions it is estimated it will take the oceans thousands of years to rebalance themselves.

Not only does ocean acidification have an impact on the marine life that live in the oceans but it also has an impact on those that rely on the oceans for food and resources. And while increasingly acidic ocean water dissolves the shells and skeletons of living marine organisms, such as the Australia's Great Barrier Reef corals, it also prevents the formation of them in the first place which then has longer term consequences on the rejuvenation and replenishment of these vital ecosystems.

EXAMPLES

Dissolving shells and skeletons which are made out of Calcium Carbonate is one thing, but when you change an organisms living environment it also increases their levels of stress which then has negative impacts on their health and their ability to reproduce and survive.

For example, scientists have found that clams, crabs, mussels, and sea urchins start to dissolve their protective shells to counter elevated acidity in their body fluids, so even if an organism can adapt to survive increasing acidity its overall health can be impaired.

Additionally, many marine organisms have complex life cycles, spending their early lives as larvae and their small size makes them even more sensitive to increased acidity which, in the case of oysters and sea urchins often means they don't develop properly. And, in the case of coral polyps ocean acidification has led to between a 52% to 73% decline in new reef building.

Elsewhere larval fish loose their ability to smell and avoid predators, so even in cases where marine organisms are able to reproduce the survivability of their offspring is reduced.

ACT NOW

When you increase the acidity of any environment it affects the balance and health of that environment, but in the case of oceans correcting the imbalance will take Eons by which time to will be too late to save many of the species that call the oceans their home.

EXPLORE:

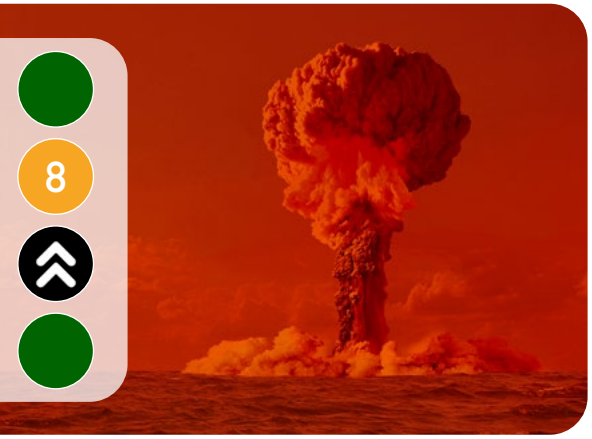
- Circular economy
- Civil education
- Reducing Greenhouse Gas Emissions and Net Zero policies
- Sustainable water management policies
- Unilateral global accords and coordinated global action

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

OCEAN WARMING

3RD YEAR ON THE LIST



QUICK TAKE

Increases in Global Greenhouse Gas (GHG) emissions have caused **Global Warming**, increasing global surface temperatures by over 1C, but only 1% of that trapped heat has stayed in the atmosphere with over 93% of it being absorbed by the world's oceans. And, because water takes much more energy to heat up than air this has resulted in an average ocean temperature increase of 0.13C per decade.

However, while that sounds insignificant oceans are now warming up 24% faster than a few decades ago with big consequences ahead.

IMPACT

Today, the world's oceans which cover over 321 Million cubic miles of the Earth's surface, are shielding humanity from some of the worst consequences of climate change because they are absorbing the equivalent of 5 50 megaton Atom bombs of heat from the atmosphere every second. Putting this in context that's over 1,100,000 Trillion Joules of energy every second which is a phenomenal number by any measure.

While most of this heat is absorbed by the upper part of the ocean, down to about 250ft, two thirds of it is absorbed by the upper 2,300ft of the ocean, and the rest is absorbed by the depths.

The net result of all this is that the oceans have been warming up by on average 0.13C every decade since the 1900's, and because warm water takes up more space than cool water this phenomenon alone has helped add an extra 0.8mm to Mean Sea Level (MSL) every year since records began in1970 - or an extra 750 Gigatons worth of water. It's also having a significant impact on the rate of global ice melt, marine life, ocean oxidation and pH levels, the world's climate, and, by association, all of us.

EXAMPLES

The consequences of ocean warming are being felt by almost every human and natural system on Earth, including effects on coastal communities and coastal erosion, crop yields and fisheries, extreme weather, and even an increase in water borne diseases such as Cholera and toxic algal blooms that cause neurological diseases like Ciguatera. It's also one of this generations greatest hidden challenges.

Powerful hurricanes have increased by 30%, polar and tropical marine ecosystems are migrating into cooler waters up to 10 degrees latitude closer towards the poles, ocean dead zones are doubling every decade, and 90% of the world's corals are at risk.

Also, compounded by over fishing and warming oceans sustainable fish stock yields have fallen by 35%, deadly algal blooms have increased by 40%, marine heat waves have increased by 54% since 1925, coral bleaching events that used to be once every 30 years are now once every six years, and coastal erosion, which leads to increased flooding, habitat destruction, and salt-water intrusion into important freshwater supplies, has also increased significantly.

ACT NOW

The threat posed to humanity by warming oceans is arguably one of the world's greatest hidden challenges that very few people talk about, and very few policies tackle. It also has an oversized impact on many of the issues we are facing today as a society, from food and water scarcity, to extreme weather and beyond.

EXPLORE:

- Circular Economy
- Coastal protection initiatives
- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Sustainability, and Transportation
- Net Zero

Data sources: Frontiers, IUCN, NASA, National Geographic, NOAA, USGS, and various.

PLASTIC PLANET

3RD YEAR ON THE LIST



QUICK TAKE

Originally hailed as a multi-purpose miracle material in 1907 when it was created, but now labelled as one of the world's greatest scourges, plastic has had an interesting and precipitous fall from grace.

It's used in almost everything we consume, takes hundreds of years to completely break down, litters our cities and coastlines, kills wildlife, and has been a scourge for decades - but it has only been the past few years that the world has really sat up and taken notice. So we have a lot to do before we can say that this trend is behind us.

IMPACT

Plastic is arguably one of the most defining materials of the modern age. It's used in everything from food packaging to pace makers, to cars and computers - and hundreds of millions of other products. And it can take up to 400 years to break down completely.

Since its invention it's estimated over 8.3 Billion tons has been manufactured, with only 9% of that having ever been recycled. Furthermore, over half of all the plastic ever manufactured was made in the past 15 years, with production increasing exponentially from a mere 2.3 Million tons in 1950, to over 450 Million tons in 2015. And by 2050 that figure, without any interventions, is expected to double.

Every year consumers consume over 1 Trillion bags, 500 Billion plastic bottles, 4.5 billion plastic straws, and around 13 Million tons of plastic waste enters the worlds oceans - an equivalent of a truck load every minute. Now, with an estimated 5 Trillion pieces of plastic floating around, it's also estimated that 87% of all seabirds, 50% of all marine mammals, and 30% of turtles having ingested plastic of some sort. All of which is the tip of the plastic mountain.

EXAMPLES

One of the most stunning, and sad, examples of plastic pollution and its impact on the world is the Pacific Gyre, a 20 Million square kilometre ocean vortex in the mid Pacific that's so contaminated and full of plastics and ocean debris that it can be seen on satellite images, and has been dubbed the Great Pacific Garbage Patch.

Larger than Texas and with an estimated 80,000 tons of plastic and 1.8 Trillion pieces of micro-plastics caught in the vortex's grip, with an estimated 46% of that by volume being plastic fishing nets, it contains six pounds of plastic for every pound of plankton, and you can find up to 70 Kg of additional plastic per square kilometer on the ocean floor beneath it. And as for the amount of straws in the patch, which are used to front so many campaigns, they account for less than 0.025%.

Of the remaining 79% of plastics that aren't recycled or end up in our oceans an estimated 12 Billion metric tons of ends up in landfill, with on average only 12% being incinerated, and the rest taking over 100 years to degrade. And there are plenty more examples I could share ...

ACT NOW

By the year 2050 it is estimated that the amount of plastic pollution could triple and that global consumption could increase exponentially unless action is taken to develop and move to more sustainable materials

EXPLORE:

- Alternative materials
- Circular Economy
- Future of Food, Materials, and Sustainability
- Policy and regulation reform
- Recycling solutions

Data sources: Greenpeace, National Geographic, Nature, Oceana, Scientific Reports, University of Georgia, and various.

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EXPLORE STARTUPS & MORE

RESOURCE SCARCITY

3RD YEAR ON THE LIST



QUICK TAKE

By 2030 it is estimated that humanity will need two Earths to support our lifestyles as we deplete resources including coal, fish, helium, land, lithum, phosphorous, natural gas, oil, rare Earth elements, water, and wood, among others, in many cases fifty percent faster than they can be replenished - if they can be replenished at all that is. And, as the world's population continues to grow it is increasingly clear that this status quo is, by any measure, simply unsustainable.

IMPACT

Needless to say the impact of humanity's consumption on the Earth and her resources is both damaging and unsustainable.

On the one hand there is the impact that increasing scarcity will have on human diet, health, and longevity, as well as on the availability and cost of the energy and goods we consume, and on the other there is the impact that going deeper and further to secure resources have on the world's bio-diversity and biosphere.

Resource scarcity will continue to cause critical, and to a certain extent, irreversible environmental damage, and it will also impact the global economy by causing market prices to rise and changing the dynamics of industry.

When we look to 2030, if the world's consumption and population continues to increase at current rates, we will need 35% more food, 40% more water, and 50% more energy - all during a period when factors like climate change will have an outsized impact on everything from food production to water availability. In short, we are pushing the planet beyond its limits to cope.

EXAMPLES

Global energy consumption is one of the biggest and easiest trends to call out as a key contributor to resource scarcity, but it's not the only one. Last year alone, for example, the world consumed more food than it produced between all of 2000 and 2007, and between 1960 and 2007 the amount of arable land per capita halved from 0.39 to 0.21 hectares, with increasing demand on it for biofuels, cattle feed, cities, conservation, food, and pulp.

Switching to water, many areas of the world are already drawing far more potable water than is being replenished and it's estimated that by 2030 over 129 countries will experience extreme water scarcity, with 2.3 Billion people currently living in water stressed countries. Then, when we switch to wood by 2050 it's estimated global demand will triple with current shortages alone increasing the cost of building the average single family home in America by $24,000 - although that figure will ultimately flex as supply volumes alter. And then we're seeing similar situations with respect to the availability of cobalt and lithium which underpin the new electric vehicle and energy revolution, and many more ...

ACT NOW

As they say: There is only Planet A, there is no Planet B. Unless, of course, you include Elon Musk's plans to colonise Mars, which to all intents and purposes is currently an impractical solution to this challenge. This then means that we have to, as we have always supposed to, find ways to live within our means, and to do this we need to change attitudes and cultures, and find new solutions that meet both the needs of humanity and our planet.

EXPLORE:

- Circular economy and recycling initiatives
- Future of Energy, Materials, and Sustainability
- Policy, regulation, and tax reform
- Sustainable living initiatives
- Unilateral global accords and coordinated global action

Data sources: United Nations, PWC, Oxfam, WWF, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

REWILDING

3RD YEAR ON THE LIST



QUICK TAKE

Rewilding is a progressive approach to conservation and nature. It's about letting nature take care of itself, enabling natural processes to shape land and sea, repair damaged ecosystems and restore degraded landscapes with the aim of creating more bio-diverse and resilient habitats, and tackling the climate and extinction crises.

Other advantages of rewilding include the direct and indirect impacts on flooding and flood risks, food chains, as well as improvements in human socio-economic, health, and well being.

Data sources: IUCN, Royal Society, WFF, and various.

IMPACT

While individual rewilding projects all have their benefits up until recently there was no official way to measure and report the how successful different rewilding programs were which was why different groups and academics came together to create the Rewilding Scale.

A conceptual framework that measures human inputs and outputs against ecological integrity the scale finally gave people a way to measure the impact of their restoration projects and assign them a rewilding score.

Broadly the framework considers the so called "Cultural Energy" whereby the "unaturalness" of an ecological system can be quantified by the amount of human associated energy inputs required to maintain it in its current state.

While different projects have different levels of success overall most well managed rewilding projects have, ironically, been wildly successful, and either halted or completely reversed humanity's impact on those local ecosystems.

EXAMPLES

Perhaps one of the most famous examples of successful rewilding has been Yellowstone which in 1995 re-introduced Canadian wolves into the environment, among other initiatives. Today, there are over 100 wolves which have had a significant impact on keeping the local Elk population in check which then, in turn, had a dramatic impact on the amount of over grazing in the park, and led to an overall increase in bio-diversity of at least 50% for the entire park.

Elk populations declined from 15,000 at their peak to 6,000, which then led to a 100% increase in Aspen growth, and a 12 fold increase in the Beaver population, which then led to a 75 fold increase in riparian, or streams and rivers, bio-diversity. And as for Coyotes, as their population came into balance there was a corresponding increase in the number of small mammals that provided food for other avian and mammalian predators.

Other similar success stories have been witnessed in Romania, with the reintroduction of Bison, Beavers in the UK, Giant Tortoises in the Galapagos, tigers in South Korea, and many more.

ACT NOW

As nature comes under increasing stress, and as we see declines in both the number of species and bio-diversity, as well as the continued degradation of the land and sea, it is increasingly important that communities and governments support and undertake rewilding projects.

EXPLORE:

- Assessment and measurement of the bio-diversity of natural ecosystems
- Future of Sustainability
- Rewilding case studies and initiatives
- Rewilding Scale
- Species selection

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EXPLORE STARTUPS & MORE

SIXTH EXTINCTION EVENT

3RD YEAR ON THE LIST



QUICK TAKE

Increasingly we are being told that we are now entering the Sixth Extinction Event, and that the mass extinction of species is accelerating. Today, more than 500 species are on the brink and expected to be lost in the next 20 years - the same number we lost in the past century, and a number that would have taken thousands of years if nature was left to its own devices.

Likened to sawing the tree branch off while we're sitting on it by scientists this trend has a significant impact on **Bio-Diversity Collapse** and on human health and well being.

Data sources: IUCN, and various.

IMPACT

Caused by a variety of contributory factors including, but not exclusively **Deforestation**, **Desertification**, **Global Warming**, **Global Waste**, as well as all manner of other human related activities, especially agricultural, the term mass extinction refers to the point in time when a high percentage of biodiversity or distinct species dies out, and today the stats are worrying. Of over 29,400 species examined over 500 species now have fewer than 1,000 individuals left with the worst affected groups being amphibians, birds, mammals, and reptiles, especially in tropical and sub tropical regions.

Ultimately experts believe this trend could lead to the total collapse of many of the natural ecosystems we rely upon to survive, with just one example of this being the collapse of bee populations which many soon have a serious impact on global food production. More broadly though the loss of Apex species and so called "valued" species, which are often replaced by invasive species, not only has an impact on human well being but has also contributed to everything from fires and pandemics to decreased carbon sequestration and a general loss of ecosystem services.

EXAMPLES

While there are many examples of this trend we'll start top down. It's believed elephants could be extinct by the end of our lifetimes and if this did happen then it would dramatically change ecosystems across Africa and Asia. After all, elephants through their foraging and dung help foster the growth of plants and trees that bats, birds, and other animals rely on for food and shelter. Furthermore, they also dig waterholes on which many animals rely on for water.

Elsewhere the extinction of other plant eating apex species such as Wilderbeast whose populations plummeted after the Rinderpest virus in the 1800's often brings with it renewed plant growth - an over abundance of which increases the chance of wildfires. Then, turning to the pollinators over 75% of the world's food crops are pollinated by insects "Colony Collapse" could not only decrease seed and fruit production, but also lead to the extinction of many valuable plants.

Even krill and plankton, which form the basis of almost every oceanic food chain aren't immune, so I could go on and on.

ACT NOW

Nature is like an orchestra, when everything is in balance the music is sublime, but when things get out of balance, well, the audience flees for the exits. Only in our case there are no exits. As we continue to see species around the world threatened with extinction the impact of loosing them on humanity and our planet will become increasingly stark and obvious with consequences that none of us like or want. It is therefore down to us to try to reverse this trend, which we can, but it's hard given all the other trends.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- ESG best practises
- Future of Agriculture
- Global accords, and policy and regulation reform
- Rewilding initiatives

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EXPLORE STARTUPS & MORE

WARMING PLANET

3RD YEAR ON THE LIST



QUICK TAKE

The world has been through many cycles of cooling and warming in its long history. Today though we're experiencing one of the fastest rates of warming in Earth's history, and whether you're a **Climate Change** denier or believer there's no disputing the evidence that shows global temperatures have been creeping up now for over century and fuelling trends such as **Climate Resilient Infrastructure**, **Extreme Weather**, **Global Sea Level Rise**, **International Migration**, **Ocean Acidification**, **Ocean Warming**, **Water Scarcity and Stress**, and many others.

Data sources: IPCC, Monash University, NASA, WEF, and various.

IMPACT

Since the pre-industrial age, 1850, it's widely believed that human activities have caused anthropogenic warming of the world's atmosphere of at least 1C and that it's currently increasing by 0.2 C per decade as global emissions of gases such as CO and CO2 continue to exceed 31.5 Gt per year and climb past 412 ppm - 50% higher than when the Industrial Revolution began.

Unless the trend is reversed, or at the very least halted, experts now believe we're on track to realise a world that's 1.5C warmer between 2026 and 2042, with a central estimate of 2030 to 2032, and that we could exceed the 2C threshold between 2038 and 2072 with a median of 2052 - at which point the world will look a very different place for all of us. And not in a good way.

From **Bio-Diversity Collapse** and the melting of the global ice sheets, which themselves will cause sea levels to rise by 10m or more and literally change the world map, to increasing food insecurity as well as human security, and the impact on all the other afore mentioned trends for a whole variety of reasons this, it seems, is a future we don't want to see.

EXAMPLES

A warming planet has many implications for the environment and humanity especially when it comes to extreme weather, from producing hurricanes that are so powerful the Japanese government wants to add a new Category 6 scale to the Saffir-Simpson Hurricane Wind Scale, to initiating more severe droughts and heat waves that spawn even worse fires, and more intense precipitation events which increases the intensity of floods.

Asides from these though this trend will also turn cities and **Megacities** into giant sweltering death traps. Today extreme heat and cold are responsible for over 5 Million deaths per year, or 9.4% of all deaths and 74 per 100,000, and as the planet warms it's believed the number of deaths attributed to cold will fall and those attributed to heat will increase significantly with people living in cities faring the worst - especially in Africa, Asia, Europe, and the Middle East which already experience extreme heat. And all of this is before we've discussed the loss of high altitude snow caps, which will affect downstream water supplies, coral bleaching events, and many other potentially deadly and society changing outcomes.

ACT NOW

There is no question that humanity has disturbed the planets natural balance in all manner of different ways. Some of those are reversible and some aren't. However, as difficult as it is this is a trend that can be reversed but it will take technology, time, and unity, the embrace of trends such as **Circular Economy**, **Net Zero Pledges**, **Zero Waste Pledges**, and others, and most of all action.

EXPLORE:

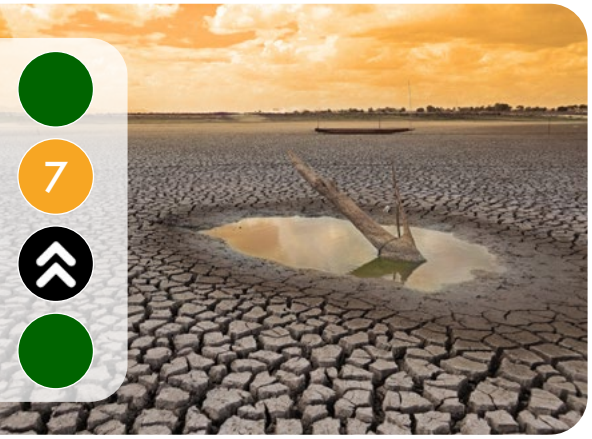
- Emerging technologies and technology roadmaps
- Future of Agriculture, Construction, Energy, Manufacturing, and Transportation
- Policy and regulation reform

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EXPLORE STARTUPS & MORE

WATER SCARCITY AND STRESS

3RD YEAR ON THE LIST



QUICK TAKE

A complex issue global water scarcity and stress are both sides of the same coin, and they're both compounded by a combination of different factors that include everything from climate change, farming practises, ocean health, and the overall societal pressure on water sources, all the way through to poor water management strategies and pollution.

The net result of this is that in many regions the supply of fresh, safe water is becoming increasingly scarce and that local populations are having to go to increasingly extreme lengths to obtain it.

IMPACT

The increasing cost and lack of access to sources of fresh, safe water that can be used for domestic, industrial, and recreational consumption is becoming such a global issue that the phrase "Future wars will be fought over water" has now entered popular culture. The future lack of water has even caught the eyes of investors and speculators who are hedging tens of billions of dollars betting that in the future water prices will increase as it becomes increasingly scarce and sought after - a trend that's got governments and institutions around the world worried as they see water becoming an increasingly privatised commodity.

Today 72% of all water withdrawals are by agriculture, 16% by domestic, and 12% by industrial sources, and when a region withdraws more than 25% of its renewable water resources it's said to be water stressed. As a result 2.3 Billion people now live in water stressed countries, 3.2 Billion people live in agricultural areas with very high water scarcity, and 4 Billion people now experience severe water scarcity at least once a year. And, by the year 2030 it is estimated that over 700 Million people will be displaced by water scarcity.

EXAMPLES

Farming arguably has the greatest negative impact on water availability because not only is it the biggest user of water, with irrigated agriculture being by far the largest user of water globally, but it's also one of the biggest polluters and causes of desertification and land degradation. Furthermore, driven by a growing global population who in 1964 consumed an average of 2,000Kcal per person per day and by 2030 will reach over 2,700Kcal - with an increasing percentage of that coming from meat which creates its own issues - it is clear that agricultures need for water in the future, and therefore its impact on water scarcity, will continue to increase.

It's also easy to think of water scarcity as just a Third World issue, but in California, which is arguably one of the world's most modern and technologically sophisticated societies, over 88% of the state is now in Extreme drought conditions, with 47% of it experiencing Exceptional drought. Not only is this leading the state to ration water, but it's also causing farms to fail, helping fuel some of the world's worst wildfires, and as hydro-electric reservoirs run low it's causing severe energy shortages as well.

ACT NOW

When a civilisation runs out of water it goes extinct so, as you can see, water scarcity isn't just problematic, it can trigger extinction level events. And, while that might sound apocalyptic it's also very hard to argue against. As a result water, and water scarcity, could be one of the greatest and most pressing challenges of our time, and as such requires immediate action.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Industry, Sustainability, and Water
- Policy and regulation reform
- Precision agriculture and sustainable modern farming methods, including Clean Meat and vertical farming
- Water desalination, direct air capture, reclamation, recycling, and other solutions
- Unilateral global accords and coordinated global action

Data sources: NOAA, OECD, UNICEF, United Nations, World Bank, USDA, and various.

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3RD ANNUAL EDITION . BOOKLET 3 OF 7

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... Citizenship as a Service
... Corporate Blacklisting
... Corporate Foreign Policy
... Debt Trap Diplomacy
... Fragile Government
... Geopolitical Fragmentation
... Global Corruption
... Global Democracy in Decline
... Global Lobbying
... Government Golden Shares
... Innovation Cold War
... Leaderless World
... Net Zero Pledges
... President For Life
... Propaganda Campaigns
... Soft Power Plays
... Splinternets
... Technological Soverignty
... Transnational Repression
... Twiplomacy
... Virtual Nations

STATS THAT MATTER

SUMMARY UPDATE

TODAY'S POLITICAL theatre is a tale of of struggle, between nations, agendas, and ideals, and jerking progress with 108 million forcibly displaced refugees and a growing number of political prisoners serving as constant reminders of our world's unequal "political norms," which perfectly highlight the need for strong international actions and a global commitment to uphold human rights and democratic values.

However, as democracy itself comes under fire from all manner of trends, including Fragile Government, Europe and other blocks are fighting back by using technology to help them progress so called Digital Democracy initiatives that, in their words, facilitate greater citizen engagement and government transparency. As promising as these are though privacy questions and governments ability to counter dangerous misinformation campaigns remain.

The past year has also seen dramatic spending shifts including increases in military expenditure and Green spending which last year hit $1.2 Trillion which shows governments increasing appetite to tackle climate change and its negative consequences, such as energy and food security, and extreme weather and sea level rise, as well as using funding to build new green industries that support future growth and jobs.

Elsewhere we're seeing consumer freedoms expanding in digital-friendly regions but receeding further where internet censorship prevails, with global trade tensions further disrupting consumers freedoms by snarling supply chains and pushing the cost of living to all time highs.

In this turbulent political climate, as trade tensions continue to simmer and as strategic dislocation accelerates, and as the world continues the process of adapting to the new emerging world order there's no question that we live in increasingly uncertain and volatile times which means governments will have their work cut out for them to safe guard human rights and freedoms, and ensure equal equity and access to opportunities for all - should they wish to.

BOOK AN EXPERT CALL

STATS THAT MATTER

POLITICAL

23

COUNTRIES WITH "FULL DEMOCRACIES"

EIU

25%

WOMEN IN NATIONAL PARLIAMENTS, PERCENT

IPU

193

UNITED NATIONS MEMBER NATIONS, 2022

UN

108 ML

FORCIBLY DISPLACED REFUGEES, 2022

UNHCR

$4.23 BILLION

TOTAL POLITICAL LOBBYING SPEND, USA 2023

OPENSECRETS

$2 TR

ANNUAL GLOBAL DEFENCE SPEND, 2022

SIPRI

9

RECOGNISED NUCLEAR POWERS, 2022

IAEA

1 ML

EST. GLOBAL POLITICAL PRISONERS, 2022

US STATE DEPT

$3.6 TRILLION

ANNUAL ESTIMATED VALUE OF GOVERNMENT CORRUPTION, BRIBES AND THEFT, 2022

TRANSPARENCY INT'L

$204 BN

GLOBAL DEVELOPMENT AID, 2022

OECD

BELT AND ROAD INITIATIVES

3RD YEAR ON THE LIST



QUICK TAKE

The multi-trillion dollar Belt and Road Initiatives (BRI) that we are seeing being promoted today are a modern spin on the old silk and trading routes that connected different parts of the world centuries ago. And their objective - to grow trade and improve supply chain resilience - is the same. By aiming to improve regional co-operation through better connectivity between countries it's hoped that by creating vast networks of energy pipelines, highways, ports, railways, and streamlined border crossings, blocks such as China and the EU will benefit significantly economically and politically from them.

IMPACT

In 2013 Xi Jinping unveiled his ambitious $1 Trillion One Belt One Road (OBOR) BRI initiative, which also included the bundling of Chinese technology MOU's with the deals, with ambitions to invest in over 1,590 infrastructure projects in 150 countries which would touch 30% of global GDP and 60% of the world's population. With the objective being to, in his own words, break the bottleneck in Asian connectivity and expand the use of China's currency and technologies, supported by the creation of a parallel Digital Silk Road initiative, there is little doubt that OBOR will have a significant impact on trends including the transition to a **Bi-Polar and Multi-Polar World**, **Global GDP Growth**, **Global Reserve Currency Wars**, **Innovation Cold War**, **Soft Power Plays**, and **Standards Shadow War**.

However, worried that Chinese OBOR loans would make countries indebted and or loyal to Beijing in 2021 the EU unveiled the Global Gateway project and €300 Million to support 70 major infrastructure projects. However, while both projects have similar objectives the EU's also includes using the funds to strengthen education, health, and research systems across the world.

EXAMPLES

These BRI and Digital Silk Road projects will change the global economic, political, and technological landscape but, as with all initiatives of this kind there are good stories and bad.

Successes include China's investment in Piraeus Port in Greece, which helped it become one of the world's fastest growing ports, the Mombasa-Nairobi railway which boosted trade and tourism between Kenya's two largest cities, and investments in Gwadar Port in Pakistan which gave the country better access to international markets. And the China-Laos railway and Central Asia-China gas pipelines have also increased the partner countries exports.

However, there are growing concerns of **Debt-Trap Diplomacy** as concerns grow over countries ability to repay OBOR loans - 60% of which are now in distress as **Global Public Debt** soars - with Zambia handing over the control of their state owned electricity company ZESCO to Chinese authorities to repay debts, Sri Lanka handing China 99 year leases on its ports after defaults, and many wondering how Pakistan will repay its $62 Billion of loans after years of financial mismanagement and floods.

ACT NOW

With BRI having so many short, medium, and long term economic, political, and technological advantages it's surprising that more countries don't promote or participate in them. For the countries that do though there is no denying the out sized impact they'll have on those countries future political influence and prospects on the global stage which makes this trend an important one to explore.

EXPLORE:

- Anti-Corruption and ethical infrastructure investment policies
- Economic, financial, and political assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Construction, Energy, Financial Services, Government, Logistics, Manufacturing, Retail, Supply Chains, Transportation, Work and the Workplace
- Impact and risk assessments

Data sources: AidData, Asian Development Bank, CFR, EIB, Europa, and various.

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EXPLORE STARTUPS & MORE

BI-POLAR AND MULTI-POLAR WORLD

3RD YEAR ON THE LIST



QUICK TAKE

Historically we used to live in a Bi-Polar world, where world politics and the global agenda were largely directed and influenced by two countries, namely Russia and the USA. However, since the dissolution of the USSR Russian influence has somewhat waned so today we live in a hegemonic world largely dominated by the USA and their agenda.

As we look forwards though and see the rise of China, a revitalised Europe, and a slowly ascending India, we can envisage a time where global agendas are dominated and influenced not by one world power, but by two or many.

Data sources: Various.

IMPACT

The ultimate impact of a Bi-Polar or Multi-Polar world is that no one country's voice will be the loudest - although make no mistake, all of their voices will be loud. As a consequence this means that trends, such as Hard Power Plays and **Soft Power Plays**, as well as **Belt and Road Initiatives**, **President For Life**, **Propaganda Campaigns** and so called **PsyOps**, will play much greater roles in influencing and shaping future global agendas and opinions. Agendas, for example, that could influence the strategic direction of international organisations such as the World Bank, World Health Organisation, World Trade Organisation, and others.

There will also be an impact on global politics and the world order, and for the majority of us the most dangerous period of time will be during the transition period - when we move from a hegemonic world to a Bi-Polar world, and when both "rivals" have roughly equal capabilities. In the past it's been these transitions that have given rise to aggressive juxtapositioning and war so the world will need to be prepared and remain vigilant to any and all threats great and small.

EXAMPLES

Perhaps a good example of today's juxtapositining, as we look ahead to a Bi-Polar World where the future is dominated by China and the USA, then perhaps India, and even the BRICS, is China's quest to assert their authority over and dominate several hotly contested areas including Taiwan, provinces along the China-India border, and the hotly contested South China Sea. And then there's the **Global Reserve Currency Wars**, **Innovation Cold War**, and **Standards Shadow Wars** which are all being used as tools to accelerate China's acension and dominance on the global stage.

With so many converging trends it wouldn't take much for some of them to escalate and change the global status quo. Although with respect to military conflict in the South China Sea it's likely all sides will continue to test each others resolve rather than risk drawing blood and finding themselves embroiled in all out war. Nevertheless in the future we could look back at these and other trends and see them as the signals that marked the start of China's ascension as it looks forwards to a Bi-Polar World and begins the process of transitioning from today's status quo to tomorrows.

ACT NOW

It is the transition periods between global power shifts that people should be wary about and we face several of those as we look into the future. The question then becomes will the activities that define these transition periods be net positive or net negative for us, and how do we navigate them so we all benefit.

EXPLORE:

- Emerging technology and technology roadmaps
- Dominating global standards and strengthening global standards boards
- Future of Governments
- Hard and Soft Power plays
- Strong institutions
- Unilateral global accords and coordinated global action

BRICS 2.0

3RD YEAR ON THE LIST



QUICK TAKE

The BRICS has always been important but as we stare down the barrel of the **Bi-Polar and Multi-Polar World**, which China wants to dominate and use to its advantage to create a new world order, today it's taken on new meaning and emphasis with the addition of multiple new members, and new ambitions. While BRICS 2.0 is staggering in scale and scope perhaps what's most interesting is whose hand is on the proverbial wheel because while joint economic and societal prosperity rank high on the agenda so does China's and Russia's desire to use it to advance their own anti-West ambitions.

Data sources: BCG, FAO, IMF, OECD, USDA, and various.

IMPACT

The blocs global impact, including on the **Global Reserve Currency Wars**, shouldn't be under estimated and neither should its propensity to prioritise its own members. Today, it accounts for 29.3% of global GDP, or $31 Tr, which while still short of the $46 Tr of the G7 means it could surpass the them in economic influence in the coming years - especially as China's and India's economies continue to outgrow most of the G7 and other global economies.

From a population - or consumer - perspective the bloc includes over 46% of the world's population versus the G7's 10%, which as we see the continuing rise of Asia's Middle Class will only help fuel its rise. And, when we look at the bloc from a natural resources perspective, with the addition of new members, it now controls more than 70% of Rare Earth metals, 43% of the global oil supply, up from 20.4% previously, 32% of the world's natural gas supply, 23% of the world's Iron Ore, and 20% of the world's Gold and fresh water. Re agricultural output the bloc also controls over $1 Tr of exports including 50% of the world's Soy beans, 40% of its corn and rice, 28% of its beef and poultry, and 24% of its wheat.

EXAMPLES

While the BRICS intended purpose is to promote economic cooperation and development, strategic resource and energy collaboration, strengthen multi lateralism and improve South-South cooperation, it also has the stated aim of challenging what it sees as the Western hegemony, and it does all this in a variety of ways including the development of new economic tools and financial rails, as well the development of a BRICS+ digital reserve currency, made up of BRICS fiat currencies, aimed at accelerating global dedollarisation.

However, as unified as the bloc seems externally it seems likely that especially China and India, and also Brazil and Russia by extension, will all in time vie for dominance within its hierarchy, which given the open animosity between China and India could be interesting to observe. That aside though some of the big initiatives include the expansion of the New Development Bank to finance new infrastructure projects, the Energy Cooperation Framework, new trade and investment initiatives and technology sharing partnerships, as well as numerous cultural and educational exchange programs which all have significant meaning and impact.

ACT NOW

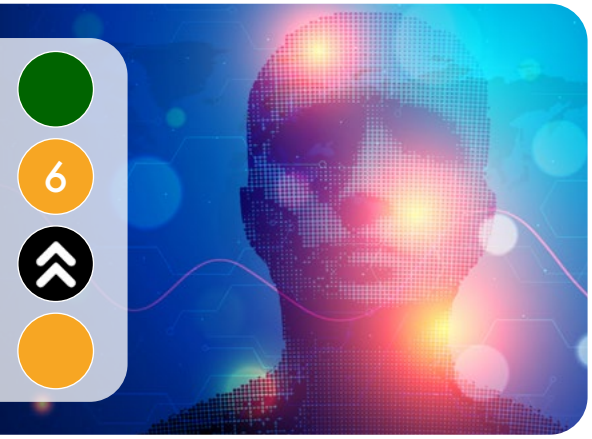
As the bloc continues to expand, and ratchets up its global ambitions it is my recommendation that executives look for opportunities to be involved with it, especially via **Connector Economies**, like India and the UAE, while at the same time staying alert to the collaborative agendas of authoritarian partners to control and influence the bloc, via **Soft Power Plays** and other means, and the political juxtapositioning of others.

EXPLORE:

- Brand localisation
- Business and impact assessments
- Investment and R&D opportunities
- Market entry strategies
- Economic, political, and security risk management policies
- Supply chain optimisation strategies
- Talent acquisition strategies

CITIZENSHIP AS A SERVICE

3RD YEAR ON THE LIST



QUICK TAKE

When governments are faced with the prospect of needing to, or wanting to, invest in the development of their country and their citizens their budgets, and therefore their plans, are often constrained by their country's GDP and other economic indicators. And many of these are themselves constrained by factors such as productivity, and population demographics and size.

However, when it comes to both of these Citizenship as a Service offers countries a way for governments to artificially grow the size of their populations and reap the economic rewards.

Data sources: Republic of Estonia, and various.

IMPACT

Ultimately the positive impact that Citizenship as a Service, which is also sometimes referred to as E-Residency, has on a country's economic prosperity is the direct result of the fact that it gives people from outside of the country a way to participate in its local economy, contribute to it, and benefit from its policies and successes in a way that wouldn't otherwise be possible. And, needless to say, provided governments can balance their programs correctly the trend is very appealing.

While the number of countries offering such programs are still limited so far in the first five years Estonia, the pioneer in the space, saw 80,000 people from 167 countries sign up, start over 10,000 new local businesses - which represents over 8% of the total number of businesses registered in the country - and contribute over €31 Million a year in taxes. All of which is run and managed by a team of just 18 people, with 87% of the participants being men between the ages of 26 and 45.

Additionally, and in time, this trend could help fuel the development and rise of so called Virtual Countries - another powerful trend I discuss in this Codex.

EXAMPLES

Estonia was the first country to establish an E-Residency program back in 2014 and given its success it's no surprise that the program's being expanded to at least another 20 countries including Brazil and South Africa, as well as Japan, Singapore, Thailand, the UAE, and the USA, to name but a few.

In Estonia's case the program has essentially two sides. The first is the E-Residency initiative itself, and the second is access to an online E-Residency marketplace.

Described as a "location free" digital toolbox built to support people from around the world the program is completely digital with the aim of making borders meaningless and letting location-independent business owners, entrepreneurs, and freelancers access a wide range of private and public Estonian services, access European banking services and marketplaces, and join a community of like minded people.

ACT NOW

Citizenship as a Service programs not only provide real benefits to their host countries and participants, but their architecture and design could also be very easily adapted to enable countries to build out the first true Virtual Countries.

EXPLORE:

- Business and impact assessments
- Case studies and examples
- Future of Government, the Workforce, and the Workplace
- Partner ecosystems and solutions
- Societal trends

CORPORATE BLACKLISTING

3RD YEAR ON THE LIST



QUICK TAKE

Just as **Sanctions** are designed to have a negative impact on the ability of countries to operate Corporate Blacklisting does much the same thing but at an individual company level rather than the national level, and it's a trend that been increasingly used over the past number of years as organisations get more powerful and as geopolitical fire fights, such as **Trade Wars**, flare.

It's also a trend that's likely to only get worse as we head towards a **Bi-Polar and Multi-Polar World**.

IMPACT

While blacklisting companies has many impacts some of the most severe include cutting off access to important markets, and restricting access to capital, talent, resources, and suppliers.

Blacklisting can happen for many reasons, including human rights violations, money laundering, national security concerns, as well as unfavourable business practises and partnerships - especially when it comes to surveillance or military related work, and questionable associations and contracts with unfavourable governments.

In some cases this trend can be a death knell for some companies and drive them into bankruptcy, and for others it can act as a wake up call that they need to improve their GRC processes, diversify their markets and supply chains, and dramatically improve their balance sheets. The increased use of this trend, rightly or wrongly, has undoubtedly accelerated the inwards development of some countries investment, market, and technology ecosystems, as well as fuel the **Shadow Standards War** and the trend of **Selective Decoupling**.

EXAMPLES

While a lot of press coverage has been given to the USA's use of this trend against Chinese companies, and vice versa, the fact is that it affects many companies in many countries. Some of the more notable examples include India's blacklisting of over 270 Chinese companies in 2020 including the likes of Alibaba, Bytedance, Taobao, Tencent, Xiaomi, and Yotta Games after tensions between the two countries were heightened after several deadly Himalayan border clashes. And then there's the USA's blacklisting of more than 50 major Chinese companies including Dahua, DJI, Hikvision, Huawei, SenseTime, SMIC, ZTE, and others for a variety of abuses including human rights abuses against the Uighurs.

In almost all cases these companies lost access to critical components, investment, markets, talent, and even software critical to their operations and product development which, in DJI and SMIC's case meant they couldn't develop products, and which in Huawei's case meant they couldn't access computer chips, the Google Play store, and other important resources with the result being hey developed their own alternatives.

ACT NOW

The more that countries use this trend the more likely it is that the companies and countries affected by it will find ways to circumvent the problems they cause which, in turn, will accelerate the **Innovation Cold War** and the splintering of various institutions, partnerships, and standards.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Creativity and Innovation, and Government
- Policy and regulation reform

Data sources: Bloomberg, Nikkei, SCMP, US Dept. of Commerce, and various.

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EXPLORE STARTUPS & MORE

CORPORATE FOREIGN POLICY

3RD YEAR ON THE LIST



QUICK TAKE

As corporations become increasingly powerful in terms of global reach, resources, and wealth, and as the trend of **Fragile Government** accelerates, many people are starting to question weather they are more powerful than governments when it comes to being able to influence and change the status quo - whether it's at a business, cultural, political, or even societal level. As a result many of them, not content with just lobbying, are starting to play key roles in developing and driving local and global political strategy, and are directly getting involved in diplomacy and geopolitics.

Data sources: Various.

IMPACT

Corporations that have direct connections to every level of government are not uncommon, such as is the case with **Global Lobbying**, and in some cases they act as a convenient back channel in times of crisis and uncertainty, such as the US-China **Trade Wars**. However, when we look at many governments track records of being able to push through change and transform the status quo their litany of failures often out numbers their wins which then leaves the door wide open for corporations to make their move and take the lead in debates and discussions that should be led by government reps.

Not burdened by the complex democratic decision making processes of government, which all too often end in deadlock and stalemate, the ultimate impact of this trend is that increasingly if you want to get something done then the best way to achieve it is to get a private corporation on side to lead the initiative - whether it's transforming the communications, education, energy, healthcare, manufacturing, space, technology, and transportation industries, or whether it's drafting and helping push through new foreign policies or regulations.

EXAMPLES

As many governments simply watched from the sidelines and threw political sticks at one another in 2017 Microsoft took the lead in working with the United Nations to draft and promote a new Digital Geneva Convention - a binding international treaty based on the Geneva Convention protocols aimed at protect citizens from state sponsored cyber attacks. And that's just one of their initiatives.

Elsewhere Google has been actively involved in shaping the communications and energy policies of countries as diverse as Cuba, Puerto Rico, and the USA, and Amazon and Meta have been actively involved in shaping India's communications, financial, internet, and retail markets and laws.

And that's before we discuss the impact that Alibaba, Huawei, and Tencent are having on Asian and African political direction and thinking even though much of their influence was reigned in after the Chinese governments ideological and political crackdown of them.

ACT NOW

Governments used to be all powerful, but increasingly, dissatisfied with the pace of change and the inability of governments to look beyond the short term, large corporations, some of which now resemble **Virtual Nations** themselves, are now taking matters into their own hands and are taking a much more proactive role in helping transform the status quo - whether it's making a meaningful impact on climate change or space, or many other topics.

EXPLORE:

- Business and impact assessments
- Future of Government
- GRC Reform
- Policy and regulation reform

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EXPLORE STARTUPS & MORE

DEBT TRAP DIPLOMACY

1ST YEAR ON THE LIST



QUICK TAKE

Originally popularised by countries railing against **Belt and Road Initiatives** (BRI), which many experts say are often a blatant attempt by some countries, such as China, to load countries with unaffordable and unsustainable loans and debt loads that they can leverage for economic and political gain, as well as preferential access to infrastructure and resources, there's no doubting that this is a highly contentious trend. And, whether or not loans are intentionally used as a way to exert undue influence on others, the fact remains that this is a very a useful **Soft Power** tool.

Data sources: IMF, The East African, World Bank, and Various.

IMPACT

This trend can quite literally be used by countries to re-shape the entire global cultural, economic, ideological, militarial, political, and technological landscape, for their own advantage. While the worst impacts can include a country's loss of sovereignty and the ceding of control of its key assets such as infrastructure, ports, and utilities thorough its inability to repay its debts, high debt servicing costs can also increase the country's financial vulnerability and make it less able to weather external shocks such as **Sanctions**, **Trade Wars**, and **Tariffs**, as well as making it more susceptible to currency fluctuations, **Global Inflation**, and **Global Public Debt** levels which can increase borrowing costs, and increase the risk of defaults and credit downgrades. All of which affects the country's ability to invest in itself and its welfare programs.

Furthermore, with geopolitical tensions is rising, such as we see with the rise of the **Bi-Polar and Multi-Polar World** and **Global Fragmentation** this trend can also be used to exacerbate geopolitical rivalries as major powers compete to extend their own soft power and influence through lending.

EXAMPLES

While no country or government would ever acknowledge they intentionally load countries with unmanageable debt with a view to gaining untoward advantages every country likely dabbles in this trend for their own ends. However, some countries investments are more private and market driven, and others are more state driven with Europe and the US being the former and China generally being the latter.

As a big state **Foreign Direct Investment** (FDI) investor China issues many BRI loans, many of which are opaque and, in the event of a country's inability to repay, come with longer term strategic "benefits." Examples include Zimbabwe, where repayment issues on billions of dollars worth of debt allegedly saw Chinese operators assume control of ZESA the state energy company, and Chinese operators being given a 99 year operating lease for Sri Lanka's Hambantota Port - which both help bolster China's long term economic and energy security. Additionally, many expect loans to Dijbouti will eventually see China establish formal military outposts at Doraleh port, and worries abound over Chinese control of the China-Pakistan Economic Corridor.

ACT NOW

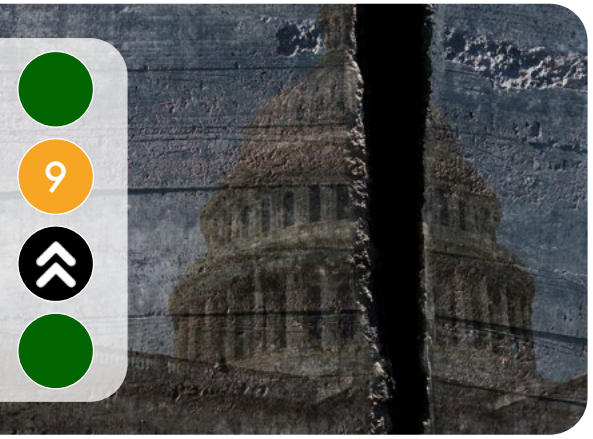
There is no doubt that those with money can use that money to exert undue influence and control over others - after all we see this all the time with the **Global Lobbying** trend. However, as the world order changes, as new ideologies and government priorities come to the fore, there is a big difference between market driven loans and state loans governed under IMF and World Bank rules, and opaque state driven loans, with the latter perhaps being the biggest point of contention and cause of international friction. As a result this is a trend companies should pay attention to since it can warp market access and attractiveness, and how companies operate in them.

EXPLORE:

- Advisory and restructuring services
- Business and Impact assessments
- Privatisation strategies
- Supply chain resilience
- Trade leverage

FRAGILE GOVERNMENT

3RD YEAR ON THE LIST



QUICK TAKE

Even though there is now a growing case to say that large multi-national organisations and **Virtual Nations** are more powerful and can have a greater impact on global business, culture, and society than sovereign governments there are still many times when we need strong governments - especially when it comes to the democratic process, law, regulations, trade, and the protection of social norms. Today though there are all too many examples that governments are becoming more fragile and that their ability to debate and pass meaningful legislation is being impacted at all levels.

Data sources: Brookings, CIA, IMF, Nasdaq, and various.

IMPACT

Different from **Fragile States** where governments lack legitimacy in the eyes of their citizens fragile government is a trend where, for a multitude of reasons, including so called Partisan Warfare, the governments in power are unable to get things done, whether that's passing new laws or legislation, or making progress on important issues.

The impacts of this are numerous and some are unexpected. In the case of the USA there are many on Wall Street who believe this trend benefits them because essentially it keeps the government out of the way of business and lets businesses just get on with business. However, on the flip side budgetary paralysis and stalled decision making has consequences on everything from infrastructure and R&D spending, to tax collecting and enforcement which in the latter's case means that, in the IRS' own words for every extra dollar in tax enforcement that they loose the government looses between an estimated $24 to $66 in income, which then creates a virtuous cycle of budget issues. In the end though you could easily argue that a paralysed government is a useless government that serves noone and little to no purpose.

EXAMPLES

Today in many countries concepts such as bipartisanship, collaboration, compromise, and consensus, are seen by many as evidence of weak will, or worse weak principles, and while some of this is driven by and exacerbated by trends such as **Truth Decay** and **PsyOps** some of it is simply driven by political careerism and egos. Today, there are many examples of this trend in action, especially in democracies whose beliefs and philosophies are constantly being attacked and eroded by foreign powers who want to sow division and manufacture a **Polarised Society**.

From Brexit which took over four years for the UK government to deliver because politicians on all sides couldn't, or wouldn't agree, and which essentially kept the UK in a state of useless suspended animation unable to move forwards or make plans, to the USA and the increased use and threat of filibusters to kill acts such as the S1 For the People Act, and the investigation into the Capitol Riots, as well as their use to stall climate, criminal justice, civil rights, immigration, infrastructure, minimum wage, and voting rights bills, there are plenty of examples - all of which impact everyday people.

ACT NOW

Faith in governments ability to deliver it at a historic low, and much of this is due to this trend which only seems to be getting worse as you look across countries which is why increasingly multi-nationals are stepping in under the auspices of the **Corporate Foreign Policy** trend. Furthermore, with no end in sight this trend plays perfectly into the hands of those foreign powers who want to show the world that democracy is broken as a concept and that it's time has come and gone.

EXPLORE:

- Budget and process reform
- Future of Communications, Financial Services, Media and Entertainment, and Government
- Policy and regulation reform
- Unification strategies

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EXPLORE STARTUPS & MORE

GEOPOLITICAL FRAGMENTATION

3RD YEAR ON THE LIST



QUICK TAKE

While many people focus intently on the ramifications of the transition to a **Bi-Polar and Multi-Polar World** there is another trend lurking under the surface that is less talked about, but that's directly related to it - that is the acceleration of Geopolitical Fragmentation. As a new world order emerges new political alliances and allegiances are being formed to capitalise on the opportunity, the result of which is not only the emergence of strange bedfellows, but also the splitting and re-reinforcement of allegiances along cultural, economic, ideological, military, and technocratic lines.

Data sources: IMF, S&P Global, UN, WTO, and various.

IMPACT

When power - in whatever form that takes - shifts hands it is always inevitable that certain allegiances will change and shift accordingly. Today we're seeing this happen around the world with almost every country winning in one way or another while at the same time loosing in other ways.

One of the major impacts of this trend is the global instability and uncertainty it causes which can directly and indirectly affect everything from **Belt and Road Initiatives**, **BRICS 2.0**, **Global Trade Volumes** and **Global Trade Flows**, **Global R&D Spending**, **Globalisation**, **International Migration**, **Sanctions**, **Trade Wars**, and many other trends. There are also serious consequences for multi-lateral co-operation which affects the effectiveness of global institutions such as the IMF, UN, and WHO. Additionally, we're also seeing this trend drive an increase in Cyber and Environmental Geopolitics, Geopolitical Risk, Regional Trade Agreements, and conflicts, as well as accelerate the **Innovation Cold War** and **Standards Shadow War**, and global **Economic Decoupling** and **Selective Decoupling** trends - among others.

EXAMPLES

Inevitably there are examples that are accelerating and exacerbating this trend by accident and others by design.

An example of by design is China's rise which, as it strives to create a new world order with itself at the center, is re-shaping the global political landscape as ideologically similar countries align with them, and as others economically align with them - with natural cross overs between the two. Meanwhile, the Russia-Ukraine and Israel-Palestine conflicts both of which, due to their nature, almost forced countries to choose sides whether they wanted to or not, exacerbated this trend.

Correspondingly it's no coincidence that in the past 5 years we've seen a 50% increase in WTO trade disputes, a 50% increase in the number of multi-national companies reconfiguring their supply chains from 40% to 60%, a 33% increase in the number of UN Security Council vetos, a 33% increase in conflicts to 53 this year, a 30% increase in Proxy Wars, a 25% increase in sanctioned countries, a 16% increase in global military spending to $2.24 Tr, a 10% decrease in Chinese exports, and a 1.5% decline in Global Trade Volumes.

ACT NOW

As this trend accelerates and shows no signs of abating, and also causes a deflationary business environment, my advise to organisations it to understand the factors driving it and find a way to mitigate and navigate the impacts for your benefit - neither of which is an easy task. Whether executives like it or not this will remain a top of table trend for decades to come and should be considered, largely, as the emergence of the new status quo.

EXPLORE:

- Crisis management policies
- Cyber and Supply chain resilience
- Diversifying alliances and flexible diplomacy
- Energy independence, smart protectionism, and technological sovereignty
- Revitalising global institutions
- Strengthen national governance and unity

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EXPLORE STARTUPS & MORE

GLOBAL CORRUPTION

3RD YEAR ON THE LIST



QUICK TAKE

Corruption is difficult to track but average consensus estimates put its costs in the range of $1.5 Tr to $2.5 Tr annually with an estimated $1 Tr of that being bribes. Corruption has existed forever, but today it's evolved. In many countries assets, such as **Cryptocurrencies** and **Web 3.0** assets, and communications are easier to hide than ever before, but in some cases, ironically as we see **Global Democracy in Decline**, the opposite is true as especially authoritarian governments unify financial and societal databases and use technologies such as **Artificial Intelligence** to identify it.

Data sources: GFI, IMF, WEF, World Bank, and various.

IMPACT

Corruption has many forms and affects everyone - even if they don't realise it. At a global level estimates suggest it reduces employment by 1%, drains $1 Tr of investment from developing countries, costs the global economy $2.6 Tr annually, suppresses wages, then in some countries it diminishes life expectancy by 10 years by adding 25% to healthcare costs and drains 15% from education budgets.

At the country level it stifles competitiveness and innovation. Economically, large levels of corruption create uncertain business environments and reduce **Foreign Direct Investment** (FDI) leading to lower economic growth. It's also responsible for the inefficient allocation of resources, and increases the cost of doing business. Politically, it erodes public trust in government and services, weakens institutions, and societally it benefits the wealthy at the expense of the poor, exacerbating **Wealth Inequality** and social disparities. Then, globally again it can distort global markets, undermine development goals, facilitate transnational crime and geopolitical instability, and plays a role in the degradation of the natural environment.

EXAMPLES

Corruption is present in every country and every sector, and the examples could fill many books. In Germany the $2 Bn Wirecard scandal, a massive accounting fraud, shook the trust in the country's regulators and financial system and led to a complete re-examination of Germany's regulatory oversight and corporate governance practises.

Meanwhile, in South Africa the former President Jacob Zuma was implicated in a scandal where he allegedly allowed the Gupta family to influence government decisions and policy making to their benefit, which damaged the country's economy, governance, and standing on the world stage. In the US the college admissions scandal, dubbed Operation Varsity Blues, led to the indictment and sentencing of several high profile individuals who paid bribes to get their children into prestigious universities, then in Cyprus authorities handed out Golden Visas, while in Angola the daughter of the former president embezzled funds and amassed a $2 Bn fortune. And, not to be left out, in China the Chairman of China Huarong Asset Management was executed for accepting over $277 Ml in bribes.

ACT NOW

Over the past decade the average global Corruption Perception Index (CPI) score has stayed stubbornly high with the score remaining stagnant at 43 out of 100 and with two thirds of countries scoring poorly, and while the sheer scale of corruption, by value, is shocking what is perhaps more shocking is the detrimental impact it has and continues to have on global society and our environment.

EXPLORE:

- AI and Web 3.0 in fraud detection
- Boost GRC, and create centralised connected databases and systems
- Corporate structures and policy initiatives
- Emerging technologies and technology roadmaps
- Enforce anti-corruption laws
- Increase public awareness and education, surveillance, and promote whistle blowing

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GLOBAL DEMOCRACY IN DECLINE

3RD YEAR ON THE LIST



QUICK TAKE

Globally many people feel democracy, and democracies, that extol civil liberties and the freedoms of expression and speech are under threat and in decline. And even though democracies generate two thirds of all global GDP, which is also in decline, they're right which is why societies must remain vigilent. In the past decade the number of countries that identify as democracies has slid from 79 out of a total of 167 countries to 72, and the number of people who live in democracies, including in India which is both the world's largest democracy and the world's most populous, stands at 3.6 Billion.

IMPACT

With 45% of the world's population living in democratic countries it's clear that democracy is unfortunately not a reality for many people. In 2022 out of 167 countries 24 were full democracies, 48 were flawed democracies, 36 were hybrid regimes, and 59 were authoritarian. And, as our world changes beyond recognition, many of the democracies that remain are struggling to combat the realities of our fast paced modern world which includes trends such as the **Bi-Polar and Multi-Polar World**, **Fragile Government**, **Polarised Society**, **President for Life**, **Propaganda Campaigns**, **Soft Power Plays**, **Truth Decay**, **Virtual Nations**, and many other trends.

While the impact of democracy is hard to quantify studies show that democratic countries are more likely to have better political stability, fairer and more robust judicial systems, and more accountable governments than their non-democratic peers. They're also more likely to have better education and health outcomes, better gender and income equality, and better human rights records, and when it comes to **Global Productivity** democracies have been shown to have a 1% higher GDP per capita.

EXAMPLES

Even though democracy is under threat though it might surprise you than many democracies are less than a generation old with countries such as Liberia, Moldova, Nepal, and Sri Lanka being less than twenty years old, and Indonesia, Mexico, and South Africa being less than thirty years old.

Human freedom and the protection of civil liberties is a right, but for many people in the world it's not reality, and increasingly many experts are concerned about the rate of democracy decline whether it's in the USA or in India, Hungary, Poland, and others.

They've also seen a worrying up tick in the number of authoritarian regimes trading technologies and tactics, as well as practising **Transnational Repression**. Furthermore, backsliding democracies also have a common pattern with the governments of those countries lauding their country's glorious past and spreading falsehoods before strongly affiliating themselves with religious groups and undermining the integrity of the country's election processes, judiciaries, and press. Interestingly the opposite is then often true for democracies on the ascent.

ACT NOW

The bar to be classified as a full democracy is admittedly very high, and there are many forces that help push a country towards authoritarianism or democracy, but of them all **Wealth Inequality** which then often leads to social inequality, local polarisation, and the fear of the future, are often the most significant drivers which spur societies into action - for better or worse. As a result companies should regularly audit the countries they're present in and trade in and, if weaknesses are identified have plans to mitigate them.

EXPLORE:

- Democracy support, international engagement, and two term limits
- Future of Government, Media and Entertainment, Work and the Workplace
- Strong institutions and judiciaries independent of the Executive
- United opposition and peaceful engagement

Data sources: Acemoglu, Bloomberg, IDEA, Economist Intelligence Unit, V-DEM, WJP, and various.

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EXPLORE STARTUPS & MORE

GLOBAL LOBBYING

3RD YEAR ON THE LIST



QUICK TAKE

While hard to quantify it's estimated this trend is easily a $10 Bn industry with at least 150,000 registered lobbyists in developed countries alone with an annual growth rate of 4 to 7%. A well known tactic used by wealthy individuals, consortiums, and corporations alike to promote their agendas over everyone else's in return for political favours and favouritism - whether that's favourable policy making or all manner of in kind benefits - this trend is growing the fastest in developing countries and is highly distrusted by the public who don't know it's full reach but often feel its impact.

IMPACT

With massive under reporting, for obvious reasons, the total lobbying spends are very hard to quantify, and therefore so too is its total impact. That said though this trend is responsible for influencing the behaviours of every country, every sector, and every economic activity for better and worse.

Impacts include an organisations ability to influence government legislation and policy making at the sector level as well as at the international trade level, with most lobbying activity centered around issues relating to agriculture, construction, energy, healthcare, and technology as well, broadly, other complimentary areas including the economy, environment, and societal issues such as free speech and privacy.

Over all lobbying is one of the main reasons why healthcare costs in certain countries are very high, why **Climate Change** and environmental degradation remain a problem, and why the public's trust in government is deteriorating. This trend is also responsible for growing **Wealth Inequality**, through the concentration of wealth, and the weakening of all kinds of well intentioned of regulations.

EXAMPLES

Linked with **Corporate Foreign Policy**, and with so many examples that they could fill many books these are some of the most notable examples. It's little surprise that the world's largest economies should also be the areas where the bulk of lobbying takes place - after all in most cases lobbying is trying to line the pockets of one individual or organisation over another. In the US lobbying topped $4.23 Bn in 2024 with the top companies in finance, insurance, and realty spending $520 Ml to influence financial and housing market regulations, and tax policies, Big Pharma spending $379 Ml to influence drug pricing, patent protections, and healthcare policy, Big Oil spending $115 Ml to influence climate policy, drilling rights, and environmental regulations, and then Big Tech spending a seemingly paltry, but growing, $72 Ml to influence anti trust and competition laws, content moderation policies, and cyber security and data privacy regulations.

In the EU the picture is roughly the same proportionally with an estimated $2.5 Bn of lobbying activity, driven ironically by US organisations, while China and India's lobbying sectors are emerging.

ACT NOW

Lobbying is growing quickly - quicker than it should - as organisations realise that this is the best way to chase riches and future success in an increasingly competitive global environment, and frankly if you don't have a seat at the table then the only guarantee is that others are likely doing their best to undermine you and your own agendas. Furthermore, as global organisations extend their lobbying efforts internationally, and given the fact that regulations can make or break businesses and markets this is a trend you cannot ignore.

EXPLORE:

- Align lobbying efforts with CSR
- Building coalitions and monitor the outcomes
- Ensure compliance with legal and ethical standards
- Integrate lobbying into your business strategy
- Prioritise transparency and public disclosure

Data sources: Europa, OECD, OpenSecrets, US GAO, US Senate, and various.

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GOVERNMENT GOLDEN SHARES

3RD YEAR ON THE LIST



QUICK TAKE

As the world transitions to a **Bi-Polar and Multi-Polar World** some experts have questioned the ability of governments, whatever their flag or political leaning, to control the activities and strategic direction of private organisations and individuals who, in some cases, have revenues, market valuations, and private wealth that exceed the GDP entire nations, and which left unchecked could end up becoming an economic and political threat to the ruling parties. Where regulation has failed though forced leadership re-education programs and golden shares seem to be succeeding.

Data sources: FT, OECD, SMCP, WSJ, and various.

IMPACT

Traditionally used to maintain control over State Owned Enterprises (SOE) today government owned golden shares are increasingly being used as an iron fist rather than a velvet glove to help various governments exert control over private companies that they deem need to be controlled - for whatever reasons. While golden shares are used by many countries the Chinese government thrust them back into the limelight after bearish regulations, aimed at curtailing the independence and power of their largest companies backfired and damaged consumer and investor confidence.

Now, this trend which let them influence and veto everything from board selection, investments, M&A, ownership, strategy, and even workforce policies, is the new tool. However, it can distort markets, soften company share prices, and having so much power concentrated in the hands of just one shareholder worries corporate governance experts. Furthermore, it's also an effective tool to help governments manipulate the allegiance of boards, and ergo entire companies and markets, as well as use it to strengthen and promote their own agendas and **Soft Power Plays**.

EXAMPLES

While this trend has its critics supporters argue it's a necessary tool for ensuring the stability and strategic direction of a country's key industries, and that it can help to protect companies from takeovers and outside influence.

In China, where the states ownership can be opaque, the ruling party has golden shares that give them decisive voting rights in over 100 companies - the most of any government. While these are mostly SOEs increasingly it also includes a collection of private companies. SOE examples include 86% ownership of China National Petroleum Corporation (CNPC), 72% of China Mobile, and 34% of the Industrial and Commercial Bank of China (ICBC), the largest bank in the world by total assets.

However, while you'd expect this they also have golden shares in many content, energy, finance, tech, and telco companies including 36kr, Alibaba, ByteDance, Didi, Qutoutiao, Tencent, and Weibo, and as all these companies look for international growth many foreign governments are growing increasingly suspicious of the Chinese governments influence over them and potential links to the Chinese military.

ACT NOW

When one shareholder wields so much power over a company undoubtedly governments, investors, and people who do business with them are going to ask tough questions about their allegiances and how far they can be trusted. As more governments use this trend as a tool to exert their will over companies it will likely play a more prominent role in trends including the transition to a **Bi-Polar and Multi-Polar World**, **Corporate Blacklisting**, **Selective Decoupling**, **Trade Wars**, **Zero Trust**, and many others, and as such companies should be wary of it and its consequences.

EXPLORE:

- Alternative suppliers, supplier diversification, and supplier audits
- Business, impact, and risk assessments
- Friendshoring, Nearshoring, Onshoring
- Future of AI, Creativity and Innovation, Cyber Security, Government, Manufacturing, and Supply Chains

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EXPLORE STARTUPS & MORE

INNOVATION COLD WAR

3RD YEAR ON THE LIST



QUICK TAKE

Innovation and R&D have always been competitive spaces with many governments and companies wrapping their most special projects in secrecy, and in 2022 the world spent at least $2.63 Trillion a year inventing what's next.

Unsurprisingly, some countries have reaped significant economic, political, social, and national security advantages from their focus on science and technology innovation, so it's only natural that now other countries want to harness it for their own advantage and to further their own agendas.

Data sources: Bloomberg, PWC, UNESCO, and various.

IMPACT

Innovation has significant benefits across the entire spectrum of society aswell as to **Global GDP Growth**, but many of those benefits are the result of common collaboration, common market policies, and common standards, all of which are now under extreme pressure as various countries around the world continue to ratchet up their rhetoric and pursue their own commercial and political agendas by effectively weaponising their innovation policies and programs and by using cyber attacks to steal their opponents ideas and IP.

Emboldened, empowered, and encouraged by these policies the **Global R&D Spending** among the world's 1,000 largest corporate R&D spenders is increasing on average by 12% per annum, and now stands at $858 Billion.

Furthermore, asides from helping these organisations defend their existing markets and enter new ones, and both avoid and drive disruption, many innovation initiatives are also increasingly being used as a vehicle to demonstrate and promote alternative standards, national pride, patriotism, and **Soft Power Plays**.

EXAMPLES

While there have been literal innovation cold wars in the past they've generally been constrained to specific activities and industries. Today though the emergence of increasingly powerful technologies combined with new market forces are giving some countries a prime opportunity to disrupt the global status quo, and while China aren't alone in this ambition in their case they finally see an opening to overtake the USA, realise technological dominance, and create a new prosperous future for their citizens - as well as use it as an opportunity to extend their soft power via their **Belt and Road Initiatives**.

In order to fuel their ambitious rise to domiance the CCP have set aside over $1.4 Trillion to accelerate their rate of innovation across almost all sectors and all **General Purpose Technologies**, and they have re-doubled their efforts to develop the country's innovation culture and ecosystems which also include duplicating some of the US's most successful initiatives. The net result is that increasingly China, not Europe nor the USA, may soon be setting future global technology standards as we see the start of a **Standards Shadow War**.

ACT NOW

While there will always be competition between countries an Innovation Cold War will inevitably have a variety of unfavourable outcomes which, among other things, will affect society at large by reducing choice and trust, and by forcing companies to decide which and whose technology standards they adopt.

EXPLORE:

- Collaborative government policies
- Emerging technology and technology roadmaps
- Policy and regulation reform
- Strengthening global standards boards
- Market impact analysis
- Unilateral global accords and coordinated global action

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EXPLORE STARTUPS & MORE

LEADERLESS WORLD

1ST YEAR ON THE LIST



QUICK TAKE

As we continue to head into a **Bi-Polar and Multi-Polar World** and as new economic blocs strengthen, such as **BRICS 2.0**, the world faces an increasingly odd crisis - a lack of global leadership, and a world where no single government, group, or world leader is willing or able to drive a global agenda or rally global consensus. Increasingly, as some observers say, it appears as though we are heading back into the days of the proverbial Law of the Jungle - a world where the strongest do what they want, with few to no consequences, while the weakest are condemned to suffer what they must.

Data sources: Various.

IMPACT

Look around you and you can see the impact of this trend in action - from companies and states who increasingly can't be trusted to act in the interests of those they have power over, or are supposed to serve, through to wealthy individuals who unashamedly use their influence, resources, and wealth to bend the world to their own agendas and ideologies with little to no resistance.

Ultimately this trend helps destabilise markets and undermine global prosperity, international cooperation, international governance and regulation, security, and stability. It also foretells a decline in nation state dominance, and a rise in regional and issue-based coalitions, rogue non-state actors and stateless threats, decision paralysis at the international and domestic level, increasingly disjointed international cooperation, such as in the field of aid, finance, health, and security, and the divergence and fragmentation of global standards, with a corresponding increase in global competition and protectionism. And then there is also the active erosion of established international institutions and norms, as well as the breaking down and straining of traditional alliances.

EXAMPLES

The most notable example of this trend is the USA. Normally, seen as the de facto global leader at the moment the American government is predominantly focused more on domestic issues, while elsewhere the EU and China are also focused on internal issues and are less willing, in the short term at least to assume global responsibility. Additionally, the lack of global **ESG** leadership, and silence and anti-environmental rhetoric of some leaders, has been a major contributory factor in the overall collapse in ESG investment and the massive unwinding of company **Net Zero** and sustainability pledges.

Other examples include a dramatic increase in **Corporate Foreign Policy** making, **Global Corruption** and **Global Lobbying**, as well as the acceleration of **Geopolitical Fragmentation**, and an increase in the frequency and voracity of **Sanctions** and **Trade Wars** as different blocs, countries, and leaders vy for dominance.

However, while it poses its challenges it also presents the opportunity for new collaborations and the emergence of a more multi-polar world order.

ACT NOW

The lack of global leadership is not a trend that is going to go away any time soon, and even if the USA does eventually return back to the scene then recent actions will have damaged its over all credibility so much that it will at best be seen as a diminished force. As a consequence businesses will have to find a way to deal with the economic, regulatory, security, and societal uncertainty which, along with other trends, simply makes the global operating environment even more difficult to predict and plan for than it already was.

EXPLORE:

- Data localisation policies and Digital Transformation initiatives
- Diversifying supply chains
- Enhance geopolitical risk monitoring
- Friendshoring, Nearshoring, Onshoring
- Improving operational resilience
- Participation in regional trade agreements

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EXPLORE STARTUPS & MORE

NET ZERO PLEDGES

3RD YEAR ON THE LIST



QUICK TAKE

Net zero targets are all about reaching net zero Greenhouse Gas (GHG) emissions whereby the same amount of greenhouse gasses that are put into the Earth's atmosphere are removed - and thereby balanced. And the targets are enormous.

In order to balance just today's emissions, let alone future emissions whose rates will be greater, we will need to remove at least 36 Billion tonnes of Carbon Dioxide (CO2), Flourinated gases, Methane, and Nitrous Oxide a year from the atmosphere which is a huge economic and political challenge.

Data sources: ETC, IEA, IPCC, OECD, UNFCCC, and various.

IMPACT

Increasingly being referred to as the "world's landfill for CO2" and other GHG's today the Earth's atmosphere has reached a value of 457 ppm in GHG equivalents. Not only is this the highest figure for over a million years, but this figure is increasing at an accelerating rate with the IPCC and other international institutions saying we now have a 67% chance of exceeding the world's 1.5°C temperature threshold, and that the GHG concentrations corresponding to a 2°C increase could be exceeded by 2034. It is also estimated that the world will need to invest between $1 to $2 Trillion of additional investment every year to reach Net Zero.

So far 191 countries have come together under the Paris Agreement to pledge they will reach Net Zero and take a leadership role in helping the world transition to a net zero carbon economy by 2050. However, to date only 110 countries have submitted viable national action plans, called Nationally Determined Contributions (NDCs) which means that as things stand the combined emission reduction plans fall far short of the targets needed to remain within the 1.5°C goal.

EXAMPLES

One of the greatest issues that people see with Net Zero pledges today is the fact that there are no limits on how many Carbon credits or organisations countries can buy to offset their own emissions. In short you can still be a global GHG polluter, and your pollution rates can get worse over time, but provided you are offsetting those you could still meet your pledge.

However, while we assume that most institutions aren't going to take that rather unscrupulous route, on the flip side we're seeing rapid increases in both the number of countries and organisations committing to hit Net Zero by 2050, or sooner, with most of their efforts focused on reducing emissions from construction, energy generation and distribution, manufacturing, shipping, and transportation, which collectively account for around 75% of all global emissions.

As a result we are seeing the fast uptake of renewable energy and alternative energy sources such as Ammonia and Hydrogen, the rapid electrification of industries, and the development of new sustainable and environmentally friendly industrial processes and Smart Cities.

ACT NOW

Reaching Net Zero will require a truly global effort and there is no room for wavering. But the world's biggest challenges are also the world's biggest opportunities, both in a commercial and social sense, and with the cost of polluting set to become increasingly expensive as the price of Carbon credits, for example, increases it will soon be more expensive to pollute than to protect. And then this, in turn, will hopefully accelerate our transition.

EXPLORE:

- Emerging technology and technology roadmaps
- ESG review and reform
- Financing and investment strategies
- Future of Construction, Energy, Manufacturing, Sustainability, and Transportation
- Innovation and Partner ecosystems and solutions
- Unilateral global accords and coordinated global action

PRESIDENT FOR LIFE

3RD YEAR ON THE LIST



QUICK TAKE

When it comes to developing and implementing long term future visions that benefit their countries - more in the medium and long term than the short term - today many democratic governments suffer from the unintended consequences of short political terms that let future focused leaders with bold and progressive visions get swapped out every few years for others with opposing views. Seen as the equivalent of swapping out an airline pilot, who set one course, with another who can change that course, now some countries are giving those pilots lifetime terms and just swapping out the co-pilots instead.

Data sources: EIU, Pew Research, and various.

IMPACT

Imagine a country whose leadership changes course and policy direction every few years - one leader develops policies promoting innovation and R&D, and the next dismantles it all, one develops environmental policies to promote the development of a greener economy and fuel jobs growth, and the next dismantles it all. And repeat. If this happens regularly then not only does that country's progress stall, but compared to its peers its competitiveness and attractiveness as a place to invest and conduct business diminishes. This is commonplace, especially democracies, today as the **Fragile Government**, **Polarised Society**, and **Propaganda Campaigns** trends surge.

Some countries though, primarily those with regimes that aren't elected - either often or at all - such as Authoritarian and Competitive Authoritarian, Autocratic, Communist, Constitutional Monarchies, or Totalitarian regimes don't have this issue because once their leaders have set a future vision they can execute and deliver it either completely or largely unopposed. And, when it comes to building future competitiveness this is giving many of them a distinct advantage over their democratic peers.

EXAMPLES

While this trend has been the status quo for many countries for centuries, especially those in the Middle East and Asia, it goes without saying that the differences between how different regimes govern their citizens and countries varies immensely with some being more progressive and utopian in nature, such as Singapore and the UAE, and others being more regressive and dystopian, such as North Korea.

Over the past decade there has been a concerted effort by certain leaders, most notably President Xi Jinping of China and Vladimir Putin of Russia, to change the presidential term limits to let them lead for life, and while in 2018 Jinping successfully passed legislation to remove the Chinese two term limit Putin meanwhile in 2020 signed legislation to let him retain power until at least 2036.

In all cases the main advantage of this trend, for better or worse, means that the leaders concerned are able to lay out multi-decade visions for their countries - whatever that entails - and implement them almost unopposed which lets them develop short, medium, and long term competitiveness in ways that elected officials struggle to match.

ACT NOW

While the more authoritarian leaders use this trend to consolidate power and as a lever to impose their will and visions on others it's undeniable that when it comes to building future competitiveness and dominance the consistency of vision and execution this trend offers, as we've seen with China, Singapore, and the UAE, to varying degrees, is almost incredibly difficult for elected populist leaders to match. And, as we see trends including the **Bi-Polar and Multi-Polar World**, **Belt and Road Initiatives**, and others such as the **Innovation Cold War** and **Standards Shadow War** unfurl there's no getting away from the fact that elected leaders will need to find a way to match this trends advantages without jeopardising their democracies.

EXPLORE:

- Alliances and partnerships
- Cultural exchanges, education initiatives, and the promotion of democratic values
- Progressive investments
- Supply chain diversification

PROPAGANDA CAMPAIGNS

3RD YEAR ON THE LIST



QUICK TAKE

The internet and the rise of powerful social media platforms and news networks opened up a new front in the propaganda wars that the governments of certain countries have been using to their advantage to undermine the culture and values of other sovereign nations, sow dissent, and spread disinformation and misinformation.

An example of both unethical behaviour and an attempt to subversively extend their own ideologies, influence, and values over other cultures propaganda campaigns are now form the linchpin of some countries political strategies.

IMPACT

Propaganda campaigns that seek to sow dissent and exploit and heighten societal divisions at the expense of people's well-being are both dishonourable and deplorable. They are also unfortunately not just common practice but business as usual for many authoritarian governments including China and Russia whose subversive propaganda campaigns encompass and target almost every country, every platform, and every topic.

While these campaigns have many objectives, from discrediting and undermining democracy and the social fabric and values of foreign states, to furthering the aggressors own commercial interests, ultimately all the campaigns have similar objectives: Promote the aggressors agendas, ideals, ideologies, and values, and sow dissent and distrust.

As a result many of these campaigns prey on and heighten societal bullying, dissension, distrust, paranoia, and suspicion, and in the worst examples lead to violence and death that spans the globe. They also create an increasingly divided and polarised world with the consequences thereof.

EXAMPLES

Sometimes dubbed Foreign Influence Campaigns, and seen as a form of Psychological Operations or Disinformation Warfare, propaganda campaigns present real danger with real consequences that leave damage in their wake - and countries have gone to war for less. Furthermore, aggressors are now exporting their so called playbooks to other foreign powers.

Like the secret wars of old almost all governments undertaking these activities work hard to ensure they have plausible deniability by using third party "Troll factories" to manage and run the campaigns on their behalf at arms length. And it's an effective tactic that hobbles many of their targets from taking direct retaliatory action against them.

From running "Cheerleader" campaigns for leaders favoured by Russian "interests" in Africa in order to sway local elections, to undermining Western COVID-19 vaccines and vaccination programs, to trying to undermine the US elections, and running Chinese CPC propaganda campaigns, there are thousands of examples.

ACT NOW

Propaganda campaigns today are so well organised and orchestrated, and their impact so damaging and widespread, that one has to wonder at what point their targets will be justified in taking unilateral direct action against the aggressors that conduct them - in whatever form that takes. Because at the moment it very much looks like they are getting away with literal "societal murder."

EXPLORE:

- Detect, Deflect, Dismantle, and Destroy (D4) initiatives
- Education initiatives
- Emerging technologies and technology roadmaps
- Impact assessments
- Social Trends
- Unilateral global accords and coordinated global action
- User authentication initiatives

Data sources: Africa Center, Bloomberg, Brookings, Europa, Reuters, SCMP, and various.

SOFT POWER PLAYS

3RD YEAR ON THE LIST



QUICK TAKE

Soft power plays are in the playbooks of every government in the world and are used to co-opt rather than coerce people into favouring one group or one way of thinking over another. It's also been very effective so far at helping individual groups and governments further their own agendas both at home and on the international stage.

Seen by many as a more effective and favourable way of exerting influence than by using outright commercial or military means we are now entering an age that will be defined by soft power plays.

IMPACT

There has always been, and will always be, an interplay between Hard Power and Soft Power plays. But where hard power relies on having the commercial means and often a strong military in order to coerce people soft power leans heavily on using other less costly and more peaceful means to weaken opponents positions and create like-minded alliances. And, faced with America's hard power superiority many governments and institutions, especially China and Russia, have created soft power playbooks which are, arguably, the envy of many countries.

While the actual impact of soft power is hard to quantify because many of its benefits are diffuse and soft, as well as the fact that the "goodwill" might not be honoured, research shows that it has a statistically important impact with its impact on **Foreign Direct Investment** (FDI) being worth an extra 0.66% increase in FDI for every 1% increase in the number of countries a cultural institution covers - which can quickly add up to billions in extra GDP. Elsewhere, soft powers greatest impact can be seen in creating and strengthening alliances which then benefit particular governments or institutions.

EXAMPLES

One of the most thoroughly documented examples of the impact of soft power comes from the UK government who estimate that in terms of foreign investment it equated to an additional £197 Billion in foreign investment, in both economic and tourism terms, and the addition of an extra 3,200 international students in 2016. However, when it comes to these figures it's also important to note that the country's Cultural Ranking and its political influence within the world also plays a crucial role - more so than the sum of its hard power "potential." The research also showed evidence of soft power on a states economic success and global influence.

Cultural exchanges between Africa and China are examples of soft power, as are the hosting of high profile international events such as the COP, G7, G20, Olympics, and World Government summits which all boost a country's soft power benefits and status - as we have seen with Japan and the UAE. It should also come as no surprise that America is generally the world's top soft power player but since President Trump's term France, Germany, Japan, and the UK are all very close seconds.

ACT NOW

Soft power is subtle and requires effort, focus, and resources to do well. It's also greater than the sum of its parts with far reaching benefits and is as old as human society itself. Therefore governments and institutions alike would do well to prioritise it and develop well thought out scalable soft power strategies.

EXPLORE:

- Cultural exchanges and summits
- Cultural Ranking initiatives
- International community contributions
- International polling

Data sources: British Council, Harvard University, Portland, United Nations, University of Edinburgh, USC, and various.

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EXPLORE STARTUPS & MORE

SPLINTERNETS

3RD YEAR ON THE LIST



QUICK TAKE

When Sir Tim Berners-Lee created the internet he highlighted its democratising potential and ability to be a force for good. But today those founding principles seem idealistic. In part this is because the internet's business model is mostly based on organisations profiting from people's personal information, but on the other the concept of a foreign managed and democratic free space that allows people to come together and voice their opinions is in opposition to the authoritarian governments of the world who see it as a threat to their authority, so have taken steps to control and "splinter" it.

Data sources: Economist, Guardian, Nesta, SCMP, and various.

IMPACT

Historically the internet was been one large amorphous distributed standardised system that spanned the world and openly let everyone participate and collaborate with others.

However, as different governments disagree with America's oversized influence over the development of future internet standards, and as others see this open world as a threat to their political authority and national security, some governments are now developing what many call "state controlled" internet alternatives. The result of which is a system which is increasingly fragmented and divided along commercial, information, political, nationalistic, and technological lines.

This state control also makes it easier to identify and quash dissent, limit freedoms, and exert authoritarian control, as well as shut down communications, and enforce information sovereignty policies. The upshot being that internet freedoms are in continual decline, and that collaborating and communicating between different systems is becoming an increasingly complex and costly affair.

EXAMPLES

While China and Russia have been rapidly increasing their internet oversight and begun the work to separate their state controlled internets from the rest of the system, they are by no means alone with countries including Cuba, Iran, North Korea, Saudi Arabia, Syria, Turkey, and Yemen following suit.

In China's case the so called Great Firewall of China is arguably the world's most successful and significant splinternet, then in 2019 Russia successfully executed its plan to disconnect the entire country from the global internet - in part to test its defences in the event of an all out cyber war but also to stress test its own splinternet. But the story doesn't end there - as China seeks to dominate global standards in everything from 5G and Artificial Intelligence to energy they are now exporting their splinternet "processes, systems, and technologies" to other interested countries as part of their Trillion dollar Belt and Road initiative.

Moving closer to home even democratic governments are taking a more active role in controlling and filtering their own internets, with the resulting debates ...

ACT NOW

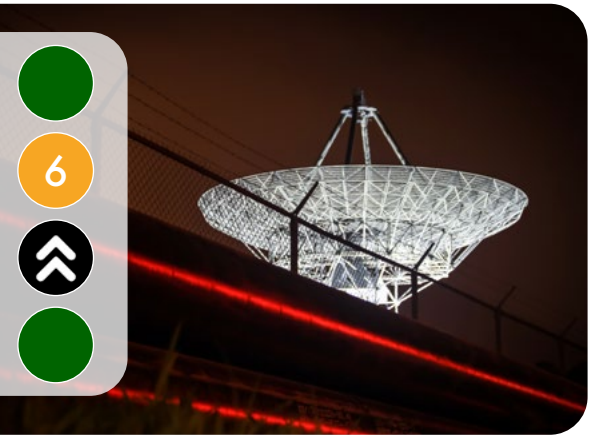
While there are an increasing number of splinternets the consequences of this "digital authoritarianism" stretch far beyond the borders and populations of the individual countries, with ramifications for global business, culture, and society. Furthermore, even the countries that aren't actively pursuing this kind of policy are exploring new ways to keep certain foreign nationals off of certain internet properties.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Communications and Government
- Policy and regulation reform
- Strengthening global standards boards and embracing open standards
- Unilateral global accords and coordinated global action

TECHNOLOGICAL SOVEREIGNTY

3RD YEAR ON THE LIST



QUICK TAKE

Technology is a top of mind priority for governments around the world, which is just one of the reasons why we're seeing a new **Innovation Cold War** and **Shadow Standards War**. As our world becomes increasingly digitally inter-connected it should come as no surprise that technology, and more specifically control over it and its influence, has become highly politicised. Increasingly seen as a form of **Technological Colonialism** today we're seeing more countries push back and prioritise the development and use of their own sovereign technologies and platforms over those of other countries.

Data sources: 311 Institute, Deloitte, Europa, WEF, and various.

IMPACT

Step back far enough in time and few people cared about whether their country relied too heavily on another country's **Cloud Computing** platforms, communications, or social media platforms, or individual **General Purpose Technologies** such as 4G, now **5G**, **Artificial Intelligence** (AI), or other so such tech stacks. Fast forward though and as we head into a **Bi-Polar and Multi-Polar World** characterised by increasing **Geopolitical Fragmentation**, **Trade Wars**, and Cyber espionage and warfare, and it's a very different story - the result of which is that more countries want control over their own digital sovereignty.

While there are many technologies and services in the firing line, today more countries than ever are developing their own sovereign AI Factories and AI Frontier models, **Cloud Computing**, **Exascale Computing**, and **Quantum Computing** stacks, and much more - as well as developing and enforcing increasingly restrictive data governance policies. The impact of which means the cost of doing business across regions is increasing, and at the same time becoming more complex and onerous.

EXAMPLES

When it comes to examples the number of countries embracing this is growing.

On the one hand we have countries such as Saudi Arabia and the UAE, both of which are developing their own regional sovereign AI foundation models, in part to ensure their economies remain competitive on the global stage and to ensure their own countries cultural heritage is not lost in the "technological noise," as well as to reduce their overall reliance on foreign platforms and technologies. Then there's the EU who have similar programs but whose approach is much broader and more mature at this stage - including the development of the AI Act, GDPR, Gaia-X, a program to reduce the EU's reliance on foreign cloud providers, and their Horizon R&D programs and Chinese 5G replacement programs.

These stories are repeated around the world with multiple **Splinternets**, China's Great Firewall and Made in China initiatives, Japan's Society 5.0 program, India's Aatmanirbhar Bharat program which is aimed at making the country self-reliant economically and technologically, Russia's Sovereign Internet Law, and many others.

ACT NOW

As countries around the world embrace the opportunity, and need, to develop and deploy their own sovereign technologies and technology stacks, as well as enforce their use - which in itself accelerates **Technology Decoupling** - this trend will only make it more difficult and more expensive for organisations to do business globally as they try to navigate an increasingly complex political and regulatory environment.

EXPLORE:

- Agile and flexible ICT policies
- Business and impact assessments
- Customer and market adaptation
- Emerging technology and technology roadmaps
- Future of Government, Politics, and Technology
- Global regulatory environment
- Risk mitigation and resilience strategies

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EXPLORE STARTUPS & MORE

TRANSNATIONAL REPRESSION

2ND YEAR ON THE LIST



QUICK TAKE

Transnational Repression, which now sees hundreds of thousands of people actively being targeted around the world, and which is doubling each year at the moment, is the trend of governments and rulers reaching across borders to silence dissent among their diaspora communities often through harassment and violence. With over 31 countries identified including China, Iran, Rwanda, Russia, Saudi Arabia, and Turkey, human rights activists, journalists, political dissidents, and others aren't safe, with most activities taken out under the noses of authorities in Europe, the Middle East, and the US.

IMPACT

This trend hid in the shadows for a very long time, flying under the radar, but over the past few years and with new revelations the reach and scale of this trend has surprised governments around the world, especially in Europe where secret Chinese police stations were found in several major European cities. It is also no surprise that more authoritarian states are likely to participate in this behaviour.

In the past 5 years there has been a significant increase in activity with more countries engaging in this practise than ever before, which dovetails with **Global Democracy in Decline**, and suggests this is an expanding and worsening trend as countries get bolder. The fact it is growing highlights countries failures at protecting the diaspora communities in their care, and how brazen certain countries have become when it comes to disrespecting international boundaries and the rule of law. Meanwhile, impacts are widespread with regular citizens feeling unsafe in their own countries, the mental well being of diaspora communities being affected, with many legal and political ramifications and impacts on civil liberties and communities.

EXAMPLES

As the number of examples grow and as the number of countries affected by this trend grow to 79, we of course have North Korea and Russia's brazen embrace of this trend with numerous murders of dissidents around the world, typically using poisons and radioactive materials to send a message to others that might follow their examples.

Despite this though China, at the moment, seems to be the main perpetrator with over 1,500 cases filed and with illegal overseas Chinese Police stations being used to surveil, coerce, then exfiltrate an estimated 230,000 Chinese citizens back to China in recent years - often by using relatives who still live in China as leverage. Other examples include post coup Turkey, and Iran which has kidnapped and then executed diaspora dissidents.

Over time not only have we seen a huge increase in incidents but we've also seen what's referred to as the Globalisation of Repression, as well as the use of increasingly sophisticated tactics such as cyber surveillance, international warrants, and the use of bilateral relationships to help these governments get what, or who, they want.

ACT NOW

It used to be the case that the majority of people who fled their country of origin were safe from that country's grasp. However, as digital communications make it easier for diaspora dissenters to be heard and share their opinions, and as more world leaders throw aside their regard for the international law and order, especially as we head into a **Bi-Polar and Multi-Polar World** where **Declining Internet Freedom** is also a complimentary trend and where international relations are straining, it's little surprise that this is a trend that's accelerating. As a consequence governments especially should think seriously about how to protect diaspora communities and consider what tools they have at their own disposal to make the countries involved think twice.

EXPLORE:

- Blacklisting, honey traps, sanctions, and tariffs
- Global co-operation and partnerships
- Policy reform

Data sources: Amnesty International, Freedom House, UN, and various.

TWIPLOMACY

3RD YEAR ON THE LIST



QUICK TAKE

Twiplomacy is the use of social media, with an obvious emphasis on Twitter, by the heads of state, leaders of inter-governmental organisations, and their diplomats, to contact diplomatic outreach and public diplomacy.

While the trend has its benefits, such as allowing leaders to communicate their opinions and policies directly to the global audience instantly without being filtered, if not managed carefully this trend can also affect foreign policy, swing stock markets, fuel societal divisions, and have all manner of unintended consequences.

Data sources: BBC, Twiplomacy, and various.

IMPACT

First coined in 2011 today on average over 90% of governments and government organisations engage in Twiplomacy in one form or another, and while most of the conversations and interactions are benign there have been far too many occasions where Twiplomacy has descended into an outright war of words between different leaders and groups.

When it comes to impact though perhaps one of the greatest benefits of the trend is the fact that it lets leaders engage with alternative and younger audiences in new ways and helps them highlight causes, initiatives, or policies that might otherwise have been lost in the overall noise of mainstream media.

But, despite this, make no mistake about this trend - it is only as beneficial and as trustworthy as the people using it, and as it grows in popularity we all need to be mindful of the fact that it also provides governments everywhere with the opportunity to push their own agendas, spread disinformation and misinformation, and sow division and discord at speed and scale.

EXAMPLES

When it comes to highlighting some of the most notable examples of Twiplomacy gone right and gone wrong, including using it as a means to promote **Truth Decay**, there's a lot to choose from, not naming names.

From the Chinese governments use of it to speak out against foreign interference in its affairs and promote its own agendas via **Propoganda Campaigns**, right through to the United State's governments use of it to promote facemasks and social distancing during the global pandemic and fan the flames of the Capitol riots back in 2020, there's no shortage of material I could use.

ACT NOW

With Twiplomacy on the rise governments and leaders everywhere have a new mouthpiece that they can use to their advantage but it is important that communications are authentic, reliable, and trustworthy, otherwise this valuable channel risks becoming yet another one to #Block.

EXPLORE:

- Communications strategies
- Future of Communications, Government, Media and Entertainment, and Trust
- GRC reform
- Policy and regulation reform
- Social media policies

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EXPLORE STARTUPS & MORE

VIRTUAL NATIONS

3RD YEAR ON THE LIST



QUICK TAKE

Online communities have always promoted a neighbourhood like feeling but today many of them are so large their virtual populations far outnumber the populations of real countries, to become "virtual supranations." There are two notable trends.

Firstly, digital technologies are letting real countries create E-Versions of themselves, and secondly, more traditional online community systems, empowered with new benefit systems and features, are now rivalling the power of sovereign governments.

IMPACT

At no point in history have private individuals been able to influence or steer the behaviours of billions of people with such voracity and speed. And, if it was not for government oversight, as well as those individuals and organisations own ethics and governance boards, we might have already seen a more dramatic shift in the global power base. A shift that would be exacerbated if virtual nations sought official recognition, or opted to give their communities access to benefits that could include everything from education to healthcare to tax relief.

The impact of these virtual nations, and their leaders ability to alter global behaviours has caught the eye of the US military with an increasing number of governments, from China to India, Europe to the US, increasingly seeing them as a threat to their own economic power, security, sovereignty, and stability. And acting accordingly.

The ability of these nations to change the world order was put in sharp focus, for example, when Facebook tried to launch Libra which could have changed the states control of money, as well as the global financial system, overnight.

EXAMPLES

With the so called populations of virtual nations ranging from the hundreds of thousands to billions it doesn't take a giant leap to see how, whether it is by accident or design, the individuals or organisations overseeing them could use their positions for better or worse, whether it's ISIS, on the one hand, or Facebook on the other.

Unsurprisingly there are an increasing number of examples, from Estonia which is becoming an E-Country complete with E-Visas and E-Citizenships with their associated benefits, to Asgardia, the very real virtual "Space Nation."

Then there's Facebook with its 3 Billion users which could decide to offer almost all manner of "virtual nation perks" to its community, including the introduction of it's own currency, like Libra and Diem, which would have had greater market-moving power than any bank.

And then by no means least there's Alibaba and Ant Financial whose behaviour, influence, and power recently caught the eye of the Chinese government who subsequently torpedoed their IPO and allegedly temporarily "disappeared" Jack Ma.

ACT NOW

It is almost inevitable that we will one day see a sovereign virtual nation emerge. It's also likely that not a single traditional sovereign nation will be happy about it, and that almost all of them will see it as a very real threat to their own economies, security, and sovereignty.

However, that said though, depending on the spending power of these virtual nations they may very well find themselves with numerous allies.

EXPLORE:

- Blacklist, censorship, embargo, and sanctions strategies
- Citizenship as a Service
- Future of Communications, Government, the Workforce, and the Workplace
- GRC reform
- New government frameworks, laws, policies, and tax reforms

Data sources: The Conversation, US DOD, WIRED, World Futures Forum, and various.

311 INSTITUTE

ANNUAL TRENDS CODEX

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3RD ANNUAL EDITION . BOOKLET 4 OF 7

SOCIETAL TRENDS

Explore all the latest trends shaping the future of business, culture, and society.



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... Woke Culture

STATS THAT MATTER

SUMMARY UPDATE

IN TODAY'S ever-changing world, societal trends continue to play a pivotal role in shaping our collective realities. Technological advancements, activism and social justice movements, cultural shifts, and environmental consciousness are all having a profound impact on individuals and society as a whole.

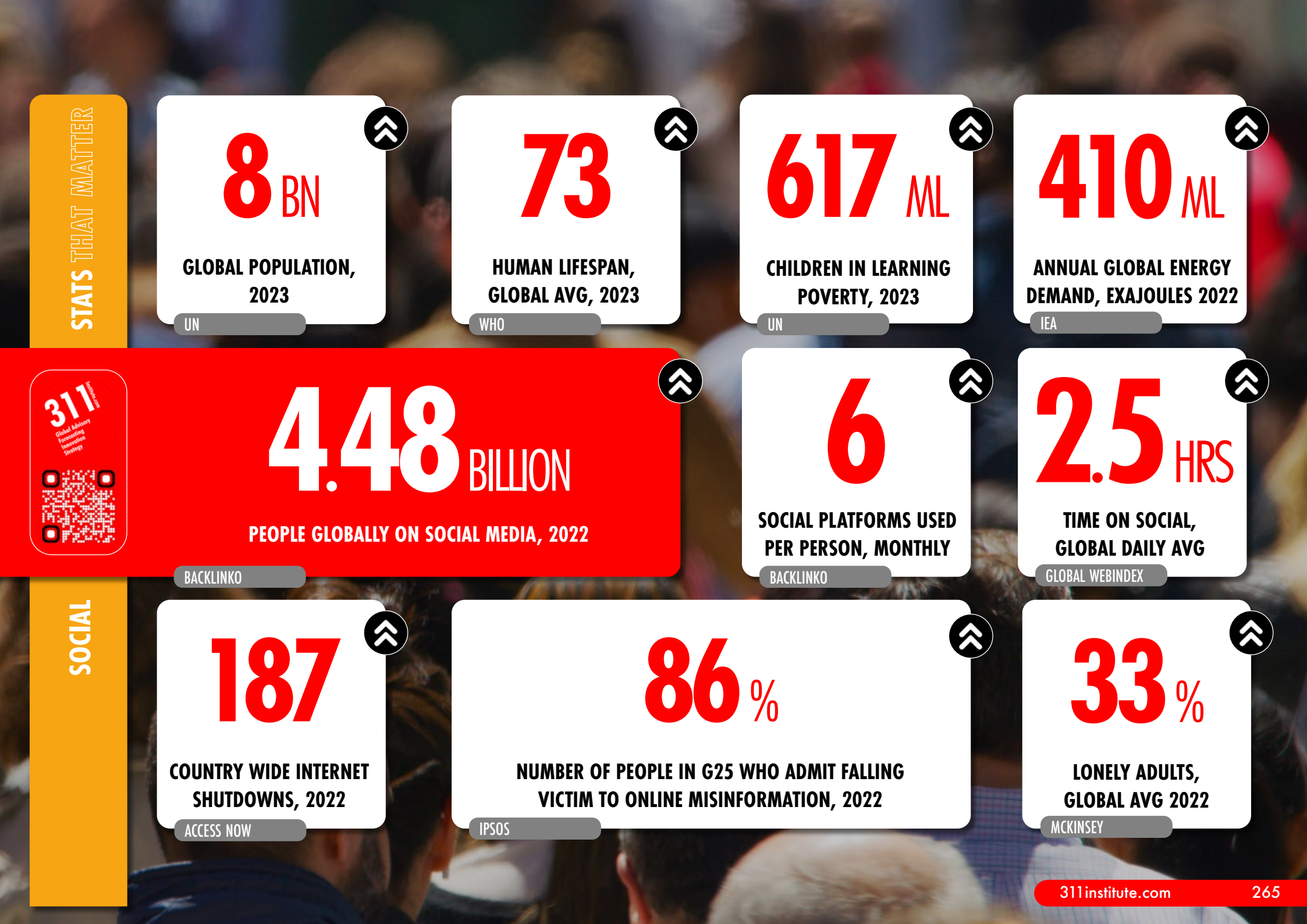
Technology continues to revolutionise almost all areas of society, from Artificial Intelligence (AI) and automation to data-driven decision-making. While these advancements offer convenience and efficiency concerns regarding privacy, job displacement, and algorithmic biases need to be addressed, as we grapple with the ethical implications they bring.

Additionally, we've seen a surge in the number of activism and social justice movements, driven by a desire for equity and system level change. Climate activism and racial justice campaigns, among others, are pushing for a more inclusive and fair society which have also sparked debates on social inequalities and have forced many institutions to reevaluate their business practices to ensure justice and equality for all.

We're also seeing the evolution of cultural norms and values with discussions around gender identity, mental health, and sexual orientation gaining momentum, challenging long-standing stigmas and promoting inclusivity. And, as society becomes more aware of its biases and prejudices there is growing demand for representation and acceptance, reshaping the cultural landscape and fostering a more compassionate society.

Similarly, the urgency to address climate change has reached new heights with people and organisations alike recognising the need for sustainable practices and environmentally conscious choices, with the move towards circular economy models, renewable energy, and reducing carbon footprints transforming industries and inspiring individuals to adopt greener lifestyles - all of which have far-reaching implications, and influence corporate responsibility and government policy making.

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STATS THAT MATTER

8 BN

GLOBAL POPULATION, 2023

UN

73

HUMAN LIFESPAN, GLOBAL AVG, 2023

WHO

617 ML

CHILDREN IN LEARNING POVERTY, 2023

UN

410 ML

ANNUAL GLOBAL ENERGY DEMAND, EXAJOULES 2022

IEA

4.48 BILLION

PEOPLE GLOBALLY ON SOCIAL MEDIA, 2022

BACKLINKO

6

SOCIAL PLATFORMS USED PER PERSON, MONTHLY

BACKLINKO

2.5 HRS

TIME ON SOCIAL, GLOBAL DAILY AVG

GLOBAL WEBINDEX

SOCIAL

187

COUNTRY WIDE INTERNET SHUTDOWNS, 2022

ACCESS NOW

86 %

NUMBER OF PEOPLE IN G25 WHO ADMIT FALLING VICTIM TO ONLINE MISINFORMATION, 2022

IPSOS

33 %

LONELY ADULTS, GLOBAL AVG 2022

MCKINSEY

AGEING POPULATION

3RD YEAR ON THE LIST



QUICK TAKE

As global living standards, which include everything from the availability of quality education, food, and healthcare, to water and work, continue to improve, and as the global population increases, it is inevitable people will live longer, and that this will impact on almost all aspects of society.

Today the pace of population ageing is much greater than it was in the past, and that rate is accelerating, and it is putting countries under greater strain as they try to adapt and cope with the inevitable consequences.

IMPACT

Between 2015 and 2050 the proportion of the world's population over 60 years old will increase from 12% to 22% and 80% of those people will be living in low and middle income countries, many of whom will face major challenges trying to ensure that their health and social systems are ready to make the most of the demographic shift, and that their younger generations aren't left with an increasingly burdensome deficit ratio or higher tax burdens.

As the pace of population ageing increases this too will create its own set of unique challenges for many countries. France, for example, had 150 years to adapt to a change from 10% to 20% in the proportion of people aged 60 or over, whereas now countries like Brazil and China will have just 20 years.

While an ageing population can bring significant personal and social benefits, as well as the economic benefits of a longer working life, it will also have a dramatic impact on every area of policy making including education, equality, health, infrastructure, monetary policy, pension planning and retirement, social contracts, urban planning, work, and many other important areas.

EXAMPLES

The global population aged 60 years and over numbered 962 million in 2017, more than twice as large as in 1980 when there were 382 million older persons worldwide. And this number is expected to double again by 2050 when it is projected to reach at least 2.1 billion - and that is before we factor in the impact of future revolutionary life extension innovations and technologies.

By 2040 it is anticipated that, with fewer health conditions, an expanded labour force, and increased productivity, the ageing population could add an additional $12tn to global GDP. But, without the right policies the ratio of people of working age to people over 60 would increase from 3.7 in 1999 to 2.1 in 2040 thereby placing a significantly higher economic and social burden on the working population.

As average lifespans lengthen people might also get married later, and even take a "late life" break in their 60's and then go on to have second careers, retiring instead in their 80's rather than their 60's which is common today. However, as with the whole trend, this alone would require a major re-thinking of government investments and policies.

ACT NOW

While some countries see an ageing population as a burden looked at with another lens it could also be a demographic dividend. However, in order to maximise the upsides, to both the individuals and the state, politicians and policy makers must prioritise education and healthcare initiatives.

EXPLORE:

- Affordable quality healthcare and housing solutions
- Career breaks and the concept of multiple careers
- Financial planning reforms
- Future of Education, Financial Services, Government, Healthcare, and Work
- Improved social mobility strategies and new social contracts
- Progressive government policies to promote financial and social inclusion
- Revising the pension age

Data sources: Barclays, OECD, United Nations, WHO, World Bank, and various.

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EXPLORE STARTUPS & MORE

ALGORITHMIC BIAS

3RD YEAR ON THE LIST



QUICK TAKE

Algorithmic bias, where the results and output of "code and machine" based analysis and decisions are biased, is often the direct result of societal bias being unintentionally encoded into AI algorithms during their training phase.

Needless to say the implications, especially in our increasingly algorithmic and automated society where people have little recourse for appeal and where transparency is limited, can have dire societal consequences that reinforce societal divisions and stereotypes, and increase polarisation.

IMPACT

Ultimately the real impact of algorithmic bias is that pre-existing societal biases get encoded into our algorithmic society, which is both automated and operates at massive speed and scale, and perpetuates them.

Furthermore, the lack of transparency, when it comes to algorithmic based analysis and decision making, exacerbates the problem even more because unlike in the real world where people can call others out for bias, and even have legal recourse, it's almost impossible for individuals to call out and prove algorithmic bias - in short it's hard to prove that the "biased ghost in the machine" exists.

While the actual impact of this trend on individuals, organisations, and society as a whole has never actually been measured or quantified we are certain that it has had an impact on everything from censorship, credit availability and scoring, healthcare diagnosis and provision, gender equality and hiring practises, marketing, policing and probation, voting, and much more.

EXAMPLES

Algorithmic bias both reinforces and in some cases heightens and exaggerates human bias.

With respect to hiring studies have shown that Amazon, Facebook, and Google's algorithms have all too often shown executive, high income, and STEM job adverts almost exclusively to men, ignoring women and other demographic groups even though, for example, women make up 27% of boards today. And in one particularly pertinent example Amazon's algorithm was shown to favour middle aged white men from California for software development jobs because of the data it had been trained on.

Algorithms have also been shown to lead police to unfairly target certain demographic groups and neighbourhoods - as well as favour other groups for parole and early release from prison.

Then, as if to drive the point home, there's the odd example of Microsoft's Tay bot which, taking data input from internet users, turned homophobic, racist, and xenophobic.

ACT NOW

In our modern world algorithmic bias is nothing less than a cancer which, if left unchecked and unsolved, could erode the very fabric of society itself and cause irreparable harm. While there are solutions though today organisations should automatically assume that all their algorithms contain some form bias and take appropriate actions to rectify the issue.

EXPLORE:

- AI best practise training methodologies
- Algorithmic audits
- Future of Artificial Intelligence
- Synthetic datasets

Data sources: Brookings, Google, MIT, New Scientist, and various.

ALGORITHMIC SOCIETY

3RD YEAR ON THE LIST



QUICK TAKE

We all live and participate in an increasingly algorithmic society where Artificial Intelligence algorithms direct and influence our lives - whether it's because they are used to assess our credit worthiness to buy products or a home, or access welfare, or match us to jobs, or our future partners, or display information we're searching for, or a million other examples.

As a consequence algorithms are having an increasingly out sized level of influence over every aspect of our lifestyles, livelihoods, and even who we live and share them with.

Data sources: Pew Research, Plos, and various.

IMPACT

Algorithms layered upon layers of algorithms make people's attempts to free themselves from the unintended consequences of the algorithmic society all but impossible, and in a world where algorithms are pervaded by bias the consequential ethical and societal issues should not be under estimated.

The overall impact of algorithms on peoples work and personal lives also has many experts split with recent surveys suggesting that 38% of them believe the algorithmic society will have a positive impact, 37% believing it will be negative, and 25% saying it will be neutral.

Reports have also called out concerns about the impact of the loss of human interaction as algorithms are tasked with making more decisions, algorithmic bias, and the likelihood that people who are already disadvantaged in society will be at even more of a disadvantage in the future. And without strong algorithmic literacy, oversight, and transparency programs being put in place all of these issues will be compounded as their use increases.

EXAMPLES

There are plenty examples to demonstrate the impact that our algorithmic society has on our daily lives whether it's the algorithms that decide what ads to show us or which search results to prioritise, the later of which influences our view of the world, or the algorithms used by the financial services industry which determine our credit worthiness and thereby the kind of home and neighbourhoods we live in.

And let's not even discuss how algorithms choose which online dating profiles to show you - if you're into that sort of thing - or how they only show you content they think you like which then increases the likelihood that your view of the world will become increasingly polarised and radicalised in internet echo chambers.

On the plus side though algorithms can speed up decision making - helping us get that dream job or loan faster, helping doctors diagnose ailments quicker and, again, all manner of other examples.

ACT NOW

On the one hand algorithms can help automate mundane tasks and make decision making easier and faster, but on the other if those algorithms are poorly designed or implemented, or infected with bias they can change peoples lives for the worse. Therefore, not only is getting the balance right important it becomes essential.

EXPLORE:

- Algorithmic auditing and transparency initiatives
- Best practises
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, and Governments

CULTURAL MISAPPROPRIATION

3RD YEAR ON THE LIST



QUICK TAKE

Cultural misappropriation is the adoption or exploitation of another culture by another more dominant culture, and covers a multitude of activities including appropriating artefacts, cultural expressions, IP, and traditional knowledge from someone else's culture without permission. While it can sometimes be used innocently to demonstrate kinship with another culture it can also reinforce stereotypes and negatively impact people's mental health which is why today more people than ever before believe that recognising the cultural roots of trends is more important than ever.

IMPACT

Most cultural misappropriation takes place without people understanding or respecting the original cultures history, significance, or traditions, and while the vast majority of it is done innocently and without malice the impacts are far reaching and take place across society and within industries on a regular basis.

Despite the fact that many argue this trend is helping raise awareness of key political and social issues, which has helped boost **CSR** and **ESG** initiatives, **Diversity and Inclusion** initiatives, and boosted the profiles of other trends including **Brand Activism**, **Brandalism,** and even **Green Colonialism**, some of the most serious negative consequences include minority economic exploitation, the dilution and loss of cultural identity, psychological impacts, and the reinforcement of stereotypes.

From the blending of different cuisines to create Fusion Cuisine and cross-cultural art and design, through to the globalisation of fashion and world music and exchange there are many beneficiaries and casualties of this trend and, as always, it's important that brands engage and listen to others.

EXAMPLES

There are many examples of this trend such as Gucci's tangle with it in 2019 when they faced a global backlash for selling a turban resembling those worn by Sikhs who consider it a sacred symbol of their faith. Then, again in 2019, Kim Kardashian suffered her own backlash when she released her Kimono shapewear line and had to rename it after a backlash by Japanese consumers. Even Disney fell foul of it in 2016 when they released a children's costume representing the character Maui from the movie Moana which included a bodysuit with Polynesian tattoos with critics arguing it disrespected and commoditised Polynesian culture.

While most brands end up recalling lines and apologising this trend also provides them with an opportunity to build trust, improve their reputation, and foster positive relationships with diverse under represented communities. Nike provide a good example with their Native American N7 collection - after several backlashes regarding the use of Native American imagery the brand opened a dialogue and collaborated with the communities in a profit share agreement to celebrate their culture and heritage.

ACT NOW

When brands open a dialogue with under represented communities there is an opportunity for a win win but it does require brands to be authentic, fair, and sincere in their conversations and negotiations.

EXPLORE:

- Brand partnerships
- Business and impact assessments
- Copyright and Trademark protections, and WIPO guidelines
- Emerging technologies and technology roadmaps
- Empasising cultural exchange
- Future of Financial Services
- Hiring cultural consultants
- Open dialogues
- Product development initatives

Data sources: International Trademark Association, WIPO, YPulse, and various.

DECLINING INTERNET FREEDOM

3RD YEAR ON THE LIST



QUICK TAKE

Internet Freedom is an umbrella term that encompasses everything from digital rights, freedom of information and freedom from internet censorship, net neutrality, and the right to access the internet and digital services. And while many institutions and people believe that all of these should be basic human rights there are an increasing number of governments who are limiting and suppressing them in a variety of ways with the net result being that globally internet freedom has been in decline for more than a decade and the trend shows no signs of reversing.

IMPACT

From digital authoritarianism, mass surveillance, and using social media to undermine democracy and alter public behaviours and opinions, to eroding privacy, privatising censorship, and silencing different communications channels, today there are plenty of ways online freedoms are being eroded. And that's before we discuss the impact of Splinternets and Internet Shutdowns, or the disappearance and "re-education" of particular groups and individuals whose views are at odds with the ruling party's views.

Estimates suggest out of the 3.8 Billion people with internet access 71% live in countries where people have been arrested for posting content on political, social, or religious issues, 65% live in countries where people have been attacked or killed for their online activities, 59% live in countries whose governments regularly manipulate online discussions, 56% live in countries where content is routinely blocked, 46% live in countries where authorities regularly disconnect networks, and 46% live in countries where access to social media is temporarily or permanently restricted. All of which is just the tip of the iceberg.

EXAMPLES

Not only does this trend have an economic and social impact, but it also has an impact on the reputation of the countries who increasingly use the internet as a blunt instrument to enforce their agendas - at both home and abroad. And, unfortunately, today there is no country that is completely free of one or more of these behaviours.

Recently researchers have seen the rise of what they call "extremely aggressive" internet censorship in over 103 countries some of which such as China, Ecuador, Russia, Sudan, and Turkey, won't surprise people. But surprisingly Japan, Italy, India, Israel, Norway, and Poland were also on the list. And while the researchers saw a slow up tick in the amount of censorship in the USA they note that the groundwork for mass censorship has now been laid, and warn about a "slippery slope" there too.

Meanwhile other examples include full internet shutdowns as we have seen in Egypt, India, Myanmar, Sri Lanka, Syria, Yemen, and many other parts of the world, and the mass censoring of content by the Chinese government as well as other autocratic governments such as Iran and North Korea.

ACT NOW

Once promoted as a democratising and liberating technology in the past decade the internet has rapidly become a conduit for mass control, manipulation, and surveillance. And this trend shows no signs of slowing down. In fact, as we see an acceleration of domestic and foreign led disinformation and misinformation campaigns, torrenting, and other factors, it will likely accelerate.

EXPLORE:

- Emerging technologies and technology roadmaps
- Ethical leadership
- Fixing social media
- Future of Communications and Government
- Policy and regulation reform
- Reinforcement of democratic values
- Recognising and removing harmful foreign influence

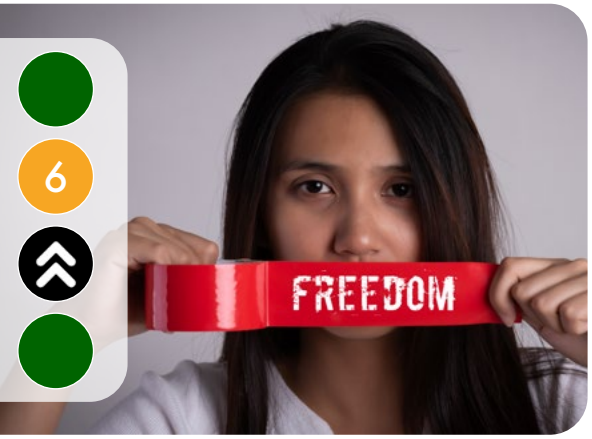
Data sources: Censored Planet, IFF, Freedom House, MIT, University of Michigan, World Futures Forum, and various.

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DEPLATFORMING

3RD YEAR ON THE LIST



QUICK TAKE

Many of us are told we live in a free society where we are free to express ourselves and our opinions. But, as we all know, life isn't that black and white and there are boundaries - especially when those opinions are deemed to be harmful to others.

Social networks and our connected society amplify the individuals ability to communicate with others at global scale and in real time, but only if you have a place on them, and if you don't abide by their rules then one minute you have an audience of millions and the next you're deplatformed.

Data sources: Forbes, Georgia Tech, Mashable, Twiter, and various.

IMPACT

The impact of being deplatformed in today's society is both divisive and damaging. On the one hand it's divisive because there will always be people who don't agree or want to abide by others rules or Codes of Conduct, and on the other it's damaging because the act of deplatforming itself can often feel very visceral and have real world emotional and psychological consequences - especially when it becomes increasingly difficult to appeal or communicate with institutions which are increasingly autonomous, automated, and opaque.

As the old saying goes: What technology gives with one hand it takes away with the other.

Despite all of the above, however, there are benefits to being able to de-platform people, especially those who proliferate fear, hate, and misinformation, that help fuel the creation of a **Polarised Society**, but getting the balance right relies on having strong, trustworthy institutions who are self-less and unbiased. And, frankly, that's getting harder as our society appears to become increasingly polarised. Which is ironic.

EXAMPLES

When an individual or organisation is deplatformed from one provider often there is a domino effect where they are deplatformed from multiple providers simultaneously, and for many the process of trying to replatform themselves, so that they can regain all or some of their former influence or power, is no easy task.

One of the most infamous events which caused a mass deplaforming of individuals and organisations was the Capitol riots of 2020 which saw over 70,000 Facebook and Twitter accounts deplatformed, including that of then US President Donald Trump, and the deplatforming of "free speech" social media platform Parler by Amazon Web Services, Apple, and Google, which then only narrowly avoided bankruptcy. And as for the former US President's efforts to get back "online" we've seen numerous attempts and numerous failures.

Seen by many as "cleaning up the internet" other deplatforming examples include Gab, InfoWars, the British Alt-Right and the Proud Boys, numerous foreign government officials, and of course many COVID-19 conspiracists.

ACT NOW

To many the act of deplatforming is seen as the equivalent of diminishing or taking their voice away, and the act of deplatforming should not be taken lightly and should always be done in a way that is both proportional and transparent, with the right to appeal and review.

EXPLORE:

- Emerging technology and technology roadmaps
- Ethics and oversight boards
- Future of Communications, and Government
- Polarised society
- GRC, policy, and regulation reform
- Strong global institutions

DIGITAL DIVIDE

3RD YEAR ON THE LIST



QUICK TAKE

When people talk about the Digital Divide they can be talking about a variety of things - such as the fact that today over 4 Billion people on the planet either have no broadband or internet connectivity or limited access, or they could be talking about the significant differences in broadband speeds and prices between different regions and the impact it has on social inequality.

In short, the digital divide is essentially a crude measure of the gap between those who benefit from the Digital Age and those who don't or can't.

IMPACT

Many of us couldn't fathom a world where we didn't have permanent access to all the world's information and almost every digital service the world has to offer at our fingertips. But for billions of people in the world today, in both developed and developing countries, this digital world and everything it has to offer is either difficult to access, or still just science fiction - whether it's because there is an access or use divide, or even a quality of use or digital skills divide.

It shouldn't come as any surprise either that the stats vary wildly depending on the region we're discussing. For example in North America over 95% of people have access to the internet, in Europe 90%, in the Middle East and LATAM 70%, Oceania 67%, Asia 55% in spite of China and India's own impressive statistics, and in Africa it's just 40%. Ultimately these digital divides create barriers to communication, knowledge, social inclusion, study, and work, heighten social differences, facilitate gender discrimination, and impact people's lives, livelihoods, and prospects by limiting access to education, government, financial, health, and other important services.

EXAMPLES

While the number of people who have good quality access to digital services and the internet will increase over time there is obviously still a lot of work to be done to close the divide because not only do people need to be given access they also need the devices, skills, and tools to make the most of that access.

Examples of this divide can be seen everywhere and in every country, but globally women are 8% less likely to own a mobile phone than men and it's believed that just closing this gap alone would add an additional $700 Billion in GDP growth in those low and middle income countries affected. Additionally, in the USA where connectivity levels are high over 90% of all emergency calls are made from mobile devices which, in turn, has improved the personal well being of women when they are away from home.

Meanwhile other benefits of closing this divide include better future earnings potential, improvements in educational performance, reducing the cost of delivering services to people, savings made from paying bills and transacting online, reductions in social isolation, and many others.

ACT NOW

We think we live in a digital world but that only applies to about half the people on the planet, and while people in developed countries benefit greatly from having access to the internet and other digital services for what seems to be a relatively small amount of money as it relates to income, for many others this world is at best awkward to access or completely out of their reach. As a result it is arguable that this closing this divide is both one of the world's greatest challenges and its greatest opportunities.

EXPLORE:

- Affordable connectivity initiatives
- Digital skills programs
- Education and literacy initiatives
- Future of Communications
- Infrastructure investment initiatives
- Space based internet services

Data sources: GSMA, ONS, WEF, World Bank, World Futures Forum, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

DEMISE OF ANONYMITY AND PRIVACY

3RD YEAR ON THE LIST



QUICK TAKE

While anonymity and privacy are two sides of the same coin there are subtle differences between the two that mean governments and organisations need to approach how they handle and regulate both of them, and treat them separately.

While most people remain focused on the debate about privacy, rather than anonymity, as more of our offline and online personal and professional data is captured and analysed by different institutions for different purposes we are increasingly entering an age where both are at risk of disappearing - ironically, for better and worse.

Data sources: Various.

IMPACT

Ultimately the impact of this trend, from both an individual and societal perspective, depends on what data institutions capture and analyse, how they use it, and how those use cases impact people.

For example, on the one hand using people's biometric information to identify their risk of cancer or heart disease so that institutions can make interventions that save or extend their lives is a utopian-like use case, with a positive impact. But, on the other hand using their data to identify them and imprison them in concentration camps or execute genocide is, needless to say, a dystopian use case.

This then brings us to the importance in building strong, trustworthy institutions whose purpose is to selflessly improve the lives and livelihoods of their citizens and customers. And, let's face it - that's an entire conversation and debate in itself, and one where somewhat ironically democratic, strong, and trustworthy governments need to take the lead.

EXAMPLES

You might be surprised at just how many different ways that the data that institutions collect about you can be used. From being able to use both online and offline tools, for example the cameras, microphones, and other sensors in your environment, to infer your character, education, ethnicity, gender, guilt, mental and physical well being, personality, and sexual orientation, as well as profile your income, lifestyle, relationships, and much more, we are already at the stage where the amount of insights institutions can glean from our data is frankly staggering. And as for some examples well there are millions but here are some top picks.

Today the Chinese government are using data to give all their citizens a Social Credit Score which is then used to determine their level of access to services such as broadband, education, finance, health, and transportation. But, drop litter, jaywalk, or bad mouth the ruling party and your risk of being cut off increases quickly. Elsewhere though doctors are using facial recognition to pre-emptively diagnose people with cancer, genetic conditions, heart disease and make interventions to save lives ...

ACT NOW

From giving institutions the means to entertain you or serve you better, to giving them new ways to save your life or detain and kill you, as our anonymity and privacy gets stripped away one layer at a time the time to discuss and regulate how we use arguably our most important asset is now. And, if we don't, and if society isn't aware of the dangers that lie ahead, then we run the risk of sleep walking into dystopia ...

EXPLORE:

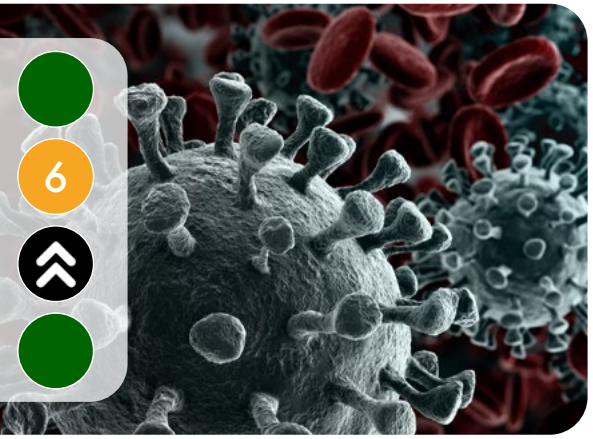
- Artificial Intelligence audits, bias, and training best practises
- Data sovereignty and Sovereign ID systems
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Customer Experience, Ethics, Government, Industry, and Society
- Policy and regulation reform
- Strong global institutions

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

EPIDEMICS AND PANDEMICS

3RD YEAR ON THE LIST



QUICK TAKE

Epidemics and Pandemics have always gone hand in hand with human development and settlement, so much so that many are irrevocably intertwined with our views of different civilisations and regions of the world whether it's Cholera, Dengue, Ebola, Influenza, and others. However, while many of us are removed from their awful impacts, with the global COVID-19 pandemic being an exception, since records began in the 1600's the intensity and frequency of novel extreme epidemics and pandemics has been increasing with researchers warning they could become three times more common in the decades ahead.

IMPACT

The impact of different epidemics and pandemics varies but includes economic, environmental, political, and societal consequences with the impact of the global COVID-19 pandemic being one of the most severe with over 7 Million deaths - or approximately 10% of the global annual total in an average year.

At its peak its impact on global inequality and poverty was staggering. 3.3 Billion people, especially in the **Informal Economy** and especially women, faced loosing their livelihoods, an estimated extra 124 Million people fell into extreme poverty, with 500 Million being pushed closer to it because of increased healthcare costs, and the number of undernourished people increased by 132 Million to 822 Million. Economically supply chains snarled, PMI hit 26.5, global GDP contracted 3.2%, global output shrank by $8.5 Trillion, and workers lost an estimated $11 Trillion in earnings. Furthermore the percentage of children in low and middle income countries living in Learning Poverty increased from 53% to over 70%, with estimates suggesting that globally this generation of students will loose over $17 Trillion in future earnings potential. All for starters.

EXAMPLES

Call them what you will - epidemics, pandemics, or plagues - humanity and our livestock have been afflicted by them since records began. Today even **Global Food Security** is under threat because of the spread of Bird and Swine Flu, and as for human epidemics and pandemics there are too many to list, but the worst have literally ended civilisations and wiped out empires.

In 2002 and 2012 SARS and MERS respectively went global with over 800 deaths each. In 2015 an outbreak of the Zika virus took off in Brazil and spread to more than 60 countries with thousands of women giving birth to babies with Microcepaly, a condition in which a child's head is smaller than normal, and other congenital conditions. And, in echoes of 2020 when the Tokyo Olympics were cancelled because of COVID-19, there were calls to cancel the 2016 Rio de Janeiro Olympics.

In 2018 and again in 2020 the Democratic Republic of Congo declared an outbreak of the Ebola virus and over 2,300 people died, COVID-19 hit in 2019, then in 2022 the Monkeypox virus took hold in over 75 countries with tens of thousands infected.

ACT NOW

Today there are an estimated 1.5 Million unknown viruses in the world as researchers hunt for "Disease X," and as we see trends such as **Climate Change** and a **Warming Planet** which make the proliferation of bacteria and viruses more likely, and **Deforestation** which pushes humans and animals closer together, accelerate it seems almost certain that the intensity and frequency of epidemics and pandemics will increase. Furthermore, combine these with increased human mobility and **Population Growth**, and you have a potential powder keg which means that, irrespective of the country you reside in, you be on guard.

EXPLORE:

- Business continuity planning
- Emerging technologies and technology roadmaps
- Future of Healthcare and Transportation
- Public health communication and monitoring policies
- Rapid response plans and teams

Data sources: UN, UNWESP, PNAS, Pubmed, WHO, WorldBank, and various.

GLOBAL ENERGY DEMAND

3RD YEAR ON THE LIST



QUICK TAKE

In a world coming to terms with fuel and even Lithium **Resource Scarcity** today we consume roughly 410 Exajoules of energy, which is growing at a rate of between 1.7% and 3% per year, and by 2050 it's estimated this figure will be closer to 550 Exajoules - depending on who's doing the modelling and whether or not the world meets its **Climate Change**, **Green Energy Transition**, **Net Zero** and other energy related goals. During the same period global electricity generation capacity is also expected to grow 3.3% per year which, ironically, could outstrip **Global GDP Growth** of between 2.5% and 4.5%.

IMPACT

Soaring global energy demand, which is in no small part due to the fact that by 2050 the world's **Population Growth** will exceed 10 Billion people, will have many impacts on our environment and society. But just how negative some of these are will depend on the future energy mix, how fast we can adopt energy efficient technologies, and how fast we can transition from a fossil fuel based energy generation system, a major contributor to **Air Pollution**, Climate Change, **Extreme Weather**, **Ocean Acidification**, and our **Warming Planet**, to new environmentally friendly alternatives.

While global energy demand is commonly calculated at the final point of use, or Total Final Consumption (TFC), unsurprisingly different research organisations estimate global energy consumption will peak sometime during the 2030's or 2040's, primarily because it's hard to accurately predict variables that include everything from the rate of **Vehicle Electrification** to the rate of the Green Energy Transition. By 2050 though estimates suggest buildings will consume 55% to 75% of TFC, and that we will reach peak gas by 2030, and peak oil between 2028 and 2035.

EXAMPLES

Across the board demand for electricity production, heating, and transportation fuels is increasing, but increasingly the kinds of fuels - or sources of energy - are changing, moving away from fossil fuels to greener, lower carbon alternatives.

When we have a look at some of the most pertinent examples of growing energy demand we expect air conditioning, which today accounts for 10% of all global energy demand, to triple by 2050, and by 2030 we expect the number of electric vehicles to grow from today's 10 Million to over 150 Million again with the impact that that'll have on future electricity generation requirements and peak load timings. And, with regards to our increasingly digital world it's estimated that the energy consumed by datacenters will double by 2030 to 4%.

Based on estimates though it should come as little surprise that by 2050 China's energy demands will increase by 30% and that in the same time frame India's will triple. However, to counter balance these Europe expects its 2050 energy demand to be 15% less than 2005 levels as new energy saving initiatives and technologies take hold.

ACT NOW

While the world's thirst for energy won't abate any time soon, and probably never will, overall the majority of organisations and people expect whatever energy sources they use to be predictably affordable, convenient, secure, and increasingly sustainable. And, having seen first hand the impact of **Epidemics and Pandemics**, supply chain snarl ups, and wars, on global energy price inflation and security, as well as its downstream impact on consumers and economies, and **Wealth Inequality**, as well as company profits, it's no surprise that future energy affordability, diversification, and security, is now a top priority for many governments and organisations.

EXPLORE:

- Business impact assessments
- Emerging technologies and technology road maps
- Energy saving and security policies
- Future of Energy, Financial Services, Government, and Sustainability
- Global energy reform

Data sources: BP, Exxon, IEA, Total, UN IPCC, World Energy Council, and various.

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EXPLORE STARTUPS & MORE

GLOBAL LEARNING POVERTY

3RD YEAR ON THE LIST



QUICK TAKE

Access to a quality education that lets people reach their full potential should be a given, but today an estimated 617 Million children don't meet the minimum standards in maths and reading with global **Epidemics and Pandemics** only making the situation worse - so much so that today 70% of under 10 year olds in low and middle income countries don't get the basic education they richly deserve. With education playing such a vital role in people's lives its therefore unsurprising that many children will end up in the **Informal Economy** and being on the wrong end of the **Wealth Inequality** trends.

IMPACT

With every year of education increasing an individuals earnings by up to 10% noone doubts the importance of a good education so it's no surprise that this trend has profound economic and societal impacts - for individuals and countries alike - with people's lack of basic education and skills severely curtailing their future opportunities for personal growth and economic success, and curtailing **Global GDP Growth** by an estimated $301 Billion.

Not only does this trend perpetuate poverty and inequality, as well as giving many people little alternative than to work in informal economy, but it also has a serious impact on their happiness, health and well being, and social status. All of which, if not tackled can see a country's GDP stagnate, and social unrest, political instability, and **Fragile Government** become the norm.

Globally it's estimated that 53% of children and adolescents worldwide, or 617 Million, don't meet minimum proficiency levels in reading and maths. In Sub-Saharan Africa this number rises to over 87%, while in South Asia, it's over 80%, the impact of which is far reaching.

EXAMPLES

While there are far too many examples to list here some of the most extreme and severe include those from Africa and Asia.

While Ethiopia has made huge progress in recent years tackling the issue around 60% of children under the age of 10 are still unable to read or understand simple text. In Nigeria this figure is 40% and in Pakistan it's 75%. Meanwhile, in South Africa which is currently suffering from record levels of youth unemployment an estimated 50% of children aren't learning the basic skills needed for success in life.

However, when we sub divide these figures by gender 52% of girls in low and middle income countries aren't learning the basic literacy skills compared with 41% of boys which, while feeding into many of the other trends I mentioned, also helps exacerbate **Global Gender Inequality**.

Unsurprisingly, this trend impacts children from marginalised communities, especially those from rural areas, indigenous communities, and those living in conflict zones the most.

ACT NOW

While estimates suggest that reducing the number of children in learning poverty by 10% could increase a country's GDP by 0.3%, which for some governments should be enough to spur action, the fact of the matter is that this trend has life long implications and implications that perpetuate across generations. It should not be lost on you, therefore, that by improving the education circumstances for one child you then improve not only their future quality of life, but also the quality of life for all their descendants as well.

EXPLORE:

- Child employment reforms
- Energy and food affordability, availability, and security
- Emerging technologies and technology roadmaps
- Future of Communications, Education, Work and the Workplace
- Inclusive educational programs and policies

Data sources: Bill and Melinda Gates Foundation, World Bank, UNESCO, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

GLOBAL MENTAL HEALTH CRISIS

3RD YEAR ON THE LIST



QUICK TAKE

The Global Mental Health Crisis has reached such an extent that it is now spoken about in much the same way as other **Global Epidemics and Pandemics** and, just like contagion based cousins its mental and physical impacts can often be just as economically, mentally, and physically damaging and long lasting.

Commonly bought on by an individuals environment or lifestyle globally each year 1 in 7 people have a mental health disorder, with 1 in 4 experiencing a mental health disorder in their lifetime, and depression being the most common.

IMPACT

While mental health disorders such as anxiety and depression, the top two disorders, stem from many sources, from a persons brain chemistry and genetic disposition to their environment and lifestyle, which can then accentuate stress and substance abuse, this trends global impact is staggering. Furthermore, studies have shown that people with serious mental health issues are twice as likely to develop life limiting cardiovascular and metabolic diseases.

Every year over 970 Ml people have a mental health disorder, and of those over 700,000 commit suicide with men being 1.7 times more likely to commit suicide than women, those between the ages of 15 to 29 being afflicted the most, and 77% of suicides occurring in low to middle income countries. Despite this though just 2% of health budgets are spent tackling the issue, and just 25% of people seek help.

Also, every year 12 Billion productive days are lost costing the world $2.5 Trillion per year, rising to $6 Trillion by 2030 - the impact of which itself can help reinforce people's situation and worsen their poor economic, personal, and professional decision making.

EXAMPLES

While this trend can afflict anyone surveys continually show that almost half of Gen Z and Millennials are stressed all or almost all the time, and that these age groups also have the greatest percentage of mental health issues as a percentage of the population. Perhaps it's no coincidence then that it's also these generations that are more likely to suffer from **Global Loneliness**.

As we stare more **Global Epidemics and Pandemics** in the face it would be remiss not to include a note on the impact of the global COVID-19 pandemic on this trend which, on top of the already burdensome global mental health crisis, triggered a massive 25% increase in the prevalence of anxiety and depression that hit young people, again, and women the hardest.

Meanwhile, in the UK more people than ever are seeking treatment with 1.81 Million referred in 2021, up from 1.69 Million in 2020, and of these 66% were women, with the number of women referred out numbering men in every region of the country. When it comes to funding the UK is also bucking the trend with 13.8% of the UK NHS budget, and increasing, being spent to tackle it.

ACT NOW

Asides from the Socio-Economic burdens the physical disease burdens associated with this trend shouldn't be under estimated with evidence showing that this trend regularly brings about the onset of, and significantly multiplies the intensity of, physical health burdens, which can stress even the biggest healthcare systems. By identifying and tackling the sources of mental health disorders early, and by making interventions sooner collectively we can move the dial on this trend.

EXPLORE:

- Address gaps in care and explore innovative mental health solutions
- Early identification and intervention strategies
- Emerging technology and technology roadmaps
- Future of Education, Financial Services, Healthcare, and Work and the Workplace
- Raising awareness, Soci-Emotional education, and avoiding stigmatisation

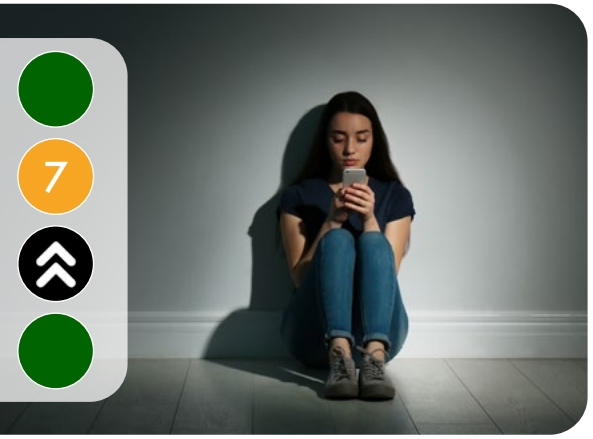
Data sources: IHME, Lancet, Mental Health Foundation, PWC, WHO, and various.

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EXPLORE STARTUPS & MORE

GLOBAL LONELINESS

3RD YEAR ON THE LIST



QUICK TAKE

Globally 33% of all adults experience loneliness but of course this varies greatly by country and ranges anywhere between 50% in Brazil to 15% in the Netherlands. When exploring this trend it's important to distinguish between loneliness and solitude. Many of us frequently crave solitude, but few of us crave loneliness. And we also need to be careful about mindlessly incorporating single person household data which in the USA alone have doubled since1950 - even though people living alone often find it harder to physically and socially connect with others and integrate into wider society.

IMPACT

Loneliness, which some call the new global health pandemic, takes many forms including emotional, existential, and social, affects all ages and demographic groups, and has many impacts - generally all negative - on people's economic, mental, and physical well being, and prospects. And identifying lonely people, who are increasingly more likely to be younger than older, but just as likely to be men and women, making the right interventions, and in some cases helping them avoid **Extremism and Radicalisation**, or worse, is hard.

Statistically though lonely workers are less engaged and productive at work, twice as likely to quit their jobs, and take twice as many sick days as their colleagues - costing the US economy alone an estimated $550 Bn. Research also suggests loneliness increases your risk of death by 26%, is worse for you than obesity, and can have the same health impacts as smoking 15 cigarettes a day, while also accelerating cognitive decline, dementia, depression, and other mental illnesses, which impact the **Global Mental Health Crisis**, and that it also exacerbates poor financial, professional, and social choices.

EXAMPLES

During the global COVID-19 Pandemic over half the world's population were in lockdowns and there is no doubt that this contributed to a sharp rise in global loneliness, with 42% of people believing that the pandemic will have long lasting mental health implications. And, ironically people living in cities during the pandemic felt the loneliest, by 30%.

Unsurprisingly perhaps the research also shows globally 41% of people have become lonelier in the past few years compared with just 19% who haven't. But, also interestingly, globally 32% of people think their communities have become more supportive in the past six months - especially those in China and India (both 55%), followed by Saudi Arabia (51%), Peru (44%), Chile and Malaysia (both 43%), Mexico (40%), the UK which incidentally is the only European country in the top 10 (39%), Singapore (39%), and Argentina (38%), with Japan, Russia, and Turkey being the least supportive.

Additionally, in the US, surveys suggest 79% of Gen Z, 71% of Millennials, and 50% of Boomers feel lonely which, if true, could be yet another consequence of the **Polarised Society** trend.

ACT NOW

Gaps in country level datasets, especially Africa and parts of Asia, make it hard to get a truly comprehensive view of global loneliness and its impact on different demographic groups and regions. Despite this though overall we can see loneliness is increasing and that there's a statistically important and worrying rise in the number of young people feeling lonely. Furthermore, as **Global Digital Addiction Rates**, **Doom Scrolling**, **Job Automation**, and other trends ascend it is increasingly important we have the systems in place to identify and support those most in need and at risk.

EXPLORE:

- Community and inclusion initiatives
- Emerging technology and technology roadmaps
- Future of Education, Financial Services, Government, Healthcare, and Work and the Workplace
- Improved access to mental health and social support programs
- Tele-Health and Tele-Psychiatry

Data sources: BMJ, Cigna, Harvard, Holt-Lunstad, Ipsos, University of Sydney, and various.

GREEN COLONIALISM

3RD YEAR ON THE LIST



QUICK TAKE

Green Colonialism is the trend of displacing, disrupting, or removing, whether it's by contract or force, the indigenous people of a region by companies who want to use their land and other natural resources to support green initiatives and projects such as mining, renewable energy projects, and offsetting environmental impacts. As the **Green Energy Transition** accelerates and as governments continue to promote and enforce **ESG** and **Net Zero Pledges**, more companies than ever are using and exploiting the natural resources of other parts of the world such as the Global South for profit.

Data sources: Columbia University, Greenpeace, UN, and various.

IMPACT

While it could be argued that green initiatives such as the construction of cabins, mines, power stations, and renewable energy projects, as well as environmental offset schemes such as carbon offset schemes, are all well intentioned there are companies and governments who behave compassionately and ethically and there are those who don't. And, as we continue to see more green projects ramp up throughout the world, there's no doubt we'll see more conflicts with indigenous people who find their lands resources being targeted by interested parties.

As green initiatives and projects become more valuable it's inevitable that some companies that want to maximise profits and protect their investments will be unethical and over zealous, often at the expense of the liberties of indigenous people who, even when they have signed land lease agreements, often find themselves being exploited. While this mostly involved barring them from their ancestral lands, interrupting their ways of life, and human rights violations, it also includes limiting or preventing access to water resources, rivers, and roads, and even genocide and murder.

EXAMPLES

Given the complexity of land lease agreements it's unsurprising that indigenous people won't always fully understand what they're getting themselves into so it's little wonder that some companies use this to their advantage to exploit and ride roughshod over them and their rights.

In recent years we've seen examples of companies in Brazil, Ecuador, and Uganda, grabbing land from indigenous people to support reforestation and plantation based carbon trading and carbon offset projects, and in the worst example of its kind in Honduras 23 farmers were killed after claiming their land had been illegally sold to a big palm oil plantation operator, Groupo Dinant, who were part of the EU's green emission trading scheme.

Then, closer to home the approval by the Norwegian government to let companies build wind farms on the ancestral lands of the indigenous Saami people led to conflict with the Saami's claiming they put their sustainable livelihoods at risk because they blocked their reindeer's migrations and disrupted their grazing patterns, leaving many too weak to survive the long winter months.

ACT NOW

While almost everyone agrees that the world needs to be greener, to curtail the impact of **Climate Change** and a **Warming Planet**, and that business needs to be more sustainable, when it comes to how we achieve this companies and governments need to be vigilant that they don't directly or indirectly enable or support the persecution of indigenous people.

EXPLORE:

- Audits, monitoring, and policing
- Emerging technologies and technology roadmaps
- Global accords and robust grievance mechanisms
- Human rights reform
- Independent contract arbitration, reviews, and settlement
- Policy and regulation reform
- Rights based negotiations

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

JOB AUTOMATION

3RD YEAR ON THE LIST



QUICK TAKE

When we think about automation we often think about **Artificial Intelligence** (AI), **Robotic Process Automation** (RPA), and **Robotics**. What we often forget, however, is that there are fundamentally two kinds of automation, namely automation that's dumb which we often simply refer to as "Automated," and then automation that's smart where different jobs and tasks are performed by intelligent systems that are often capable of complex decision making which are "Autonomous." As we head into the future this distinction, between automated and autonomous, is crucial.

Data sources: WEF, World Futures Forum, and various.

IMPACT

When it comes to the trend of job automation today there are a variety of **Exponential Technologies**, **General Purpose Technologies** (GPT), and tools, that are becoming increasingly capable and mature, which in turn is accelerating their adoption by businesses across all sectors as organisations everywhere embrace **Digitisation** and look to streamline operations, reduce costs, and reduce human related accidents and errors.

However, while analysts and news networks are all too often alarmist we must remember that there are jobs which can be fully automated and those that are only partly automatable. Furthermore, while many organisations cite automation as helping improve productivity so far **Global Productivity** statistics have remained pretty flat and stagnant - something known as the Solox Paradox.

Statistics wise many believe that by 2030 55% of the jobs that don't require a degree are in jeopardy of being automated, and that one third of all of the jobs we have today won't exist - although inevitably this will be somewhat offset by new kinds of jobs.

EXAMPLES

Job automation has always been a stalking horse that's worried people, and even a few decades ago people were worried that the internet, for example, would wreak havoc on the jobs market. Today though "the internet" has created hundreds of millions of new jobs and represents more than 10% of US GDP, which is perhaps good news as we look forwards to its next evolution **Web 3.0**.

Today there are many examples of job automation, whether it's tractor drivers whose jobs are being made redundant by the arrival of self-driving tractors, call center operators, claims handlers in the insurance sector, equities traders in the financial services sector, paralegals in the legal sector, or even AI programmers and data scientists in the technology sector. If truth be told we are all at risk of automation, even in the right brained creativity and innovation sectors which employ more than 235 Million people and generate over $8 Trillion in GDP, with the arrival of trends such as **Creative Machines**, **Digital Humans**, and **Synthetic Content**, but as the speed of both cognitive and manual automation accelerates it's imperative we find ways to adapt.

ACT NOW

As humans we are great at finding new ways to do old things, and new ways to do new things, which inevitably means that we are also adept at finding ways to automate many of the jobs and tasks that we all do on a daily basis, no matter how complex they are, even surgery and dentistry. However, while automation is always going to be a stalking horse the real issue isn't that we should be afraid of it, it's that we should have the social and political policies in place to help people transition from dead ending careers and roles to new ones with agility and speed.

EXPLORE:

- Business and impact assessments
- Education and training reform
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Education, and Work
- Policy and regulation reform

POLARISED SOCIETY

3RD YEAR ON THE LIST



QUICK TAKE

We appear to live in an increasingly divided and polarised society where we're seeing **Global Democracy in Decline**, a world where diametrically opposite opinions and views are the norm, where people with neutral views are increasingly marginalised and ignored by others, and where differences increasingly divide us rather than unite us. Furthermore this trend, which is also eroding social cohesion, is accentuated by the rise of **Algorithmic Echo Chambers**, **Global Loneliness**, **Rapid Urbanisation**, and the exploitation of negative and polarised media content for individual purposes.

Data sources: Pew Research, UoCB, and various.

IMPACT

As many societies appear to become increasingly polarised - and thereby divided - whether that's because those are the narratives that mainstream media and the social networks appear to promote in order to increase their engagement and viewership, whether it's the direct result of disinformation and misinformation campaigns, or the consequence in the rise in the number of algorithmically generated and promoted echo chambers, or even because of the consequence of badly thought out urban planning and government policies, one thing is certain - a divided society is no society at all.

This trends impact though is broad, growing, and pervasive, and asides from the toll it takes on peoples emotional, mental, and physical well being, it's also a leading cause of government shut downs, public disinformation and misinformation, segregation, violence, and risks to public health. And all that's before we discuss the impact it has on communities, families, schools, and workplaces, where people are becoming more judgemental, segregated, and less helpful, undermined, and more antagonistic towards one another.

EXAMPLES

There are plenty of examples, and ultimately many of them are the result of the coming together of many different factors, which make "unwinding" our increasingly polarised society no easy task. Although, that said strong education systems and the teaching of tolerance, and increasing trust in government, information, and people, could go a long way to helping bridge the divides.

When we look at the COVID-19 Anti-Mask, Anti-Vax, and Vaccine-Hesitant groups for example reports show that over 65% of all global vaccine disinformation and misinformation came from just 12 people, the so called "Disinformation Dozen," the impact of which was mass protests and an estimated 90 Million Americans opting out of vaccinations - all of which had a significant impact on America's attempts to unlock and re-open its borders and economy.

Needless to say other polarising topics include class, climate change and the environment, immigration and migration, race, religion, and science, with politics now perhaps being the most polarising because it encompasses all of these.

ACT NOW

Most polarising topics are amplified by passionate actors who have become increasingly adept at exploiting the technologies and tools that underpin our connected society, as well as behavioural and social engineering. Furthermore, on the whole the content they create and share often includes shreds of truth, if not the entire truth, to give it the appearance of legitimacy and boost its appeal.

EXPLORE:

- Emerging technologies and technology roadmaps
- Disinformation and misinformation strategies, and information weaponisation
- Future of Education, Government, Media and Entertainment
- Policy and regulation reform
- Social cohesion and inclusion initiatives
- Urban management and planning strategies

POPULATION GROWTH

3RD YEAR ON THE LIST



QUICK TAKE

The world's population, which stands at just below 8 billion today, is estimated to grow to over 10 billion by the year 2050 which will be an increase of more than 25%, and it is feared that this will put increasing strain on the world's finite resources.

While this is a slower rate of growth than we have experienced in the past by 2100 it is projected that there will be over 11 billion people - all of which is before we take into account future healthcare improvements which will increase human longevity.

IMPACT

The world has finite resources and, as you can see from the other trends in this Codex humanity has already had a significant impact on the planet, all of which has implications for future generations and the resources they have access to and available to them.

On average the world's population uses over 60 billion tonnes of resources every year, and while the overall distribution varies by region, when we consider the resource use for food, housing, and transport alone, Africans consume around 10kg of resources per day, Americans 88kg, Asians 14kg, Europeans 79kg, Latin Americans 34kg, and Oceania 100kg.

As we look to the future where not only the population size will grow but so too will the consumption figures it's easy to see how we could run into problems of resource scarcity which will include everything from food and water, to commodities and territory. And that's all before we consider the detrimental impact human activities may have on some of those resources, which include over consumption, land degradation, pollution, spoilage, waste, and other trends.

EXAMPLES

In order for the world's population to maintain its existing size global fertility rates need to be approximately 2.1 births per woman, and it is expected that we will drop below that figure by 2070 as global fertility rates continue to decline with the net result being that organisations expect the world's population to stop growing by 2100.

Between today and 2100 it is expected that Africa's population will grow from 1.3 billion to 4.3 billion, Asia's will peak at 5.3 billion and shrink from 2055, Europe and Latin America's will peak at 748 million and shrink from 2058, and that North America's will increase from 369 million to 491 million by 2100 - albeit artificially boosted by net inward migration which is estimated to be 85 million people.

By 2100 it is also anticipated that the populations of just six countries will account for more than half the world's population - these are India with 1.45 billion, China with 1,065 billion, Nigeria with 733 million, the USA with 434 million, Pakistan with 403 million, and finally D.R. Congo with 362 million.

ACT NOW

While there are many solutions to population growth some of them are obviously controversial.

EXPLORE:

- Access to affordable quality education and healthcare
- Circular economy and sustainable living solutions
- Family planning initiatives
- Female empowerment and gender equality initiatives
- Government policy reforms
- Resource planning initiatives
- Restricting child marriage

Data sources: Friends of the Earth, Pew Research, United Nations, and various.

SOCIAL ECHO CHAMBERS

3RD YEAR ON THE LIST



QUICK TAKE

Arguably one of the most influential trends of the modern age social echo chambers quickly highlight both the dangers and potential that Artificial Intelligence and people skilled in behavioural conditioning have to change the world and shape global opinion. Partly caused by like minded people coming together to share points of view, and exclude those who don't share those views, and partly caused by algorithms which prioritise and display content that reflects the preferences of those individuals, echo chambers create and heighten societal divisions that otherwise wouldn't be as prolific.

IMPACT

The result of many different factors the impact that social echo chambers have on our society can be seen everywhere, and in some cases they are both devastating and deadly.

Pick any of the big topics of the day - climate change, gun control, immigration, race, religion, science, technology, terrorism, and more - and in many cases when you venture online you'll see an almost cult-like polarisation of views with different groups of people living in different worlds consuming and sharing utterly different content.

From influencing the outcome of democratic elections and expanding and reinforcing the views of the far right and QAnon, to spreading misinformation and stoking the fires of racism, there are very few topics that echo chambers don't distort. And while they initially simply reflect people's views, over time the majority of them take advantage of people's angers and fears and exploit them to such an extent that they inspire cult-like devotion which then flows out onto the streets and manifests itself as real world action, protests, and wanton violence.

EXAMPLES

While it's always easiest to blame the social networks themselves for creating social echo chambers research shows that it's often the influencers, the people at the centre of these networks who are connected to everyone, rather than the algorithms that have the greatest impact when it comes to amplifying the differences between people and use them to further their own specific agendas.

Furthermore, research also shows that if the person at the center of the network shows any particular bias it can quickly be amplified by the network.

There is also evidence that polarised, or polar opposite, echo chambers coevolve with one another. In other words as one echo chamber's opinions change or get stronger so too do the opinions of the opposing echo chambers with prime examples being those relating to abortion, gun control, immigration, Obamacare, the pandemic, and partisan politics.

ACT NOW

While there are mix of echo chambers, from the benign and amusing, to the outright dangerous and extreme, solving the issue of echo chambers has many academics and policy makers tied in knots, but as we live more of our lives online and as we consume more online content which shapes our real world opinions getting a handle on this trend is increasingly becoming a priority for multiple groups around the world as it becomes increasingly responsible for fracturing parts of our society.

EXPLORE:

- Algorithmic adjustments
- Future of Artificial Intelligence, Communications, Government, and Society
- Intervention initiatives
- Political and social trends
- Policy and regulation reform

Data sources: Humboldt University, New Scientist, PNAS, Twitter, University of Pennsylvania, and various.

TRUTH DECAY

3RD YEAR ON THE LIST



QUICK TAKE

We live in a world where many of our behaviours and opinions are increasingly shaped by Truth Decay, namely the distribution of disinformation and misinformation that's often created by anonymous and autonomous people and bots. And, while this trend is widely responsible for undermining most people's trust in information and in one another on the one hand **Artificial Intelligence** (AI) algorithms are using the outputs to create **Social Echo Chambers**, and on the other **PsyOps** and other nefarious actors are weaponising it to sow division and create a **Polarised Society**.

Data sources: Various.

IMPACT

When people no longer trust the information they're presented with you can easily argue that the fabric of society itself starts to unravel and that we find ourselves on a slippery slope into oblivion because inevitably not only does this trend undermine the credibility of our ubiquitous and vital information networks, but it also undermines trust in one another, which then creates division where there should be unity.

Today we live in a world where the **Power of the Individual** means that one person can reach out and influence millions, even billions, of people at a speed and scale that was unimaginable just a decade ago. And, while this can be good for **Solopreneurs**, when it comes to this trend it means that just a handful of people or bots or Troll Farms can spread disinformation and misinformation at staggering speed which can result in protests, rioting, violence, and even mass murder. As a consequence not only is this a highly dangerous trend it's also one that's only going to get worse as nefarious actors use increasingly sophisticated tech such as AI, **Digital Humans**, and **Synthetic Content**, to create even more sophisticated campaigns.

EXAMPLES

Sometimes characterised by the umbrella term "Fake News" this trend exists in all kinds of formats - from the small white lies created and shared by individuals that cause small amounts of harm to the professionally crafted and controlled campaigns run by state sponsored actors who are motivated to do extreme harm and sow dissent in their adversaries. Unfortunately, there are plenty of examples of this trend - that is of course if you believe them.

During the pandemic we all saw the social divisions that were created when disinformation about the safety of COVID-19 vaccines, and the motivations of governments, were posted online. Not only did it lead to protests and riots, and worse, but researchers discovered that just 12 individuals were responsible for more than 65% of all of the online anti-vax disinformation.

We've also seen multiple BLM disinformation and misinformation campaigns as well, and then of course during the Russia-Ukraine war we saw PsyOps and **False Flag Attacks** campaigns go into full swing, and we're not even beginning to scratch the surface yet.

ACT NOW

When it comes to this trend the majority of watchers find that many of the most damaging and divisive campaigns are run by arms length state sponsored organisations, Troll Farms, and tight nit "motivated" fringe groups, and that almost all the accounts they use are fake which then leads us to wonder whether or not the pre-requirement to register and prove your identify before you're able to open a new social media account should be made mandatory as it is in China where all new registrations have to be biometrically authenticated.

EXPLORE:

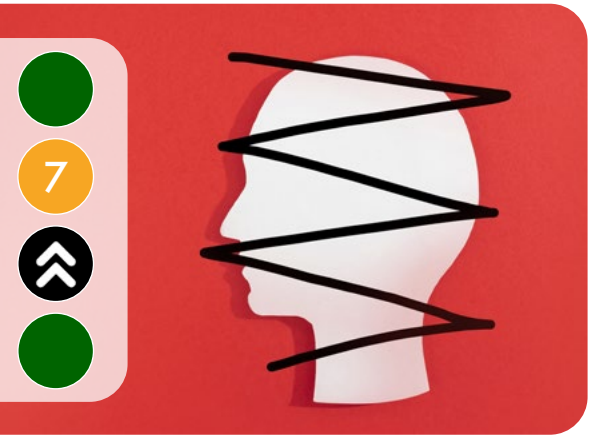
- Digital ID's
- Education reform
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Media and Entertainment, Education, and Government
- Policy and regulation reform

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

WOKE CULTURE

3RD YEAR ON THE LIST



QUICK TAKE

Before circa 2016 the references to woke were simply an endearing term for being socially aware or empathetic and the word was closely aligned to the 1990's trend of political correctness. Fast forwards to today though and the trend has been heavily politicised, especially in the USA and especially by right leaning political parties who have seized hold of it to heap blame on it for everything from deadly mass shootings to lower military recruitment. The result of which means that it is now its own powerful trend, and both a force for highly inclusive politics and societal behaviours, and highly divisive ones.

Data sources: IPSOS, Pew Research, YouGov, and various.

IMPACT

We live in a diverse world and on a diverse planet, and while almost all of us celebrate natural diversity unfortunately that's not always the case when it comes to human diversity so unsurprisingly this trend, which some argue has helped raise awareness of key political and societal issues, has many impacts. As the world embraces **Globalisation** and **Diversity and Inclusion**, with some bumps, we're seeing a growing number of strong pro Woke voices and strong anti Woke voices - some of which are designed to grab headlines and gain financially from the trend, and others that are the result of authentic discorse and sentiments.

Amplified in **Social Echo Chambers** and within government increasingly this trend is being weaponised resulting in the rise of **Cancel Culture**, and an increasingly **Polarised Society** and **Fragile Government** - both of which have serious implications for democracy, freedom of expression and freedom of speech, as well as corporate and government policy making, and their impact on social equity and justice including affirmative action programs, anti-discrimination laws, and social services programs.

EXAMPLES

A prime example of "Culture Wars" there is still significant confusion over the term "Woke," and unsurprisingly the responses vary by age, demographic group, ethnicity, and political affiliation. In the USA and UK 47% and 43% of people respectively are familiar with it, with twice the number of young people - circa 60% - recognising it compared to over 55's. Then, doubling down, in the USA 66% of people of colour are familiar with it compared with 43% of white respondents, and politically 61% of Democrats feel it's a positive term compared with just 8% of Republicans.

So, unsurprisingly, name a topic and it's likely near a Woke storm somewhere - whether it's abortion, gun control, LGBTQ+ rights, climate change and the environment and ESG investing, gender and religious education, and others.

And, try as they might even companies like Disney, whose CEO Bob Chapek in 2022 said they would not take a public stance on the Florida's Parental Rights in Education Act, but whose employees then did, aren't immune from "Woke Wars" after then Gov. DeSantis took offence, put them in his cross hairs, and revoked their Reedy Creek agreement.

ACT NOW

In a world where free speech is a right, but not always a given, it's vitally important that we all keep an open mind. And, while we are all entitled to our own opinions it is also important that we respect other people's beliefs, even if they are contrary to our own, and that those beliefs don't directly or indirectly cause anyone mental or physical harm. Increasingly when it comes to this trend the advice for brands is to be clear with your core mission, purpose, and values, be authentic, and don't adopt a narrative you don't believe in and wouldn't be willing to stand behind.

EXPLORE:

- Audit internal policies, marketing communications, and partnerships
- Active listening programs
- Business and impact assesments
- Corporate alignment, culture, messaging, purpose, and values
- Education and open dialogues
- Future of Government

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... Immersive Reality
... Internet of Things
... Jumping S-Curves
... Metaverse
... Power of the Individual
... Robotics
... Singularity
... Standards Shadow War
... Synthetic Biology
... Technological Colonialism
... Technological Decoupling
... Tokenisation
... Web 3.0

STATS THAT MATTER

SUMMARY UPDATE

TODAY IS a relatively unique time in human history - there are not a few but several sci-fi like technologies emerging and converging, any one of which has the potential to reshape our world in profound ways.

Firstly, quantum computing continues to advance at a rapid clip with breakthroughs enabling the development of increasingly complex quantum algorithms. And, while still nascent practical applications relating to Artificial Intelligence (AI), cryptography, and optimisation problems are now within our grasp bringing both opportunities and threats - namely the promise of new solutions for currently insurmountable problems juxtaposed with the risk of obsoleting many of the contemporary encryption standards that we rely on.

The numer of AI-backed Synthetic Biology breakthroughs has also exploded with AI designing new enzymes, organisms, and proteins that can produce everything from biofuels and climate resilient crops to plastic degrading bacteria and carbon negative CCS materials - all of which carry enormous potential to help us solve many of today's pressing environmental issues.

Furthermore, Blockchain continues to expand beyond cryptocurrency with the Decentralised Finance (DeFi) trend especially providing new opportunities for unbanked individuals to access financial services, as well as for Blockchain-based supply chains offering unprecedented transparency.

Lastly, the Metaverse is now more tangible, fueled by advances in AI, Augmented Reality (AR), and Virtual Reailty (VR), with a multitude of new immersive environments for play, social, and work continuing to emerge. But, as the line between the digital and physical world blurs, new questions around data privacy and ownership of digital assets are rearing their heads.

Overall, all these technologies and many others, such as 3D Printing and 5G, hold tremendous potential but many of them also highlight the ever growing need for strong ethical guidelines and comprehensive regulations.

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STATS THAT MATTER

70%

ENCRYPTION HACKABLE BY QUANTUM COMPUTERS

NIST

8 HRS

TIME TO CRACK 2,048-BIT ENCRYPTION WITH QC

MIT

430 PB

DATA STORED IN 1 GRAM OF 11-BASE DNA STORAGE

ILLINOIS UNI

1.7 PBS

FASTEST FIBER OPTIC DATA TRANSFER SPEED

MACQUARIE UNI

311 Global Advisory Forecasting Innovation Strategy 311institute.com

x 1,000

VOLUME OF GENERAL KNOWLEDGE CONTAINED IN OPENAI GPT-4 COMPARED TO ANY HUMAN MIND, 2023

OPENAI

155

THE VERBAL IQ OF OPENAI CHATGPT, 2023

SCIENTIFIC AMERICAN

1.8 TR

TOTAL OPENAI GPT-4 PARAMETERS, 2023

SEMI-ANALYSIS

TECHNOLOGY

$ 7 TR

EST. GLOBAL COST OF CYBER ATTACKS, 2022

CS VENTURES

x 300 MILLION

SPEED OPENAI GPT-4 LEARNS COMPARED TO THE HUMAN BRAIN, 2023

OPENAI

1 DAY

TIME FOR THREADS TO HIT 100 MILLION USERS

META

5G

3RD YEAR ON THE LIST



QUICK TAKE

5G is the fifth generation mobile communications standard. One of many **General Purpose Technologies** it represents a giant leap in capability from 4G with latencies in the 1ms range, speeds in the 1.5gbps to 10gbps range, and cell densities over100 times greater than what came previously.

The net result of these, and other advances, means 5G enables a host of interesting use cases many of which impact every corner of global business, culture, and society, whether it's in the form of **Continuous Innovation**, **Tele-Operations**, or many others.

Data sources: Grand View, GSMA, PWC, and various.

IMPACT

The impact of 5G goes far beyond its technical specifications and capabilities. While revolutionary in themselves 5G was first thrust into the public limelight when it was used as a political football by especially China and the US who used it as a pawn in the ongoing **Innovation Cold War** and **Standards Shadow War** as the reality of life in a **Bi-Polar and Multi-Polar World** dawns on the world.

Ironically it's 5G's power and capability, as well as it's central and pivotal role in the so called future "Data Economy" that made it a prime pawn in today's modern political theatre in the first place.

All that aside though it's believed that the 5G services market will grow by 46% CAGR to reach $856 Billion by 2028, and that by 2030 it will boost global GDP by $1.34 Trillion. Both of which, as we've seen historically with other mobile standards, are likely low balled.

5G's greatest impact though comes from its ability to disrupt and transform how almost all organisations operate and go to market in all sectors.

EXAMPLES

When it comes to examples of 5G's "disruptive" potential there are many so I will highlight what I consider to be the most interesting, and let it not be lost on you that 5G unites the Digital, Physical, and Virtual worlds.

With **Work from Anywhere** we have gotten increasingly used to being able to work from where we like but 5G takes that a step further by enabling workers to do physical work in remote locations while they are based elsewhere - via Tele-Operations - with examples including surgeons operating on people hundreds of miles away and construction workers building communities on other continents by controlling drone machinery.

Another good example of 5G's impact is Continuous Innovation where live sensor data from products is fed back to **Creative Machines** in real time which then use it to innovate and iterate new, next generation products before sending the designs off to be 3D printed on demand ... And then, of course, there's the ability to perform site inspections in VR, speed through **Digital Twins** and the **Metaverse**, and all manner of other astounding use cases.

ACT NOW

As we have seen previously the introduction and deployment of a new mobile communications standard often affects every corner of global business, culture, and society, and it is no different with 5G. However, as the world becomes more connected and digitised 5G's significant technological gains represent nothing less than a disruptive shift in the global status quo that will have far reaching consequences for everyone and everything it connects.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Creativity and Innovation, and Work
- New business models
- Partner ecosystems and solutions

ACCELERATING RATE OF CHANGE

3RD YEAR ON THE LIST



QUICK TAKE

Thanks our increasingly digital and connected world, and fuelled by **Exponential Technologies**, there has been more change in the last decade than in the previous hundred years. And this rate of change is accelerating.

Today we live in a world where digital products and services can be adopted by billions of people almost instantaneously, and in a world where increasingly powerful technologies can be combined together to create increasingly powerful and disruptive new products and services - and that is both an opportunity and a threat.

Data sources: Various.

IMPACT

When it comes to forecasting any kind of future and creating corresponding business, horizon, or vision strategies the ability to think exponentially rather than linearly is of utmost importance - especially bearing in mind that the rate of change, which is accelerating, is itself accelerating.

If the accelerating rate of change is not taken into account during planning processes then this trend can have serious business consequences as executives both underestimate what will be possible in the future and when those changes will have a quantitative impact their business. Furthermore, it is also important to bear in mind that in an exponential world what you would normally expect to happen in a 10 year time frame, in a linear world, will actually occur in 5 to 7, and what would happen in 5 will actually happen in 3. Or sooner.

This simple but often overlooked trend has led to the downfall of numerous giants and incumbents, but it has also fuelled the rise to dominance of companies that can see the future and "skate to the puck" as they say.

EXAMPLES

When it comes to examples of organisations using this trend for gain, as well as organisations who have felt its sharp end, there are plenty to choose from. Since 1955 90% of the S&P 500 have vanished and it's estimated that within the next decade 40% of today's will also disappear meaning that in just a few decades the average tenure of companies in the S&P 500 will shrink from 33 years to just 12.

While some companies vanish because they are bought or merge, others simply fail. What they all generally have in common though is that they have all failed to adapt to new market conditions. Sometimes company culture is to blame, sometimes it's execution, but increasingly it's because they underestimate the future, its impact, and most crucially its timing.

Companies who failed to adapt to their detriment include giants such as AOL, Blockbuster, Boeing, HP, IBM, Kodak,Motorola, Nokia, Xerox, Yahoo, and others. But there are also plenty of new "giants" who have become experts in surfing the trend including Alibaba, Alphabet, Amazon, Apple, Netflix, Tesla, SpaceX, and many others.

ACT NOW

The rate of change is often overlooked when it comes to business planning but if ignored at best it can clip your revenues and profits as new competitors and realities disrupt your market, and at worst it can bankrupt your company. While the future in all its diversity should be explored thoroughly executives must keep an open mind because what's possible tomorrow will often look radically different to today.

EXPLORE:

- Crazy ideas and developments in alternative industries and other countries
- Emerging technologies and technology roadmaps
- Future of Disruption
- Innovation and Partner ecosystems and solutions
- Transforming company culture

ALGORITHMIC AUDITS

3RD YEAR ON THE LIST



QUICK TAKE

As algorithms take a more dominant role in our society in everything from automating processes and tasks, as well as making decisions, it is clear that the they way they have been trained is causing algorithmic bias. And, needless to say, this is having a variety of negative consequences on individuals and society.

As a result it is becoming increasingly important that these algorithms are audited to evaluate their utility, and certify they are fair and safe.

IMPACT

Today algorithms are ubiquitous. They accelerate the spread of disinformation and misinformation, amplify societal echo chambers, hijack our attention, and encode, heighten, and exaggerate human bias, with all their negative consequences. Therefore ensuring that human and societal values are reflected in these algorithms is increasingly important.

While the benefit and impact of algorithmic audits is currently hard to determine, in part because there are so few organisations offering them and in part because there are so few organisations taking them up because there's no legal requirement and they don't want third parties examining their proprietary algorithms, based on the negative impacts algorithms can have on individuals and society it's no wonder that many experts say they should be as "ubiquitous as seatbelts." And they have a point.

However, the wholesale regulation of automated decision making tools is not far off, and organisations should be ready for When not If.

EXAMPLES

Unsurprisingly the algorithmic auditing industry is a relatively new phenomenon with many organisations in the space talking about the methodologies they use to "examine the Black Box," or "score the algorithms that score us" as part of the **Algorithmic Society** trend. Both of which, when you think about it, are pertinent viewpoints that both highlight the scale of the challenge we have ahead of us as a society.

Current examples of organisations who have undertaken algorithmic audits include AI hiring company HireVue who employed a third party to examine the levels of bias in their models - which many experts then instantly piled on top of calling the study "too narrow and misrepresented." Which then highlights another issue with such auditing practises - organisations using them as a toothless tick box exercise.

ACT NOW

Being able to prove that the algorithms that enable and underpin our digital society are fair and safe is of critical importance, especially as their influence over our personal and professional lives increases. And while many organisations might be reluctant to have their algorithms audited it is becoming increasingly clear that law makers are circling to make it a requirement.

EXPLORE:

- Best practise and case studies
- Emerging technologies and technology roadmaps
- Explainable AI
- Ethics and oversight boards
- Future of Artificial Intelligence
- Universal AI ethics frameworks and regulations

Data sources: Accenture, Brookings, Harvard University, MIT, and various.

ARTIFICIAL INTELLIGENCE

3RD YEAR ON THE LIST



QUICK TAKE

Perhaps the most game changing technology in human history Artificial Intelligence (AI), one of the **General Purpose Technologies**, could help humanity transcend to a new Utopian state - or destroy it. And even though the likelihood is that it's going to be somewhere in between we have to be mindful of the consequences of living in an **Algorithmic Society**.

Technology used to be our prosthetic - automobiles and hammers - but in the future it will increasingly be our boss, co-worker, confidant, and partner. And AI is at the center of it all.

Data sources: Forbes, IDC, PWC, and various.

IMPACT

Today most AI is what we call Artificial Narrow Intelligence (ANI) with models being based on either Machine Learning (ML) or Deep Learning (DL) methodologies, but by 2035 we should see Artificial General Intelligence (AGI) which will have human-level intelligence, and by 2045 Artificial Super Intelligence (ASI), which will bring about global System Level Change. And we are already seeing AI's that are capable of self-design, self-evolution, and self-replication, and Zero Shot Learning AI.

Within three years it's estimated that overall AI venture capital investment will hit $100 Billion, up from $18.5 Billion today, and by 2030 it's estimated that AI, which can automate and augment human jobs, workers, and work, could add an extra $15.7 Trillion to **Global GDP Growth** with just over half of that being recognised by Asian economies.

One of AI's greatest promises though is to improve global productivity, with many experts estimating that on average it will help improve global productivity across sectors by at least 40% - with the final figure likely being much higher - while at the same time impacting over 50% of all human jobs.

EXAMPLES

AI is by far the world's greatest commercial opportunity - and it has already been credited with the invention of several products. But, while people talk up its ability to automate and augment human jobs, workers and work, it's already capable of alot more.

Automation is simply the unintelligent automation of process flows, but AI is already exhibiting autonomous behaviours which are much more impactful and powerful. Think, for example, about the difference between an automated expense system and a self-driving car and you quickly realise the difference. And as for AI examples, there are millions.

There are **Creative Machines** that can ideate and generate new products and **Synthetic Content**, AI based decision systems which are used in business and the military, AI's that run **Autonomous Organisations,** and new forms of AI that learn without data and which can share "knowledge" and experiences via **Hive Mind Systems**. Then, of course, there are the more everyday examples we're all familiar with such as those that power our news feeds, search engines, and all the different services we rely on.

ACT NOW

AI is undoubtedly a game changer, and it is already influencing global human behaviours and decision making. While it's capable of **Accelerating the Rate of Change** it can also be used as an authoritarian tool of control and oppression which means that we, as a society, must guide its development and use carefully and wisely with both eyes wide open - something that, ironically, we aren't doing very well today.

EXPLORE:

- AI Bias, AI Ethics, and Algorithmic Audits
- Best practises
- Emerging technology and technology roadmaps
- Future of Artificial Intelligence, Creativity and Innovation, and Work
- Policy and Regulation reform
- Standards Shadow War
- Synthetic Data

BLOCKCHAIN

3RD YEAR ON THE LIST



QUICK TAKE

Blockchain is a digitally distributed, decentralised, public ledger technology (DLT) that exists across a peer to peer network and that in most cases is immutable - except for a few rare circumstances such as what's known as a 51% Attack. It's most important attributes include helping third parties trust one another without the need for intermediaries and enabling low cost real time settlements. As a result it is a highly disruptive **General Purpose Technology** (GPT) with wide ranging applications across every sector, and as such it is increasingly becoming a key part of the world's digital fabric.

Data sources: Accenture, Deloitte, Gartner, Microsoft, and various.

IMPACT

For most people blockchain is an invisible technology. It's like the electrical wiring in your house - it fulfils a very important function but it's hidden from view. As a GPT blockchain is a disruptive and transformative technology that today handles approximately 3 transactions per second and that in many cases is helping organisations in all sectors and operating areas of the economy disintermediate intermediaries and revolutionise their business and operating models and product offerings.

The impact of this technology is significant and should not be underestimated - from helping all manner of different transaction types become real time and almost zero cost, to giving organisations the ability to disintermediate industry intermediaries like the global SWIFT payment network, and upending the world of finance with the arrival of **Crypto Cities**, **Cryptocurrencies**, and RegTech, there are few limits to what this technology can do. In 2020 estimates suggest that 20% of the **Internet of Things** (IoT) trend was blockchain enabled, and with a growth rate of 69% CAGR it's believed that the global blockchain market will be over $163 Bn by 2027.

EXAMPLES

While there are millions of examples of blockchain in use today, whether it's as the foundational technology supporting cryptocurrencies and **Decentralised Exchanges**, or helping authorities regulate illegal fishing activities, or helping enforce copyright and helping artists sell their **Non-Fungible Tokens** (NFT) artwork, there are no shortage of interesting and impactful examples.

Some of the more notable ones though include the use of blockchain to create **Digital Identities** that would finally give the 2 billion people on the planet who today have no way of proving their identities, and therefore no way of getting loans or proving property ownership, with the means to do so. And then there's it's role in helping improve the efficiency of global supply chains and supply chain transparency.

Elsewhere organisations like Fetch.ai are combining **Artificial Intelligence** (AI) and blockchain to help democratise peoples and notably robots access to AI, and others are using it to build **Decentralised Finance** (DeFi) ecosystems. And that's before we discuss its role in helping build the future **Meta-Economy** and the **Metaverse**.

ACT NOW

Blockchain is a game changing technology that in many respects has single handedly re-written the rules of business across different sectors and business functions. Furthermore, as we continue to see the rise of **Digitisation**, **Tokenisation**, **Web 3.0**, and other trends, its influence on the global economy and society is only going to grow.

EXPLORE:

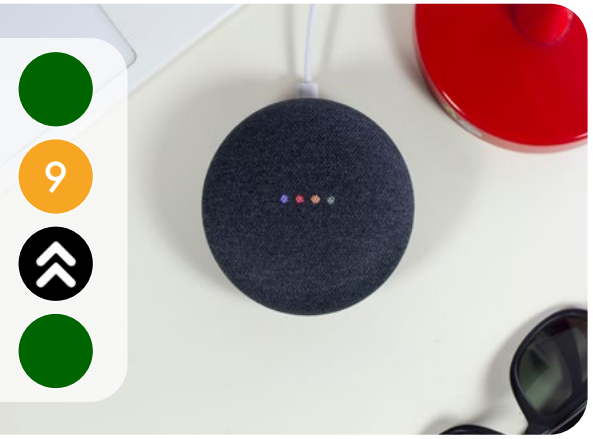
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Technology
- GRC impact
- New business and operating models
- Partner ecosystems and solutions
- Policy and regulation reform

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

BEHAVIOURAL COMPUTING

3RD YEAR ON THE LIST



QUICK TAKE

Fuelled by dramatic advances in **Artificial Intelligence** (AI), communications, computing, **Digitisation**, and several other **General Purpose Technologies** the way we interact with technology is changing beyond all recognition.

No longer limited to just using decades old input devices such as keyboards and mice behavioural computing, which allows us to use a mix of natural language, voice, and other inputs such as gestures and touch, is transforming how we use technology and its role in our personal and professional lives.

Data sources: Various.

IMPACT

Behavioural computing, especially when coupled with **Affective Computing**, represents nothing less than a paradigm shift in computer interfaces and how people everywhere interact and use the devices and technology that are near us, on us, and as the **Singularity** approaches, increasingly within us.

Perhaps the greatest impact of this trend is the fact that it makes technology, and by association all the services it gives us access to, accessible to people irrespective of their technical ability.

Behavioural computing refers to any natural human "behaviours" that we can use to interact with technology including everything from eye movements, gestures, thoughts, touch, and voice, to all manner of other less obvious behaviours including biomarker and biometric cues - especially as those relate to user authentication, identity, and security.

The ultimate impact of this trend is that it makes technology and the services it gives us access to simple to use and interact with, in turn meaning billions more people can unlock the benefits and value technology has to offer.

EXAMPLES

While many of us are used to some of the more common examples of this trend, such as the use of Smart Speakers in our homes that let us access different services and perform different actions using nothing more than our voices, there are some more sci-fi like examples I can walk you through as well.

Examples such as the use of **Neural Interfaces** that even today are letting people with ALS use computers and communicate with loved ones by converting thoughts into text, as well as letting others control drone swarms, exosuits, prosthetics, and even F-35 fighters with nothing more than their thoughts. The latter is also perhaps the most extreme example of just how much this trend lowers the bar when it comes to letting people to control and interact with the world's most sophisticated and complex technologies.

Elsewhere we see users using eye motion, gestures, as well as thoughts to navigate **Immersive Reality** (A/M/VR) environments, and others using natural language to debate with AI's such as IBM Watson. And, as Conversational AI matures this trend will unlock even more opportunity.

ACT NOW

The ability to control and interact with technology using natural behaviours and natural language democratises access to all manner of valuable and potentially life changing services for the people who today don't know how to access them using conventional user interfaces. This is therefore a revolutionary shift and not one to be ignored.

EXPLORE:

- Best practises and case studies
- Accessibility initiatives
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Computing, and Work
- New business and operating models
- Partner ecosystems and solutions
- Policy and regulation reform

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

CREATIVE MACHINES

3RD YEAR ON THE LIST



QUICK TAKE

Many think that human creativity cannot be encoded in machine form. But they are wrong. Outside of those ingenious flashes of inspiration most human creativity is the result of a set of exquisitely interlinked processes and steps. And those can be encoded in algorithmic form.

As a result today we have Creative Machines that are capable of basic product design, innovation, and iteration, and they can do it billions of times faster than humans. And, as they evolve the content and products they create will increasingly shake the world.

Data sources: Various.

IMPACT

In the coming decades the impact Creative Machines will have, on everything from computer chip design and drug development, through to the generation of Synthetic Content and all manner of alternative products, from batteries and robotics to vehicles, will be nothing short of world changing.

By cutting down product development times by upto 99% while also speeding up concept to shelf times and reducing the costs associated with product development by multiples they will be a game changer in every sense of the word that allows organisations to accelerate their R&D efforts by millions to billions fold - with all the benefits that brings.

Today over $1.7Tn is spent on product R&D globally and that has been increasing at an average annualised rate of 12% for the past decade, with the top 1,000 companies alone spending over $782Bn last year.

Creative Machines will have a material impact on all R&D and will also democratise innovation and product development for everyone on the planet once it is provided as a service.

EXAMPLES

Creative machines are able to design, innovate, and iterate an increasingly wide variety of products, and they are also using these same constructs to generate Synthetic Content in all its forms - from audio and imagery, to characters, video, and virtual worlds.

Today Creative Machines are being used by Airbus to design aircraft, Amazon to design fashion lines, GM to design cars, Google to design new AI chipsets, by Insilico to design 30,000 new drugs in 21 days, by NASA to design lunar landers, by Toyota to design new EV batteries in weeks, and Under Armor to design sneakers. And a myriad of other examples.

Meanwhile, in the Synthetic Content space they are being used to generate all manner of content that ranges from books and music, with the latter being signed by Sony and Warner, procedural games, television adverts, videos, and virtual worlds - which are then used to further accelerate product design and innovation in simulation. Furthermore, when combined with other technologies such as 5G, advanced manufacturing, Digital Twins, and IOE, this trend becomes even more impactful.

ACT NOW

The impact of this trend should not be underestimated and while it is still a nascent trend it is accelerating fast and generating results that are already having a disruptive impact on multiple parts of society and industry as a whole. Furthermore, when it is combined with new advanced manufacturing technologies organisations have already demonstrated their ability to design and manufacture goods that would have taken years to develop in days.

EXPLORE:

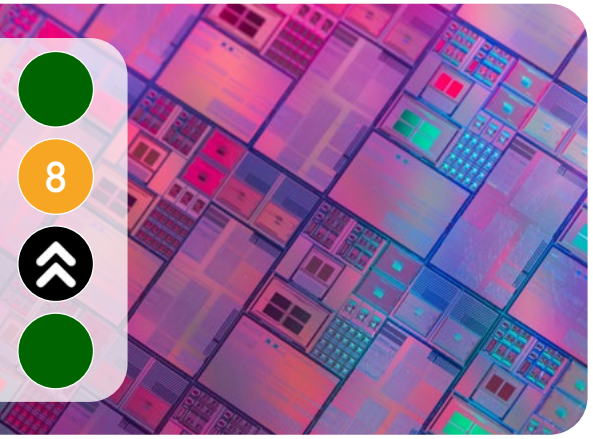
- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Creative Machines, Entrepreneurship, Manufacturing, and Media and Entertainment
- IP and patent reform
- Policy and regulation reform

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

EXPONENTIAL TECHNOLOGIES

3RD YEAR ON THE LIST



QUICK TAKE

Exponential Technologies are a class of technologies whose performance doubles in a set time period. Think computer chips and Moore's Law, where processor power doubled every 18 months for decades, and you have the idea. When we talk about these technologies though there's often more to it than just some simple rule. Firstly, "Performance" can relate to almost anything - bandwidth, camera resolution, computing power, and so on. Secondly the "Cost" of purchasing this new "Performance," which often comes in a smaller form factor, also often falls exponentially over time.

Data sources: 311 Institute, World Futures Forum, and various.

IMPACT

Many of the world's most impactful and powerful **General Purpose Technologies** (GPT) are Exponential Technologies whose overall Cost-Performance improves at an exponential rate - rather than a linear one. And the impact of this is that, from a buyers perspective, we can all buy increasingly powerful technological capabilities for significantly less money than they used to cost.

One famous example that people like to refer to is the fact that today the devices in our pockets have more computing power than the Apollo 11 computers that put man on the Moon in 1969. In real terms each of these computers cost $1.5 Million and had a processing speed of 0.043MHz with 12k of fixed memory and was the size of a suitcase. Today, to put exponential technologies in context, you can buy a 4 GHz Intel i7 processor with 8Mb of Cache that comfortably fits in your hand for $50.

The impact of being able to access more technological "Performance" for less cost, like in my example, has not only transformed human society, but it has also been the main driving force behind record **Global GDP Growth**.

EXAMPLES

Most of the technologies we use today are exponential technologies. From the computer chips, computer storage, and camera sensors in our devices, and the wireless networks they connect to, from the gene sequencing machines doctors use in hospitals to the **Artificial Intelligence** (AI) systems that interpret the results, to the 3D printers that today print everything from cars and rockets, to trainers and transplant organs, and beyond. And here are some common examples for you ...

In 1976 the first Kodak digital camera sensor had a resolution of 0.01 Megapixels, weighed 1.8Kg, and cost $72,000 in real terms - or $7,200,000 per Megapixel. Today, a 48 Megapixel sensor weighs 0.002Kg and costs just $0.041 per Megapixel - a staggering 1,756,097,560x Cost-Performance reduction.

Meanwhile, Intels first IC chip in 1971, the 4004, had 2,300 transistors at a size of 10,000nm each, and a speed of 0.00074 GHz for a real cost of $13 per transistor. By 2018 the 4.80 GHz i9 had 7 Billion 14nm transistors at a cost of $0.00000024 each - a 4,166,666x Cost-Performance reduction.

ACT NOW

We live in an age dominated by exponential technologies with the **Algorithmic Society** being a prime example. Additionally, the **Accelerating Rate of Change** also means the time we have to see and prepare for new technology innovations, that are multiple times more affordable, powerful, and ubiquitous than their predecessors is shrinking. And while this alone presents society with challenges exciting things lie ahead for those who are willing to explore what the future holds.

EXPLORE:

- Emerging technologies and emerging roadmaps
- Future of Disruption and Exponential Technology

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

GENERAL PURPOSE TECHNOLOGIES

3RD YEAR ON THE LIST



QUICK TAKE

General Purpose Technologies (GPTs) can best be described as technologies that are pervasive, with the ability to affect multiple sectors of global business culture, and society, that improve rapidly, and often exponentially, and which spawn innovation.

They include technologies such as **5G**, **Additive Manufacturing**, **Artificial Intelligence** (AI), Augmented and Virtual Reality, **Blockchain**, Gene Editing, **Quantum Technologies**, robotics, semiconductors, as well as electricity, electronics, the internet, steam engines, and many others.

Data sources: 311 Institute, Bloomberg, PWC, and various.

IMPACT

Today, investment in and the development of modern day GPTs that can be combined together to create powerful, next generation products and services are the strategic focus of many governments around the world who see them as a way to disrupt the global status quo and dominate and profit from the future. This is made even more pertinent as we race head long into a **Bi-Polar and Multi-Polar World** and see new **Standards Shadow Wars**.

Needless to say when to comes to highlighting examples of their impact you need look no further than the device in your hands, the cell towers in your town, the search bar in your browser, or the products on your table - their influence is everywhere.

From a commercial perspective though it's estimated that AI alone will add $15.7 Trillion to **Global GDP Growth**, and that Quantum Computing and 5G will add a further $3.7 Trillion and $1.3 Trillion respectively - all of which are likely under estimated. And if just three GPTs can help grow the global economy by more than 20% by 2030 then just imagine what happens when we factor them all in ...

EXAMPLES

The emphasis that countries are putting on controlling and owning future GPTs and their associated standards is best highlighted by China who are investing over $1.4 Trillion up to 2025 as part of their "Made in China 2025" strategy as they look to "Change lanes and overtake" the EU, US, and the rest of the world in their quest to become the world's dominant economy and super power.

Just to put this ambition into perspective the US is investing $325 Billion over the same period under their Research and Innovation Plan, and the EU will invest $177 Billion "to develop emerging and other novel technologies." In short, it doesn't take a maths computer to see who has the greater ambition. And we haven't even factored in industry contributions yet ...

The development and adoption of GPTs has the power to transform the future of entire economies and their citizens, but over the past 200 or so years they have also been the primary drivers behind massive increases in global productivity and GDP - yesterday with the Industrial Revolution, and tomorrow with many other exponential technologies.

ACT NOW

In many respects GPTs are literally the technologies that create and unlock the future - they are the key. And this makes them extremely valuable. It is no surprise therefore that an **Innovation Cold War** is brewing between different world powers, as well as global organisations, who want to control and dominate their future development for their own ends.

EXPLORE:

- Creative Machines
- Emerging technologies and technology roadmaps
- Future of Exponential Technology
- Policy and regulation reform
- Strong global institutions
- Unilateral global accords and coordinated global action

IMMERSIVE REALITY

3RD YEAR ON THE LIST



QUICK TAKE

Immersive Reality (IR) is an umbrella term for a wide collection of technologies, including Augmented (AR), Mixed (MR), and Virtual Reality (VR), as well as Sensory Reality (MXR) and other complimentary technologies such as **Neural Interfaces**, Haptics, and others, that are being used to combine and merge the digital, physical, and virtual worlds into one seamless, increasingly "realistic," consumer experience. While trends such as **Digital Twins** and the **Metaverse** get a lot of the attention overall this trend is already having a seismic impact on global business, culture, and society.

Data sources: Bank of America, Grand View Research, and various.

IMPACT

Over the past five or so decades we have been busy creating multiple digital and virtual worlds and ecosystems that run parallel alongside the real world, but over the past decade as different technologies have improved, matured, converged, and commercialised these worlds themselves are now converging and merging - so much so that it's becoming increasingly possible for us to flit in and out of these different "realities" at will to do and perform all manner of different activities.

In 2020 the overall IM market was worth an estimated $24.7 Bn and by 2026 it's estimated that it will grow by at least 50% CAGR to reach over $37.8 Bn. We can also see the trend becoming much more ubiquitous in our lives and daily professions as **5G** enabled smartphones and other devices packed with powerful compute components gain the ability to stream authentic AR, MR, MXR, and VR experiences from the **Cloud**. Furthermore, as new materials help reduce the form factor of today's bulky VR headsets into little more than some funky **Wearable Technology** and regular sized glasses there's no doubt that the cultural embrace of this trend will also improve and accelerate.

EXAMPLES

There are millions of examples of this trend in action, from AR games like Angry Birds and Pokemon Go, to the use of MXR to create new haptic team sports, and VR in education and training and **Virtual Malls**.

Some of the more notable and odd examples though include the use of VR to help people re-connect with their dead loved ones, the use of VR in drug development and surgery settings, and to help rehabilitate patients, as well as perhaps one of the best examples I've seen, namely the use of VR to help parents empathise and visualise their children's upcoming surgeries and post-op lifestyles.

Meanwhile AR, MR, and MXR, are also being used to bring holographic video calls to life by giving family members who are wearing Smart Glasses the ability to play virtual games with one another including baseball, and hug one another virtually - something you have to see to believe. And then elsewhere we have organisations like Meta working on beaming these virtual worlds straight into our heads using neural interface technologies, Industry 4.0 applications, and many more.

ACT NOW

The ability to unify the digital, physical, and virtual worlds into one seamless and convenient experience that consumers can easily "step into" will have all kinds of ramifications for humankind and our world, from helping build the **Meta-Economy** to helping re-invent every sector and almost every conceivable human experience. As a consequence this is a trend not to ignore and I urge all organisations to experiment with it.

EXPLORE:

- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Education, Financial Services, Healthcare, Media and Entertainment, Manufacturing, Retail, and the Workplace and Workforce
- Partner ecosystems and solutions

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EXPLORE STARTUPS & MORE

INTERNET OF THINGS

3RD YEAR ON THE LIST



An example of a Living Sensor, DARPA

QUICK TAKE

The Internet of Things (IoT) is a slow burn megatrend that will not only change how our world operates but also how we interact with it, especially when it's combined with the **Immersive Reality** trend. Broadly defined as anything - literally anything - that has a sensor in it that communicates data via a network today advances in multiple technology fields no longer mean this trend is confined to transforming dumb objects into smart ones, because as trends such as **Synthetic Biology** and **Nano-Manufacturing** improve we now even have the capability to turn living organisms into IoT devices.

Data sources: Bain, Cisco, Fortune, Gartner, IDC, and various.

IMPACT

The ultimate impact of this trend will be to turn everything in our world into a smart device or node that can intelligently capture, analyse, and communicate data which can then be used for a multitude of purposes. As a result this trends market opportunity is almost unlimited, which is why the valuations of this market vary wildly. On average though analysts peg its value at $450 Bn today and estimate that in 2028 it will be worth just under $2 Tr, both of which are likely under estimates.

By 2025 it's estimated that there will be over 75 Bn IoT devices connected, also likely a massive under estimate, and that the amount of data collected by them all will top 73 Zettabytes. However, as we see the increased adoption of **Edge Computing** it's also likely that most of this data will be analysed at the edges of the network rather than having to be communicated back to **Cloud Computing** datacenters for processing.

With general ROI being 3 years on IoT related investments and 61% of organisations believing they have a high level of IoT maturity it's clear this trend is moving, but it will still take decades for us to realise its full potential.

EXAMPLES

While there are millions of examples, from using this trend to help utilities and transportation organisations predict and identify equipment and infrastructure problems in real time, to the development of **Smart Cities** and **Smart Homes**, and **Wearable Technology** devices that help analyse, monitor, and improve human well-being, some of the more notable examples of this trend include **Continuous Innovation**, a trend that when combined with **Synthetic Innovation**, will completely transform how products are designed and innovated, with another example being **Autonomous Vehicles** which will use it to generate their own **Spatial Intelligence**.

However, from Smart Supply Chains with **Product Traceability** built into every asset and product that in time can be fully automated using logistical **Control Towers**, to the **3D Bio-Printing** of human hybrid organs that are embedded with sensors that, in the case of 3D printed human hearts could predict the onset of a heart attack and shock the heart back into the right rhythm using printed batteries and energy films, this trend has no shortage of amazing and useful applications.

ACT NOW

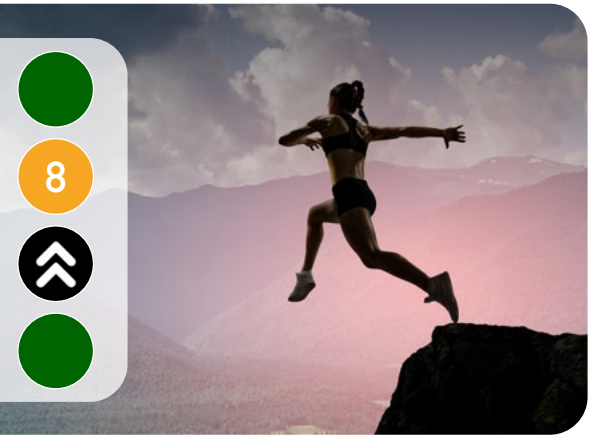
This trend is completely transformative and it lets us capture and analyse all manner of actionable data on everything in our world - with all the benefits and consequences that brings. While this is a revolutionary trend which dovetails into many other trends such as **Digitisation** and **Digital Twins**, among others, and has many benefits, organisations must also be aware of its potential downsides, such as its broad threat surface which could leave organisations vulnerable to cyber attacks.

EXPLORE:

- Best practices and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Healthcare, Manufacturing, Sensors, Technology, and the Workforce
- Partner ecosystems and solutions

JUMPING S-CURVES

3RD YEAR ON THE LIST



QUICK TAKE

Inevitably squeezing new performance gains from even the most advanced technologies eventually becomes far too costly and difficult to do, and when that happens researchers jump to a new technology. This is called Jumping S-Curves. The word S-Curve comes from the fact that when a new technology emerges it often develops at a slow rate - from a Cost-Performance perspective at least - then the rate of development accelerates, and then eventually the improvements slow down and flatten off. The examples of this are everywhere, from 4G to **5G** to 6G, and from silicon to quantum computers and beyond.

Data sources: 311Institute, ARK Investment, and various.

IMPACT

Ultimately the impact of being able to jump S-Curves, and move from one **Exponential Technology**, which has run out of steam so to speak to a new technology that has the potential for even greater performance and gains, is that our entire society moves forwards and that in time science fiction becomes science fact.

It also means that ultimately over time almost all of our technologies become increasingly capable and powerful, which then means that their disruptive potential increases. Furthermore, this potential is then magnified even more as **Technology Convergence** takes place, which then leads to the almost complete re-invention of global business, culture, and society.

While it is difficult to give precise details about the impact of this trend, because it's so complete and so wide spread, one of the most notable impacts is its impact on the economy and Global GDP Growth. One the one experts estimate that many of these exponential technologies will destroy over $41 Tr in economic (GDP) value, and on the other they estimate that they will then create over $200 Tr of new economic value.

EXAMPLES

While there are many examples of jumping S-Curves some are more obvious than others such as the "jump" we made from 1G to 2G to 3G to 4G and now 5G mobile communications, with 6G already in the wings. These are all prime examples of jumping the S-Curve as we move from one technology that's increasingly difficult to improve on and then jumping to the next.

Elsewhere we have the likes of WiFi 6 and the jump to WiFi 7, 3D Printing and the jump to 4D Printing and even to weird technologies like Xolographic 3D Printing that let us print working Nano-Machines straight out of the gate.

In the computing space we're moving from Silicon based computing to Quantum and Neuromorphic computing, which then in turn will themselves give way in time to Biological, Chemical, DNA, Photonic, and possibly even Liquid and Wave computers, and in the sensor space we're starting to make the jump from MEMS sensors to Quantum and DNA sensors that are millions of times more sensitive.

And the list goes on ...

ACT NOW

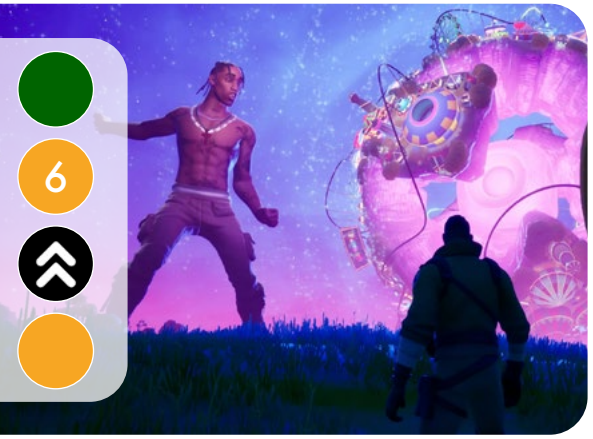
When one technology runs out of road, or runs out of steam - whichever analogy you prefer - human ingenuity almost always finds a way to move beyond it and as one famous ICT company used to say "Invent the next." As such if you, like I, like predicting the future then this is a trend you have to get to grips with and understand, do that and suddenly predicting the future and deep future becomes "less difficult."

EXPLORE:

- Benefits and impact assessments
- Emerging technologies and technology roadmaps
- Future of Technology
- Partner ecosystems and solutions

METAVERSE

3RD YEAR ON THE LIST



Travis Scott, Fortnite

QUICK TAKE

The Metaverse is as an infinite collection of traditional **Immersive Reality** (A/M/VR) experiences and sensory immersive (MXR) experiences and virtual worlds which can be accessed via gadgets and the web - even though ironically the Metaverse's ultimate vision is to replace the web as part of the **Web 3.0** trend. As a result many of the organisations racing to dominate and monetise it are already building walled gardens which, unless there's a common set of standards, won't let users move their avatars or digital assets between different worlds - even though **Blockchain** makes that possible today.

Data sources: Emergen, PWC, and various.

IMPACT

Arguably the equivalent of being plugged into a 21st century Matrix the Metaverse is perhaps one of the most exciting trends of them all because of the commercial, personal, and professional opportunities it creates, such as the ability to be anyone or anything doing anything anywhere where the only limit is your imagination or the imagination of those around you. And the only thing that's holding everyone back from literally jumping into it is culture and the maturity and usability of the technology underpinning it - all of which are obviously massive challenges.

Estimated to grow at a rate of 43% CAGR it's expected that by 2028 the Metaverse will be worth $829 Billion, especially as new smaller and less obtrusive AR and VR glasses and gadgets emerge, especially as we see the expansion of the ecosystem, and a significant increase in both the resolution and richness of the content. It's also likely that many of the organisations who eventually dominate this space will hail from the entertainment, gaming, and technology sectors, but that shouldn't dissuade others from being bold.

EXAMPLES

As the Metaverse takes shape organisations are already reaping lucrative commercial rewards with the best known being Epic, under the auspices of Fortnite, and Meta. In Epic's case they have been experimenting with virtual gigs within a Metaverse construct for a while with their most popular gigs drawing over 12 million people. Then, in Meta's case, not only have they been building a vertical stack spanning hardware and software for years now but in 2021 Mark Zuckerberg pivoted his entire empire, including Facebook and Oculus, to focus on it and the **Meta-Economy**.

Elsewhere **Exergaming** and **Virtual Malls** are on the rise, and Microsoft, Sony, Warner, and others are pivoting their businesses, including investments, to capitalise on it whether it's for communication, collaboration, entertainment, or other purposes. Meanwhile others are developing Blockchain platforms that let people move avatars and digital assets between platforms, and even LVHM have developed new **Non-Fungible Tokens** (NFT) monetisation models to let people buy, sell, and trade luxury **PhyDigital Products** such as handbags.

ACT NOW

To older generations the concept of the Metaverse will be almost completely alien and foreign, but for today's younger generations it will increasingly become their go to "world" which means that at the very least it's important that you experience this trend first hand and develop a point of view.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Digital asset and product development, including Digital Twins
- Future of Communications, Creativity and Innovation, Entertainment, Finance, Retail, Technology, and Work
- New business and operating models
- Partner ecosystems and solutions
- Policy and regulation reform

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EXPLORE STARTUPS & MORE

POWER OF THE INDIVIDUAL

3RD YEAR ON THE LIST



QUICK TAKE

We live in an exponential society where one persons ideas and products, which can increasingly be created and marketed by **Creative Machines**, can be discovered and consumed by the billions of digitally connected people on the planet at unimaginable speed and scale. The upshot of this is that, literally, one person or entrepreneur can change the world and shape the future faster than ever - for better and worse. Not only does this mean individuals have more power than ancient rulers but it also means we all have an obligation to ensure this power is used to benefit all of society.

Data sources: Guardian, MDPI, Visual Capitalist, and various.

IMPACT

With easier, faster, and simpler access to finance, ideas, markets, and resources, today it costs less to start, operate, and scale a global business, or reach a global audience, than ever before. It also costs almost nothing to communicate and sell an idea, opinion, or product, and collaborate with others - the combination of which means that influencing society, creating or shaping the future, and making an impact has never been so affordable or easy. Which then puts global and societal level change within everyone's reach for the first time in human history.

While this is obviously highly beneficial though without the right oversight, policies, and regulations, in place the businesses and individuals who capitalise on this trend, such as Mark Zuckerberg whose platforms now connects and algorithmically influence over 3 Billion people, or to put it another way almost everyone on the planet with a decent internet connection, this trend is open to being abused - as was neatly illustrated back in 2014 when Facebook adjusted the platforms algorithms to conduct an illicit and highly unethical "Mood-Manipulation" experiment ...

EXAMPLES

Examples of the ability of individuals and **Solopreneurs** to change and shape the future at a speed and scale that would have been unimaginable just two decades ago, are everywhere.

From climate change activists like Greta Thunberg who used social media to galvanise over 1.5 Million students into direct action across 125 countries, and triggered over 483,000 mentions in 2019 - up from just 4,000 in 2018 - to celerities including Cristiano Ronaldo and Justin Bieber with 517 Million and 455 Million followers respectively who, in their own way, also have the ability to influence popular culture.

However, this trend, which leverages connectivity, "digital," and technology as force multipliers, is also highly advantageous for entrepreneurs who, like their celebrity counterparts, can use it to build, operate, and scale huge businesses easier and faster than ever before with prime examples being Fortnite, Minecraft, Roblox, as well as industry behemoths such as Alibaba, Amazon, Apple, ByteDance, Google, Netflix, and Tencent, as well as newer "Unicorns" such as Airbnb, Deliveroo, GitHub, Uber, and thousands more.

ACT NOW

As we look into the future the power of entrepreneurs and individuals, to change and shape future business, culture, and society, will only increase. Then in time this trend will be augmented by new automated and autonomous technologies which will accelerate it exponentially as machines take on more of the heavy lifting. As a consequence we face both an exciting and perilous time, and it will be crucial that individuals act ethically and with a higher purpose in a way that benefits people and planet alike.

EXPLORE:

- Accelerator programs
- Emerging technologies and technology roadmaps
- Future of Communications, Creativity and Innovation, Education, Entrepreneurship, Financial Services, Manufacturing, Society, Work and the Workplace
- Policy and regulation reform
- Social trends

ROBOTICS

3RD YEAR ON THE LIST



QUICK TAKE

When I say the word Robotics it's likely that two things pop into your head - hardware based robots like those you find on the factory floor and in your home, and or **Robotic Process Automation** (RPA). But there's a lot more to robotics than just those two categories.

Today we have these kinds of robots, but we also have software robots, often known as just "Bots" for short, as well as Co-Bots, inflatable robots, soft robots, and even Crystal, DNA, Molecular, and Nano Robots. Although, again, the latter are often just called Nanobots.

Data sources: Boston Dynamics, and various.

IMPACT

While we have already seen the arrival of robots of that are capable of designing themselves, evolving themselves, using **Creative Machine** technologies, and then printing themselves off using **Additive Manufacturing** technologies many people still think most robots are basic. But that's increasingly not the case.

In the financial services sector trading bots are now so ubiquitous and sophisticated that traders believe if they go rogue they could collapse the global financial markets in mere seconds - something we saw happen in 2018 when Bloomberg misreported Facebook's results and bots sent the stock down by over $32 Bn within milliseconds. Furthermore, whether they're running **Dark Factories** and **Dark Warehouses**, driving **Job Automation** or running **Autonomous Organisations**, or simply being used to automate low level tasks, as we see technologies such as **Artificial Intelligence** (AI), **Blockchain**, and **Machine Vision**, improve we'll also see an exponential improvement in the development of Generalised Robots, as well as ones that learn autonomously, and that share **Hive Mind Systems**.

EXAMPLES

Robots are more ubiquitous than you might think. While the Roomba robot moves around vacuuming your home other software based robots are busy at work in the digital ether automating tasks that include everything from share dealing and **Synthetic Content** to expense approvals and much more. Some of the most interesting examples of robots in action though include ATLAS the world's most sophisticated humanoid robot that can dance and do parkour alongside it's Spot the robot dog colleagues, as well as robots that can evolve their own code in the same way animals do with DNA.

We then have DNA and Molecular robots that have been used to create molecule sized production lines and create molecular products - the first Molecular Assemblers in action. Elsewhere MIT have used **Neural Interfaces** to train robots new skills telepathically, and Google has linked multiple robots up to AI and **Cloud Computing** to develop Generalised Robots that learn by themselves and that can share their new experiences and skills instantly with "the collective" via hive minds. And these are just a few of the amazing examples I could mention.

ACT NOW

When people think about robotics they are often very narrow focused, but today robots of all kinds are helping accelerate both manual and **Cognitive Automation** faster than ever before across all sectors and job and task categories. They are also becoming increasingly generalised and utilitarian which means it's only a matter of time before we all see much more of them, whether it's in the home, at work, or behind the scenes.

EXPLORE:

- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Financial Services, Robotics, and Work
- Partner ecosystems and solutions

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SINGULARITY

3RD YEAR ON THE LIST



QUICK TAKE

Over the decades technology that was distant from us has been gradually getting closer to us and today it's near us, on us, and in some cases, in us.

However, as **Exponential Technologies** advance we can see a time when technology isn't only in near, on, and in us, but a time when we are technology - literally. And, as odd as that sounds today using **Synthetic Biology** we have already turned living human cells into powerful Biological and DNA **Computing Platforms**, and that's just the start of how this trend will transform the human condition forever.

IMPACT

The ultimate impact of the Singularity will be to create the "next" version of Homo Sapiens sometimes referred to as Human 2.0. More than just Cyborgs augmented with technology human beings will become the technology. We will be connected with and fused with **Artificial Intelligence** (AI) and compute, be able to connect with one another and machines via **Hive Mind Systems** and Telepathy, and perhaps most intriguingly could be both immortal and freakishly powerful - both in the literal sense.

What toll all this will have on global culture or society, as well as the human psyche and sense of self, noone knows although we can assume that this "ascension" as some people are already calling it would create a super and a sub species of humans comprised of those who embrace the Singularity and those who don't. And, needless to say history has demonstrated time and time again that the cognitively superior species has almost always wiped out the less superior ones. Which then leads us into debates about Dystopia and Utopia - both of which are equally possible with this trend.

EXAMPLES

While there are many definitions of the Singularity it's estimated it will become reality in the mid 2040's which would also coincide with the development of Artificial Super Intelligence (ASI).

However, while it might be possible to become Human 2.0 in this time frame it will likely be many more decades before we see this trend adopted en masse because, as we've seen time and time again, even though we already have sci-fi like technologies emerging today culture, ethics, law, liability, and regulations almost always slow down their ultimate adoption.

As I often say though the future is being written today and we have already used **Synthetic Biology** to turn living human cells into powerful biological supercomputers that are able to autonomously identify pathogens in the body and create Living Pharmacies that produce the drugs to defeat them. Additionally, we've also already seen human Brain-to-Brain (B2B) telepathy demonstrated numerous times, Cancer beating Nanobots, and the use of **Neural Interfaces** to help people communicate so, as you can see, we are already laying the foundations.

ACT NOW

While we have a long time until this trend becomes a viable reality is underscores just how significantly all our lives could change within just a couple of generations. This trend should also serve as a warning that we need to be ever vigilant and prepared for what happens when sci-fi becomes our every day.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Computing, Ethics, Healthcare, Manufacturing, and Robotics
- Policy and regulation reform

Data sources: Harvard University, John Hopkins University, MIT, UCL, and various.

STANDARDS SHADOW WAR

3RD YEAR ON THE LIST



QUICK TAKE

Think of a nation that rose to global dominance because of its ability to develop new technologies and technology standards and it's likely only one comes to mind: America. From **Artificial Intelligence** (AI), mobile phones, and semiconductors, to the internet and the standards that underpin it, the US has been a technology and standards leader for decades. And they've benefited and profited from it handsomely. Now though China, the EU, and others want that crown, and there's a "Shadow War" to develop and dominate future global technology standards.

Data sources: Internet Association, PWC, SEC, and various.

IMPACT

While many people might not attribute too great a value with being the country behind the development of technology and technology standards the fact of the matter is that today the US internet sector alone - as it's own specific sector - now accounts for more than $2.1 Trillion of America's GDP, or about 10%, which makes it the fourth largest sector of the US economy behind the government, manufacturing, and real estate.

Furthermore, between 2012 and 2018 the internet sector grew nine times faster than any other part of the US economy, and I'm not even going to touch on the benefits it's bought every other sector.

Meanwhile, semiconductors may "only" account for 0.3% of US GDP but they play a mission critical role in supporting a further 12% - which is why we saw key sectors of the global and US economy, such as the automotive sector, come under pressure when the global pandemic cut supply. And as for AI, well, estimates say it could benefit the US economy by over $3.7 Trillion and the global economy by over $16 Trillion - all of which makes winning the Shadow War table stakes when it comes to owning the future ...

EXAMPLES

Spurred in part by the 2019 China-US **Trade Wars** China's efforts to control and shape the future of global technology standards is well documented and they talk openly about the "golden opportunity for the country to realise the goal of overtaking [other countries] by changing lanes." Which is quite apt when you think about it - and worrying when you think about the control and surveillance implications.

To back this up in 2018 they released a strategy document entitled "China Standards 2035" which laid out their action plan to play a leading role in the development and formulation of future technology standards for technologies as diverse as **5G**, 6G, AI, Big Data, **Cloud Computing**, energy, the **Internet of Things** (IoT), payments, **Quantum Technology**, and many others. And, since then, they have translated more than 500 of their domestic standards into English and incorporated standards clauses into many of their MOU agreements with countries as part of a so called "Digital Silk Road" strategy that, arguably, uses **Soft Power Plays** to persuade countries to adopt their standards over others.

ACT NOW

While there is a Shadow War over the future of technology standards countries are also inflating their presence on international standards boards such as the IEC and ISO as they juxtaposition with one another, which then only fans the flames of the **Innovation Cold War**. As a consequence governments and organisations need to be vigilant, maintain investment in R&D, and double their efforts to ensure that standards don't become bifurcated or compromised.

EXPLORE:

- Creative Machines
- Emerging technology and technology roadmaps
- Future of Exponential Technology
- Strong global institutions
- Unilateral global accords and coordinated global action

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SYNTHETIC BIOLOGY

3RD YEAR ON THE LIST



QUICK TAKE

Just take a look around you and you can see what being able to code software has done for the world. Then, take another look and you can see what mother nature has managed to achieve using just 4 base pair DNA.

Now imagine the power we hold in our hands, and the potential good and bad we could unleash, if we could program and re-write the code of life in the same way we do with software today. Then imagine what we could do with DNA that has 6, 8, 11, or even more base pairs, and I guarantee you haven't even started to scratch the surface yet.

Data sources: BCC Research, CB Insights, and various.

IMPACT

Possibly the most impactful and powerful trend of them all - even surpassing the potential of almost every other **General Purpose Technology** (GPT) - Synthetic Biology has the potential to change everything about our world, from how we construct buildings, develop computers, food, materials, robots, and other technologies, manufacture products, all the way through to how we power and sense our world, treat disease, and via the **Singularity** even how humankind evolves. As such, even though it is an early stage trend, it is not to be underestimated.

Today the synthetic biology industry is worth an estimated $9.5 Bn and is expected to grow at a rate of 28% CAGR to reach $33.2 Bn by 2026, and as **Artificial Intelligence** (AI) and **Genetic Engineering** technologies such as CAST, CRISPR, and others improve it's certain that activity and investment in this trend will accelerate. However, while it's a slow burn megatrend with arguably no upper limit its overall progress both within and outside of the traditional biological life sciences sector will likely be slowed by enhanced regulator scrutiny as all of us head into the literal unknown.

EXAMPLES

Today there are many examples that sound like science fiction, in fact, some make science fiction sound tame, such as using synthetic biology to turn human liver cells into dual core computers which, in turn, opens the door to turning humans into "Living Pharmacies" - AKA disease fighting biological supercomputers ...

Then there's the creation of **Designer Humans**, children who have been genetically modified in vitro so they don't inherit their parents inherited genetic conditions such as Hunters Syndrome and Thalassemia, both fatal disorders, using a technique that could cure over 6,000 genetically inherited conditions that today are widely regarded as being incurable.

We've also seen the development of genetically modified organisms, such as corals that don't bleach, and bacteria that quadruple the energy density of biofuels and the efficiency of solar panels. Then there's the use of 8 base pair synthetic DNA to create new forms of synthetic life, programmable living robots, biological and DNA computers, and DNA storage systems that can store over 500 Pb of data in a gram of DNA.

ACT NOW

When it comes to this trend the sky is the literal limit, especially as AI and **Synthetic Innovation** platforms that can design and then, using the trends of **Additive Manufacturing** and **Bio-Manufacturing**, 3D Bio-print their own synthetic biology creations at digital speed start to ramp up - something that sounds less like science fiction when you realise that AI has already managed to design its own synthetic human genome which could be used to create the world's first synthetic humans ... As a result this is very much a trend to watch.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Ethics and oversight boards
- Future of Healthcare, Manufacturing, and Synthetic Biology
- Policy and regulation reform

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TECHNOLOGY COLONIALISM

3RD YEAR ON THE LIST



QUICK TAKE

We are all familiar with the idea of Imperial Colonialism where different countries invaded and ran other countries and regions, and by doing so also exported their behaviours, culture, languages, and traditions. Fast forwards to today and countries are being accused of doing the same thing but by using technology and technology services as the "invading force." While this takes many forms many see the provision and use of **Artificial Intelligence** (AI) services as an example of how foreign, and especially US, cultures, ideologies, and traditions are being imported by the back door.

Data sources: Various.

IMPACT

In much the same way you experience and suck in some Americana atmosphere and culture when you visit a McDonalds or a Nike store on the high street today you experience some of that same Americana culture when you tap into or use American AI services, such as those from OpenAI, whose AI models have been trained on American-centric data. While this might be fine if you're an American if you live in ASEAN or the EU or LATAM this can feel like America coming through the back door to influence your behaviours, ideologies, opinions, political leanings, and outlook on life. And some countries find that unpalatable, especially those who consider the US as more of a foe than a friend. The same is true though of any countries "technology exports," but increasingly this trend is being politicised and called out.

Impacts, whether they're seen or not, include cultural erosion, data exploitation, ethical concerns and concerns over **Soft Power Plays**, intellectual property and security concerns, the loss of sovereignty and the monopolisation of markets, as well concerns over technology's ability to exacerbate the **Polarised Society**.

EXAMPLES

When you think of the cultural impact of technology there are many broad and extraordinary examples.

In the US there is the fear that the Chinese Bytedance owned TikTok social media platform is secretly being used to manipulate the ideologies and opinions of American teenagers to the benefit of the Chinese Communist Party (CCP), and then in the Middle East there is a worry that citizens using American AI models will forget their own countries heritage and traditions. Meanwhile in India there was concern over Facebook's Free Basics offer which created a dependency on their services and violated Net Neutrality principles.

Further afield in Kenya there were concerns that Google's Project Loon connectivity project was a way to monitor and spy on citizens, while in Brazil authorities have been concerned about satellite images being taken of the Amazon Rainforest without their consent and with no remuneration. And even the mining industry isn't immune from this trend as governments, such as the DRC, accuses countries using their Rare Earth Metals of degrading and exploitative practises.

ACT NOW

While most people might not dwell too much on this trend many governments are, and that means that whether you like it or not it's a trend that you need to be aware of because in a world increasingly dominated by **Geopolitcal Fragmentation** regulations can change in an instant. Furthermore, it's a reminder of the biases that are inherent in some of the systems and services that we use, whether those are intentionally programmed in or not so my recommendation is to remain vigilant.

EXPLORE:

- Best practises and case studies
- Emerging technology and technology roadmaps
- Foreign Direct Investment flows and M&A activity
- New business and operating models
- Partner ecosystems and solutions
- Product localisation strategies

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TECHNOLOGICAL DECOUPLING

3RD YEAR ON THE LIST



QUICK TAKE

Thanks to increasing **Geopolitical Fragmentation**, primarily as we head into a **Bi-Polar and Multi-Polar World**, we are already familiar with the concept of **Strategic Decoupling** where companies and countries start decoupling from one another predominantly from a supply chain perspective. As divisions deepen though this decoupling is happening at many levels including **Economic Decoupling**, and also at the technological level which is not only its own stand alone trend but is also itself being accelerated by **Technological Colonialism** and the **Shadow Standards War**.

Data sources: Bain, BCG, Stanford CEI, and various.

IMPACT

As global decoupling continues to happen at so many different levels this trend is perhaps the most difficult to resolve because while supply chains can move and money and money flows can be exchanged and re-routed it's much harder to technologically separate countries from one another, especially in our inter-connected digital world where there are so many middle men and providers that make the ultimate owner of an individual technology stack or service opaque and very difficult to ascertain. Driven by suspicion that adversaries will use technology to gather information and intelligence and access sensitive systems, this trend is also being used by some countries as a weapon to hobble the economic, political, and technological advancement and expansion of rivals such as is the case with China, the EU, and the US.

Economic impacts include increasing the cost of doing business and market fragmentation, as well as impacts on consumers, **Global R&D Spending** and technology standards, National Security, talent, **Technology Sovereignty**, and the duplication of effort among many others.

EXAMPLES

While still a relatively new trend we've already seen a number of political fallouts with the most notable being the demand by the US government for G42, the UAE's premier **Artificial Intelligence** (AI) company, being told that if it wants to continue to serve the US civilian and military markets then it can only do so from a pure play US technology stack that doesn't include any Chinese technology or components.

That asides though this trend is much more than just about decoupling from foreign adversary AI services, **Cloud Computing**, or hardware and software providers. Increasingly, the scope includes every technology and every connected smart device, which in the US's case also includes the exclusion of Chinese smart cranes at their major ports as well as the exclusion of Chinese UHVC and renewable energy technologies from their energy grids, with restrictions on autonomous vehicles also expected to materialise. Meanwhile, in China the CCP have banned Apple and Microsoft products from government departments, and South Korea is spending over $450 Bn to reduce its reliance on foreign semiconductors.

ACT NOW

Today organisations are increasingly familiar with the need to comply with different countries Data Sovereignty and **Technological Sovereignty** regulations - which are onerous enough but are normally constrained to the data and application layers of their IT and OT technology stacks. Going forwards though organisations, including **Cloud Computing** providers, could be increasingly required by law or by regulation to prove that the technology stacks that they serve their customers from don't contain or rely on hardware, software, or other technologies that are directly or could be indirectly linked to hostile foreign countries or governments. And that is going to be a very tough ask.

EXPLORE:

- Business and impact assessments
- Emerging technology and technology roadmaps
- Geopolitical allegiances and risks
- Technology segregation and separation strategies

TOKENISATION

3RD YEAR ON THE LIST



QUICK TAKE

Tokenisation is the process of exchanging sensitive data, that can be of any nature, for non-sensitive data called Tokens that by themselves have no extrinsic or exploitable meaning or value. The process of tokenisation itself creates a bridge between digital and real-world assets and their storage, trading, and transfer in the digital world.

Ultimately the upshot of this is that this trend has the potential to unlock access to a huge range of different assets and services and thereby create a variety of disruptive, global scale opportunities.

Data sources: HSBC, Nesta, OECD, Visa, WEF, and various.

IMPACT

While this trend has many implications such as being a key enabler of trends such as **Fractional Ownership** and **Non-Fungible Tokens** (NFTs), as well as letting individuals and organisations take stakes in previously illiquid assets such as art or realty, it'll be significantly accelerated by the arrival of **Web 3.0**.

Today though one of its biggest impacts is on the financial services markets where asset tokenisation has become one of the most prominent use cases of Distributed Ledger Technologies (DLT) technologies such as **Blockchain** and the accelerating **Decentralised Finance** (DeFi) movement. In turn not only this causing wide spread industry disintermediation, but it's also having an effect on trading and affecting the liquidity and volatility of all manner of related markets - especially in times of stress.

By 2027 it's estimated that up to 10% of global GDP will be stored and transacted via DLT and that tokenised markets could therefore be worth of upwards of $24 Tr, and that's before we look at all of the other non monetary stores of value it could attack and some of the other use cases.

EXAMPLES

The main kinds of tokens include Asset or Commodity Tokens that are backed by standard assets that already have a value such as gold, oil, or sovereign currencies, Equity or Security Tokens that equate to ownership of something, and Reward, Social, or Utility Tokens that only have a value in the system they're used in. However, while these are the main types there are plenty of others being spawned all the time.

Some of the more notable examples of this trend include the tokenisation of electricity consumption, fund raising, shares, and voting, as well as the Reserve Bank of India's decision to force **E-Commerce** and online platforms to delete and replace all credit and debit card information on their platforms with surrogate tokens to secure the card details of customers. Elsewhere organisations such as Storj use it to create decentralised cloud storage systems, run ICO's, build **Decentralised Autonomous Organisations** (DAO), and even build **Temporary Organisations** that eventually dissolve themselves and leave behind unowned self-governing, decentralised systems or protocols like Bitcoin itself.

ACT NOW

Tokenisation is the metaphorical glue that both accelerates and enables many of the other digial trends I discuss in this codex, and there are many that believe in the end the so called token economy, which will ultimately include any transferable asset of any kind, will rival the real world economy in size and exceed it in scale.

EXPLORE:

- Best practices and case studies
- Benefits and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Financial Services, Security, and Work
- Policy and regulation reform

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WEB 3.0

3RD YEAR ON THE LIST



QUICK TAKE

Web 1.0 as it was known was a basic decentralised read only system. Then came Web 2.0, the internet we know today - a centralised, participatory system that allows users to collaborate and create content.

What comes next, unsurprisingly, is Web 3.0, a truly decentralised internet with no intermediaries that's characterised by technologies and trends including **Artificial Intelligence** (AI), **Blockchain**, **Cloud**, Distributed Apps (dApps), **Immersive Reality** and the **Metaverse**, **Non-Fungible Tokens** (NFTs), and ubiquitous connectivity.

IMPACT

Web 3.0 is a slow burn megatrend simply because of the scale of the task in hand and the amount of work needed to "evolve" the current web. However, despite this the momentum is gathering with more than 65% of all Web 3.0 developers joining in 2021 to help build and manage more than 500,000 Web 3.0 code repositories and more than 160 Million commits. Furthermore, when we look deeper into the statistics we see that 20% of new developers also joined the Ethereum ecosystem, which is a telling statistic in itself, and that over 2,500 developers are now working on **Decentralised Finance** (DeFi) projects - with that ecosystem growing at 76%.

Dubbed by many as the "Billion dollar Web 3.0 Industry" today these armies of developers are busy developing the ideals and the foundations of Web 3.0, including everything from "Cryptoeconomic" and **Meta-Economy** platforms to **Decentralised Autonomous Organisations** (DAO), and beyond, and while estimates about the future market size vary wildly countries such as India estimate that in the next decade Web 3.0 could add at least $1.1 Tr to their GDP, with other countries also likely to similarly benefit.

EXAMPLES

With the likes of Sir Tim Berners-Lee, the inventor of Web 1.0 and his World Wide Web Consortium (W3C) voicing concerns over the current Web 2.0 internet, especially when it comes to Big Tech, the **Demise of Anonymity and Privacy**, and trends like **PsyOps**, it's clear that many of the people helping build out Web 3.0 see this as an opportunity to correct past mistakes.

However, while Sir Tim himself has developed a web decentralisation platform called Solid (SOcial LInked Data) that lets people store their data securely in "pods" it remains unclear whether or not Web 3.0 can truly be the "fresh start" that many people hope, especially as organisations like Meta start claiming their stake to it and tie it into their Metaverse plans.

Meanwhile, while organisations such as ThreeFold are encouraging people to join the peer to peer revolution others such as Elon Musk and Jack Dorsey are more critical of the public being able to "own" Web 3.0 saying that it and its overall agendas and goals will be driven by VCs and LPs and that ultimately "it will become a centralised entity with just a new shiny label."

ACT NOW

While many people hope that Web 3.0 will fix many if not all of the problems we see today with Web 2.0 it's unlikely, which would be very unfortunate. However, that said it does represent a seismic shift in both the architecture and capability of the web, and while it will still likely be dominated by large and even larger tech platforms than we see today it should still nevertheless have a significant impact on how organisations and individuals conduct business and consume all manner of different services.

EXPLORE:

- Best practises and case studies
- Business and impact assessment
- Future of Artificial Intelligence, Communications, Media and Entertainment, and Work
- Partner ecosystems and solutions
- Policy and regulation reform

Data sources: Consensys, Deloitte, Electric Capital, Goldman Sachs, and various.

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AUTONOMOUS ORGANISATIONS

3RD YEAR ON THE LIST



QUICK TAKE

Complimentary to **Decentralised Autonomous Organisations** Autonomous Organisations that operate with no human employees, and in some cases no human oversight, emerged in 2015 and almost any company that offers highly transactional highly repetitive services, such as Amazon and Uber, and others, are ideal candidates.

Enabled by technologies such as **Artificial Intelligence**, **Blockchain** and **Robotics**, this trend represents a paradigm shift in business operations and thinking and will be highly commercially and socially disruptive.

Data sources: Various.

IMPACT

While the majority of governments, individuals, and organisations talk about the impact of automation on their respective workforces almost none of them are talking about what happens when entire organisations are able to operate and scale autonomously without the need for any human involvement - including the CEO.

However, while these organisations might not have any human employees in the near to medium term it is highly recommended that they have some form of rigorous human oversight. Which, again, isn't being discussed.

Needless to say fully autonomous organisations will be able to operate at magnitudes of cost smaller than traditional organisations that employ people, and this will ultimately create a dilemma for business leaders and governments who will be tempted to embrace the concept or risk being disrupted by it. Shareholders will also face their own dilemmas, including the ethics of the concept as well as, more practically, how to assess and quantify the investment opportunity.

EXAMPLES

Autonomous organisations are essentially software based organisations that incorporate governance and decision making rules which can be programmed to operate autonomously without human involvement. The earliest examples were community organisation experiments which replaced traditional organisational governance and other operational processes with pre-agreed, compliant computer code.

As the concept gained traction new technologies were leveraged, including Artificial Intelligence, Blockchain, Smart Contracts, and others, and one of the first examples of a fully autonomous organisation was Aidyia, a hedge fund based out of Hong Kong which, even though it was created by a human would, to quote the founder, "Continue to operate even if we all die."

Meanwhile, Amazon and Uber are ideal candidates to become autonomous organisations due to their highly transactional nature. Amazon is using AI to design fashion lines, and is increasingly zeroing in on fully automated on demand manufacturing, fulfilment, and delivery capabilities.

ACT NOW

While Autonomous Organisations are still a nascent concept it is easy to see value in their model and, in some cases their simplicity. Furthermore, as new technologies become increasingly autonomous and intelligent, and become increasingly adept at acting on, and making decisions, this is a trend that is only going to accelerate. But, given the paradigm shift it represents there will be many challenges to overcome.

EXPLORE:

- Auditing, governance, and transparency reforms
- Competitive and economic impact assessments
- Government monetary, regulatory, and tax reform
- Safety, security, and regulatory implications

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DECENTRALISED AUTONOMOUS ORGS

3RD YEAR ON THE LIST



QUICK TAKE

Decentralised Autonomous Organisations (DAO) are Blockchain based organisations governed by rules encoded in computer code and Smart Contracts that are not controlled by a single entity or institution.

Such organisations can be thought of as a loose co-operative of pseudo-anonymous individuals and digital entities that are able to bid for, generate, and assign tasks, collaborate with one another to complete them, and be automatically rewarded accordingly.

IMPACT

The DAO model, that lets people set their own their salary, as well as what they work on and when at their own discretion and speed, is an increasingly attractive proposition in a world where flexible working and the Gig Economy are both becoming more popular.

As self-governing organisations where everyone has a common goal and where everyone's behaviours are steered by the lure of incentives, which often take the form of network tokens, and where rules are enforced by machine consensus and Smart Contracts, there's alot to like about them.

Over time DAO's, which are becoming increasingly popular, will force traditional organisations to adapt their hiring and working practises as they compete to hire and retain talent.

Also, given the fact that DAO's operating models are both amorphous and autonomous, essentially being based on little more than Blockchain and compute resources, once they become established within an industry they could change its economics forever - thereby putting incumbents at a serious economic disadvantage.

EXAMPLES

If you aren't looking for them DAO's at the moment are quite easy to overlook because their operating model all too often lets them operate under the radar. Nevertheless though they offer an intriguing look into the future of "Trustless" corporate governance and it seems inevitable that as the technologies that enable them improve in cost, capability, and performance, that this trend will continue to be one to watch and be wary of.

Championed by blockchain, crypto, and developer communities who are using DAO's to experiment with new ways of organising and working it shouldn't come as any surprise that the industries being infiltrated first are those with the strongest collective communities. As a consequence DAO's are gaining a notable foothold in the Financial Services industry where they are fuelling the Decentralised Finance (DeFi) trend.

Furthermore, as DAO's increase in popularity more US states, such as Wyoming, are actively discussing and passing legislation that permit them to become Limited Liability Partnerships (LLP) and incorporate under state law.

ACT NOW

By their very nature DAO's operate in a legal grey area because unlike their traditional peers they have no head offices and no hierarchy to speak of, and as a result it is difficult to attribute liability. It's also almost impossible to find a "single throat to choke" in the event of issues.

EXPLORE:

- Company incorporation reform
- Competitive and economic impact assessments
- Future of Work
- Hybrid business and workforce models

Data sources: Various.

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DIRECT TO CONSUMER

3RD YEAR ON THE LIST



QUICK TAKE

The he internet and other digital channels, as well as new logistics and manufacturing trends, have given all organisations a simple and effective way to produce products and sell them directly to customers, crucially with no middlemen unlike the standard B2C play, with the net result being that today this trend is increasingly becoming the standard. Furthermore, not only does the Direct To Consumer (D2C) trend help organisations disintermediate their traditional routes to market and partners but it also lets them commercially benefit from the **Know Your Customer** and **Single Customer View** trends.

Data sources: CB Insights, Invesp, and various.

IMPACT

D2C helps organisations reduce costs and increase profits by eliminating multiple steps between themselves and their customers, It also helps them gain more insights into their customers and their behaviours - both of which can be used to help them create better products and better customer experiences.

Today over a third of consumers say they've bought products from D2C brands, with people aged 13 to 44 making 68% of those purchases - a statistic that shows how this trend is heavily skewing towards younger audiences. When we drill into the figures we then find that 77% of all those purchases are in the apparel and accessory market, with 19% in the beauty and cosmetics market, neither of which should be particularly surprising

As a result of this last year 78% of DTC brands increased their marketing budgets compared with just 60% of traditional retailers, and recent have shown that 55% of consumers say they prefer to buy directly from brands rather than multi-brand retailers - with more than 40% saying that more of their spending will go towards these brands in the next five years.

EXAMPLES

While organisations have always been able to sell DTC new technologies and trends, such as **E-Commerce** and so forth, have made it easier than ever before. So easy in fact that today anyone can literally set up shop for next to nothing and create their own global DTC brand.

Arguably one of this trends biggest impacts has been on global culture and entrepreneurship, and it's now helping create more **Solopreneurs** than ever before. Also, as anyone who watches the US hit show Shark Tank will know its also now why almost all of the Sharks don't think startups should bother spending too much effort trying to get into big box retailers ... but that's another story.

Of all the millions of D2C brands, ourselves included by the way, some of the most notable include organisations like Casper a "Bed-in-a-Box" company who now has nine figures in sales, Dollar Shave Club who started from literally nothing and were bought by Unilever in 2016 for over $1 Billion, and of course Warby Parker the "DTC Darling" who now has a market valuation of over $3 Billion and rising.

ACT NOW

Today it's cheaper and easier than ever before to have a product idea, produce it, market sell and ship it, and it's only going to get easier from here as different business models and processes, technologies, and trends continue to be automated and commercialised. The net result of which increasingly means that organisations across sectors have faster routes to market than ever before - if they want to use them that is. That said though, despite this trends significant advantages when it comes to starting, growing, and scaling your business organisations should still think carefully about their GTM strategy.

EXPLORE:

- Benefits and impact assessments
- Future of Artificial Intelligence, Computing, Creativity and Innovation, Financial Services, Logistics, Manufacturing, Retail, and Work
- Partner ecosystems and solutions
- New business and operating models

ETHICAL CAPITALISM

3RD YEAR ON THE LIST



QUICK TAKE

It is increasingly clear that traditional capitalism - that puts organisations and shareholders first at the expense of almost all else including consumers, nature, society, and workers - is unsustainable. And as more leaders realise the harm of traditional capitalism they're seeking ethical alternatives.

The Economics of Mutuality (EoM) is one such alternative that moves organisations from an organisation-centric business strategy to a purpose-centric one, and maximises financial capital by balancing financial, human, natural, and social capital alike.

IMPACT

When we look at the world we live in and the challenges we face there are an increasingly vocal number of people who accuse so called traditional capitalists and capitalist business models of being inherently alienating, exploitative, unstable, unsustainable. Furthermore, they also level accusations that they're directly responsible for creating massive economic inequality by commoditising consumers and workers and eroding human rights, while at the same time incentivising almost imperialism like expansion and competition.

Naturally, we can see the impact and results of traditional capitalism everywhere - from consumers who are the product, through to increasing **Wealth Inequality**, and union law suits against corporations who treat their workers as commodities, and in some cases even have Artificial Intelligences (AI) monitor and automatically fire them - as was the case with Amazon and Uber - to the unsustainable pollution and ravaging of Earth's natural resources and environments which are fuelling everything from **Climate Change** and **Extreme Weather** to **Bio-Diversity Collapse** and **Resource Scarcity**.

EXAMPLES

Productive relationships are fundamental to all aspects of business - whether they are within organisations or whether they're with consumers, society, or suppliers via the organisations influence on the environment, health, labour, or markets. And while some organisations focus, rightly, on **Corporate Social Responsibility** (CSR) and **Environmental, Social, and Governance** (ESG) initiatives these are only part of the solution.

Perhaps the best example of an organisation making a difference and embracing ethical capitalism is Mars who in 2011 kick started a 2 year long pilot which included "people, performance, and planet" initiatives.

First Mars created new measurement systems and developed what they called "Shared Economic Benefit" KPI scoreboards which allowed them to directly measure and connect their own financial performance to their consumer, human, natural, and social capital initiatives which all sought to improve how the organisation shared the benefits of its own economic performance across all of its different stakeholders - rather than just shareholders.

ACT NOW

It is clear today that traditional capitalism, as a model, is flawed and that in many cases it's accelerating and exacerbating global problems which is why in surveys, depending on the country, just 6% to 42% of 18 to 29 year olds support it. In addition, the competitiveness and global prominence of nations increasingly depends on the moral fibre of their organisations and mutuality in business is key to helping them access and unlock it for the mutual benefit of all - as I often say: People, planet, purpose.

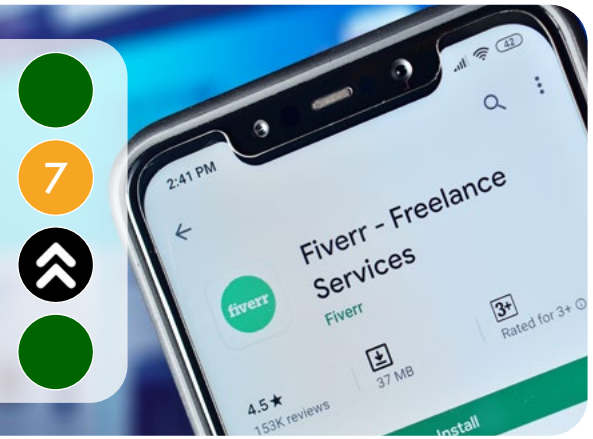
EXPLORE:

- Ecosystem mapping
- Holistic value creation
- Interventions design
- KPI and measurement systems
- Mutual P&L statements
- Purpose initiatives and statements

Data sources: Harvard University, JSTOR, Oxford University, and various.

MULTI-SIDED PLATFORMS

3RD YEAR ON THE LIST



QUICK TAKE

Although sometimes thought of as a recent phenomenon Multi-Sided Platforms (MSPs) have been around for centuries, but in the past few decades they've been turbo charged by the internet and the digital world.

At their most basic level MSPs connect two or more groups together - such as customers and suppliers - by playing an intermediary role. However, as many MSPs scale in time we see more of them disintermediating suppliers and taking on that role for themselves as they try to find new ways to grow their customer base, influence, and revenues.

IMPACT

Even though our world seems full of MSPs the fact of the matter is that there aren't as many as people think, and that those that do exist are larger than many people think - much larger.

Today our world is dominated by all kinds of MSPs, some of which we now simply refer to as simply the "Tech Giants" which rely on strong network effects to connect everyone to this product or that service, and in some cases their size and power - which is cumulatively in the tens of trillions of dollars in revenues and global - means they are capable of influencing and shaping the future of global business, culture, and society at a speed and scale we've never seen before. In some cases, they are now big enough to be called **Virtual Nations** and arguably have more impact, influence, and resources than many actual nations.

However, while MSPs can help sellers and buyers alike reduce search and transaction costs, today organisations on the supply side need to be careful they don't get disintermediated by MSPs and become little more than a commoditised transactional supplier to their downstream customers.

EXAMPLES

Billions of people use MSPs on a daily basis and it's plain to see that some of them have dominant roles in our lives. They have also come to epitomise the business benefits of being able to leverage modern technology to connect different groups together for pure business advantage.

It's also plain to see that there's money to be made in the MSP model and that there are significant advantages to being able to play the role of the middle man. As the old saying goes: Airbnb the world's largest hotel chain owns no hotel rooms, Alibaba the world's largest retailer holds no stock, Facebook the world's largest media company creates no content, and Uber the world's largest taxi company owns no cars.

However, while some MSPs are happy to remain "mere" intermediaries others like Amazon and YouTube are busy using their platforms to nurture direct relationships with customers, with programs such as Amazon Prime and YouTube Premium, and disintermediate sellers and advertisers alike by promoting and selling their own branded products. And this evolution is dangerous for sellers who rely on them.

ACT NOW

Traditionally MSPs have connected sellers and buyers with one another but increasingly sellers need to be prepared to defend against disintermediation plays if and when it happens. Despite this though there's no denying that there are clear benefits in being or becoming an MSP.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Connectivity, Creativity and Innovation, Disruption, and Manufacturing
- New business and operating models
- Product innovation initiatives

Data sources: Deloitte, Forbes, MITSloan, ResearchGate, and various.

SURVEILLANCE CAPITALISM

3RD YEAR ON THE LIST



QUICK TAKE

Many define Surveillance Capitalism as the unilateral claiming of private human behaviours, experiences, and other personal data for free by private organisations who then analyse, package, and sell them for commercial gain. As arguably modern society's most profitable and prolific business model the rise of the **Internet of Things** (IoT), as well as other trends including the continued erosion of both offline and online privacy, mean that it's certain that, unless ill prepared regulators intervene, that this business model will only grow in popularity, power, scale, and sophistication.

IMPACT

While this trend has numerous benefits, such as being able to be used for both Utopian and benign purposes such as to improve customer convenience or the customer experience, as well as even well-being with trends such as **Predictive Healthcare** and **Quantified Self**, it can also be used for highly Dystopian purposes including to advance the **PsyOps Pandemic** and enforce **Population Control**.

Arguably the main driving force responsible for the **Demise of Anonymity and Privacy**, with 91% of people believing it's an unfair practise, today it's estimated that the large tech giants make an average $35 per month by selling and using people's personal data. It also shouldn't come as any surprise that this trend has also led almost every government to question people's right to privacy and data ownership, and that it's generated much debate about its true societal cost.

Seen by some as the "Price of Connection" to the world's largest technology ecosystems it's now estimated that this trend accounts for over $4 Trillion of global **GDP Growth**, and that figure is climbing.

EXAMPLES

We all know the common examples of this trend - Alibaba, Amazon, Baidu, Google, Meta, Tencent, and others. But the fact is that almost every organisation, whether they operate offline, online, or both, want to know more about you so they can communicate and engage with you and sell you more stuffm however most avoid the spotlight because they're eclipsed by the giants. Today perhaps one of the most disturbing commercial examples of this trend is its use to collect data and "intelligence" on people before they're even born by analysing the behaviours and purchases of parents to be.

Asides from this more common a garden examples of this trend include Google's capture and analysis of the contents of more than 1.2 Trillion searches a year to generate marketable insights into users "thoughts," and Meta who it's claimed now have more than 5,000 data points on every person and data on more than over five billion people. And all of this is before I highlight examples from China where so called **SuperApps** from organisations such as Tencent are gathering and analysing data on even more people from an even greater variety of sources.

ACT NOW

While gathering, analysing, and selling people's personal data for profit has now firmly established itself as the go to business model for many organisations, whether it's in whole or in part, many questions remain about its ethical and moral implications, and its impact on people's personal privacy and society. However, with regulators ill equipped to properly debate the future of this trend and create and enforce appropriate regulations it's almost certain that this trend will only become more divisive, invasive, prolific and, of course, profitable.

EXPLORE:

- AI bias and data privacy
- Benefits and impact assessment
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Media and Entertainment, and Technology
- New business and operating models
- Policy and regulation reform

Data sources: Harvard University, London School of Economics, ResearchGate, and various.

CUSTOMER BEHAVIOUR TRENDS

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... MOVEABLE MORALITY
... MOBILE FIRST
... NOW OR NEVER
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MOBILE FIRST

3RD YEAR ON THE LIST



QUICK TAKE

Globally we live in a Mobile First world with 52% of all internet traffic being mobile. But country specific usage varies depending on local network infrastructure investment patterns over time. Irrespective of usage patterns though as **Global Digital Addiction Rates** remain elevated, **Digitisation**, and as **Super Apps** become central to people's lives this trend will dominate even more in the years to come with companies prioritising mobile already seeing 39% higher customer satisfaction than their peers, 50% better customer loyalty, and perhaps most importantly 10 to 15% higher revenues.

IMPACT

This trends impacts are numerous but the ability of companies to offer mobile first experiences is obviously limited to the affordabilty, availability, reliability, and speed of local mobile networks whether that's 4G, **5G**, or even **Satellite Internet**, and to a lesser extent local broadband networks, which makes country level investment in these networks increasingly vital to both regional and **Global GDP Growth**.

Globally it's now estimated 92% of people use their mobiles to research products and services before making a purchase and that over 62% have made purchases on their mobiles with mobile expected to account for 73% of global **E-Commerce** sales by 2025, up from 54% in 2022. Furthermore, and perhaps unsurprisingly mobile also accounts for 81% of all digital media time, rising to 90% by 2025.

This also means that Digitisation, **Omni-Channel Experiences**, **Opti-Channel Experiences**, and mobile responsive UI design are all increasingly crucial to a providing consumers with the best possible experiences, and used well these can provide companies with a significant competitive advantage.

EXAMPLES

Some of the highest mobile first usage actually comes from developing countries whose societies who, with little or no access to reliable fixed line broadband services, went straight to mobile as cellular networks were rolled out. this also means that in some countries many consumers are not just mobile first they're mobile only. Good examples here include those countries in Africa, Asia, and LATAM.

While the global average for mobile use is 52% as you'd expect it's unevenly distributed and it's skewed higher in countries with poor fixed network infrastructure. In Sudan and Yemen, for example, 83% of all internet traffic is mobile, Libya (75%), Chad (74%), Egypt (68%), Eritrea (67%), and Ethiopia (58%). Then, when we skew the perspective slightly to look at the most populous countries on Earth, 80% of India's traffic is mobile, and in China it's 65%.

Meanwhile in more developed countries the figures are closer to the global average or even below it with Italy at 57%, Greece (51%), Brazil and the UK (50%), France (48%), Spain (47%), Germany (44%), Australia (37%).

ACT NOW

In time we'll see device format change as trends such as **Immersive Reality** continue to emerge and as big shifts in the Telecoms sector play out. However, while people in developed countries are more likely to use multiple connected devices including desktops and laptops for leisure and work, which affect the reported mobile internet usage figures, as hundreds of millions more people become middle class - especially in Asia - companies would do well to remember that some of these high mobile first usage rates we're seeing in regions of the world could decline in percentage terms and be more in sync with the figures we see in the developed world. As a result I'd urge companies to not forget the rest.

EXPLORE:

- Emerging technologies and technology roadmaps
- Frictionless customer experiences and payments
- Future of Communications, Retail, and Work and the Workplace
- UI design and optimisation

Data sources: Bain & Co, Cloudflare, Forrester, McKinsey, and various.

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EXPLORE STARTUPS & MORE

MOVEABLE MORALITY

3RD YEAR ON THE LIST



QUICK TAKE

Human morality changes, and today we're seeing big shifts in consumer morality and therefore consumer behaviours. One day individuals and societies live by one set of principles and values, and then the next not so much. Moveable Morality refers to the changing principles and values that consumers use as their North Star when deciding which companies to buy from and what products to buy. With access to info, and with greater awareness of social and environmental issues and the growing importance of personal ethics in decision making, today's consumers are more informed and fickle than ever.

Data sources: NCBI, NIH, and various.

IMPACT

Today we're seeing consumers, especially Gen Z and Millennials who were once staunch advocates of ethical and sustainable consumerism welch on their principles as **Global Household Debt**, **Global Inflation Rates**, and other "Polycrisis" factors dampen their enthusiasm to pay premium prices for ethically sourced sustainable products.

Overall the impacts of this trend are further reaching than many people realise because consumer behaviours impact company behaviours which impact everything - in the same way that the ripples caused by throwing a stone into the water eventually touch everything in the lake. A simple example of this is imagine a society that prioritises sustainability above all else, then imagine the impact of that. Imagine how companies would respond, how they'd alter their business models and strategies, and their marketing and product development plans to align with their customer buying behaviours.

Now imagine the values of that society change to favour low prices over sustainability - you can imagine how fast companies, as well as governments and investors, would flip their priorities.

EXAMPLES

There are many examples of the impacts this trend has on companies, such as Patagonia the sustainable clothing company who became the literal darling of the retail industry when they and their customers North Stars aligned. Then there's the story of Coca Cola who, as sugary pop drinks fell out of favour, and even became subject to new **Global Indirect Tax Rates**, pivoted heavily to diet and sugar free alternatives.

Additionally, the rise of sustainable consumerism saw consumers flock to products that were environmentally friendly and sustainable helping fuel the rise of eco-friendly products such as bamboo toothbrushes, plant based cleaning products, and reusable shopping bags. Similarly there's been a large increase in the numbers of consumers seeking out products that are ethically sourced and produced such as cruelty free cosmetics, fair trade coffee, and organic cotton clothing.

However, as the cost of living rose we then saw many of these same consumers flip behaviours and move away from these core buying principles to seek out lower cost and less ethical and environmentally friendly alternatives.

ACT NOW

It's fair to say that there are companies in the world who follow their own morality and priorities irrespective of how consumer behaviours change. And then there are those who change their priorities as often as the wind changes direction, and those companies who appear to align with changing consumer behaviours while in reality changing very little about their behaviours - as we witness with the **Anti-Sponsorship**, **Brandalism**, **Greenwashing**, and other such trends. Despite this though surveys continue to show that consumers see through brands attempts to fool them and remain loyal to brands that are consistent and authentic.

EXPLORE:

- Brand authenticity
- Corporate culture, mission, and values
- Future of Retail
- Taxation strategies

NOW OR NEVER

3RD YEAR ON THE LIST



QUICK TAKE

After a series of devastating **Global Epidemics and Pandemics**, with the COVID-19 pandemic being by far the worst, not only do consumers feel they have to catch up on the time they lost in lock downs, but they also realise life is too short to mooch. So, while the pandemic helped push the **Global Loneliness** and **Global Mental Health Crisis** trends to historic highs, now consumers are seizing the day - even as we see **Global Household Debt** levels spiral - and prioritising immediate experiences and purchases they may have previously put off to make the most of every opportunity.

IMPACT

Confronted by a daunting and somewhat unpredictable VUCA future dominated by Permacrises and Polycrises - two words noone ever wants to hear let alone in the same sentence - consumers are embracing the present like never before and this trend, which can be seen as a rebellion against restraint, is having not just an impact on company sales, it's also having an important impact on people's mental well being as many embrace their inner selves, step out of their bubbles and comfort zones, and live in the moment.

However, while some activities that people are engaging in, such as buying products that they've been lusting after for a long time are about instant gratification, we're also seeing a significant up tick in the pursuit of experiences that are fulfilling, meaningful, and **Unapollacetically Me**. In short, ones that satisfy the soul and make a satisfying but tiny dent in **Global Digital Addiction Rates**.

Overall, akin to impulse buying, women are more likely to indulge than men, 45% of people are single, and 20% of people admit spending $1,000 or more, with the average being $30 to $100.

EXAMPLES

With trends such as **Buy Now Pay Later** (BNPL) helping fuel this trend it could be said that companies are finding new ways to help consumers Live Now and Pay Later. However, as most of these purchases happen in store rather than online there's an opportunity for hard up Brick-and-Mortar retailers to grab much needed additional revenue.

In the UK estimates suggest consumers spend over £3 Billion each month on impulse buying - up from £2.5 billion in 2012 and up 2% from 2021 - equating to a staggering £144,000 per person over a lifetime, with a third experiencing "Buyers Remorse." Meanwhile in the US Americans are spending 14% more on impulse buys than they did in 2021 - up from $260 to $300 per month - with 87% admitting to impulse buying more and clothing, dining out, household items, vehicles, technology, toys, and travel topping the lists.

Interestingly though, studies suggest the growth of this trend is due in part to people needing to alleviate anxiety and reclaim a sense of control after the pandemic which also means we must be wary that this trend doesn't create future compulsive buying behaviours.

ACT NOW

With some experts now believing that some consumers are embracing this trend to hide or overcome their anxieties and regain a sense of control in their lives post pandemic societally we need to be careful that this trend doesn't turn people into compulsive buyers that, in the long term could only make their financial and mental well being worse. as a result companies should act ethically and responsibly to ensure that their customers well being is being upheld.

EXPLORE:

- Business and impact assessments
- Dark pattern UI regulation
- Future of Financial Services, and Retail
- Government awareness and possible policy reform
- Psychological implications
- UI design and optimisation

Data sources: BRC, Deloitte, MyJar, NIH, Shopify, Statista, Whistl, and various.

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EXPLORE STARTUPS & MORE

UNAPOLOGETICALLY ME

3RD YEAR ON THE LIST



QUICK TAKE

The Unapologetically Me trend refers to the growing desire among consumers to express their individuality and authenticity through their purchasing decisions.

Driven by the desire for self-expression and personalisation, as well as the overall rejection of what many see as conformity and homogeneity this is a rising trend, with the result being that consumers are increasingly seeking out products and experiences that reflect their unique identities and preferences, rather than simply following trends or conforming to societal norms.

Data sources: Mckinsey, and various.

IMPACT

From a brand perspective this trend can be difficult to navigate for the simple reason brands need to manage costs and inventory which often means producing generic products en masse which goes counter to the identity and purpose of this trend. However, as it becomes easier for manufacturers and retailers to tap into the **Customisation** and **Immersive Reality** trends, among others, there are opportunities for companies to differentiate themselves by offering personalised and customised products and experiences. And then there's the data that shows 71% of people want personalised products, 76% of people are disappointed when they don't find them, and the opportunity for companies to grab a piece of what some regard as a $1 Trillion pie.

Furthermore, this trend also contributes to a shift in cultural attitudes with consumers embracing **Diversity and Inclusion** and celebrating individuality, which has the potential to drive positive social change and promote greater inclusivity and acceptance - which in itself has a huge number of benefits on everything from corporate innovation through to creativity and wellness.

EXAMPLES

As more consumers than ever before seek out products and experiences that reflect their unique personalities and preferences, from customised accessories and clothing to personalised travel itineraries and wellness programs, and even individualised gourmet, there's no denying that we're seeing a surge in demand for niche and specialty products, as well as the rise of platforms and marketplaces that cater to specific consumer interests and identities.

One brand embracing this trend is Tourist Journey who in their own words sell world class travel advisory services, affordably, with a tech driven twist, and whose mission is to make the luxury of personalised travel planning accessible, easy, and quick with t platform letting travellers build completely customised itineraries that span 19 countries across three continents within minutes.

However, whether it's exclusive investment portfolios, off beat gastronomic experiences, original sports apparel, personalised nutrition plans, tailored running sessions, or the latest in haute couture beauty and fashion statements there are no shortages of examples - or what brands can offer.

ACT NOW

To deliver on this trend companies generally need to rely on one of two things - either they need to rely on the consumer to personalise their own products and experiences, or the company has to have enough data on those consumers to do it for them, which takes brands uncomfortably close to the **Demise of Anonymity and Privacy** trend and all that entails. However, while this, like many trends will rise and fall, there will always be people who want to live their most unique lives and so there will always be a market to serve.

EXPLORE:

- Authenticity and company culture
- Emerging technologies and technology roadmaps
- Future of Agriculture, Gaming, Hospitality and Tourism, Manufacturing, Media and Entertainment, and Retail
- Marcom and product development
- Social listening

CUSTOMER EXPERIENCE TRENDS

CONTENTS

... OMNI-CHANNEL EXPERIENCES
... OPTI-CHANNEL EXPERIENCES
... ROBO CUSTOMER SERVICE
... SHOPPABLE VIDEO

OMNI-CHANNEL EXPERIENCES

3RD YEAR ON THE LIST



QUICK TAKE

Consumers in the B2B and B2C spaces shop and interact with companies across multiple channels and multiple devices, and today they expect those channels to be integrated and unified with one another so they can have a seamless customer experience.

A step up from Multi-Channel Experiences that treated each channel separately Omni-Channel Experiences are centered around the customer to ensure they can easily and seamlessly navigate between every company touch point to make a single purchase or complete a single task.

Data sources: Adobe, Google, OmniSend, Zendesk, and various.

IMPACT

With 90% of consumers expecting consistent interactions with the companies they deal with across channels this trend is an important one to get right, especially as purchase frequency is 250% higher, and order values are 13% higher, on omni-channel versus single channel.

However, as we continue to see the growth in both the number of and variety channels, which can include everything from **Behavioural Computing** interfaces and **Digital Humans**, to new immersive experiences, the **Metaverse**, as well as new apps, devices, platforms, and even **Robot Customers**, it's proving increasingly difficult for companies to keep up with trends and develop optimal strategies.

15 years ago the average customer typically touched two touch points when buying, now that number's six, with 50% of people using at least four, and soon it will be over ten. Despite these challenges though the companies that get their omni-channel strategies right on average retain 89% of their customers, compared to just 33% for those with poor strategies.

EXAMPLES

There are plenty of organisations who have, to coin a phrase "done omni-channel right." On the one hand we have organisations like Disney who perfectly marry their in park apps and experiences with their Magic Band program, then on the other we have the likes of Starbucks who have seamlessly unified their apps, payment cards, and even Spotify integrations with one another to create seamless customer experiences. Both of which go to show that when it comes to omni-channel there's alot more to think about than simply unifying different web and social media channels together.

Then we have the likes of Walgreens who integrate both front end and back end elements together to help customers stay in the loop, but also help them rapidly complete all manner of forms and refill requests. And, as for Sephora their omni-channel strategy so far has helped them nurture over 11 million customers who spend 15 times more than the average customer. As you can see there's not necessarily a one size fits all approach, but with the right forethought organisations can leverage this trend to their, and their customers benefit.

ACT NOW

All the data shows that organisations with a well thought out and executed omni-channel strategy have customers who are more loyal and spend more, and ultimately that's every executives dream combo so this is a trend that, arguably, should be prioritised.

EXPLORE:

- Customer journey planning
- Data and technology strategies
- Emerging technologies and technology roadmaps
- Future of the Customer Experience, Marketing, Retail, and the Workplace

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EXPLORE STARTUPS & MORE

OPTI-CHANNEL EXPERIENCES

3RD YEAR ON THE LIST



QUICK TAKE

While **Omni-Channel Experiences** are very much about organisations passively offering their customers and would be customers the opportunity to engage with them via all manner of different channels Opti-Channel Experiences, which are seen by many as the next evolution of channel engagement, are all about organisations proactively presenting customers with the right channel for the task, with the aim of optimising, simplifying, and improving the overall customer experience and all the benefits that brings.

IMPACT

Seen as a fad by some and as the future of customer engagement by others at its heart this trend is driven by organisations who are trying to proactively provide customers with the best frictionless experience that encourages customers to engage more, spend more, and remain loyal - whether it's offline or online or invariably both.

Whereas omni-channel experiences are all too often dominated by discussions about being present on every channel this trend is more about proactively simplifying and optimising the overall customer experience and right sizing the number of channels customers are exposed to.

As a result the predominant impacts of this trend include helping organisations reduce the cost of managing, operating, and supporting a bloated channel portfolio while also allowing them to simplify back end business processes while at the same time improving customer personalisation, precision, and the overall customer experience - the latter of which can be negatively impacted if an organisation has too many channels to choose from anyway.

EXAMPLES

Every day consumers interact with organisations across hundreds of different channels and with the number of channels growing daily inevitably not only will organisations find it increasingly difficult to keep on top of them all but customers will also feel increasingly overwhelmed by them.

In today's age though while people might not remember your content once hooked you can be assured they'll remember how it feels to do business with you, and that's where this trend can help organisations differentiate themselves from the crowd.

While organisations such as Disney have fully embraced this trend to give their customers what they call a "White glove" concierge service across every touch point more traditional organisations, such as DBS Bank in Singapore, have also been using it to improve the customer experience, with one simple example being to switch customers who've lost their credit cards to their voice channels which has been shown to put customers at greater ease than purely relying on passive digital channels.

ACT NOW

While some organisations are focused on delivering experiences via every possible channel they can, and often doing it poorly, others are trying to optimise and simplify the customer experience by making careful strategic decisions that tie into this trend. Furthermore, in the age of **Digitisation** and **Hyper Personalisation**, it could be argued that this trend provides the most appropriate customer centric experience.

EXPLORE:

- Benefits and use case examples
- Emerging technologies and technology roadmaps
- New business and operating models
- Partner ecosystems and solutions

Data sources: Various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

ROBO CUSTOMER SERVICE

3RD YEAR ON THE LIST



QUICK TAKE

Today's customers are more demanding than ever, wanting everything not only faster but also on demand and naturally those expectations extend to customer service and support.

As a result more organisations than ever before are now exploring new ways to serve their demanding customers better across all the channels they use while at the same time reducing operational costs and improving efficiency - the net result of which is the increasing provision of customer service using technologies such as **Artificial Intelligence** (AI), and others.

Data sources: Accenture, Forbes, Hubspot, Zendesk, and various.

IMPACT

Even though 86% of customers value human based interactions when it comes to the future of customer service there's no doubt that the "robots" are coming - whether they come in Bot, **Digital Human**, **Robotic Process Automation**, or some other form, and with $1.6 Trillion in revenue lost every year due to poor customer service, and with customers spending 17% for a good experience, and with customer centric businesses being 60% more profitable than their peers this trend is potentially invaluable. Furthermore, as **Exponential Technologies**, such as AI and **Behavioural Computing**, as well as others such as **Immersive Technologies** improve, and as new channels such as voice become increasingly capable, cost effective, and ubiquitous there's no doubt this trend will accelerate and become the dominant way organisations serve their customers - especially in the digital age.

Today over 40% of adults use voice and 70% use messaging apps to interact with businesses, over 80% of enterprises use AI to augment their customer service, and with bots alone reducing customer service costs and wait times by at least 90% this is a trend to watch.

EXAMPLES

As more organisations embrace **Digitisation** there are inevitably going to be more organisations where you never ever engage with a real human being with Netflix being just one example of millions that I could mention. Furthermore, as we see the rise of **Autonomous Organisations** it could very easily be argued that in the future not only will customers, whether they are humans or **Robot Customers**, never engage with a real human but that the organisations themselves will be fully automated - and that's a thought worth pondering for lots of reasons.

In the meantime though we have car manufacturers using Augmented Reality (AR) to help customers service their vehicles without the need for manuals or training, and we obviously have a proliferation of bots spread across all manner of channels that are helping customers get the information they need the instant they need it.

Elsewhere we also have digital humans and voice assistants helping customers in all manner of ways, whether it's helping them choose products or just check the status of their orders, and we're only just scratching the surface.

ACT NOW

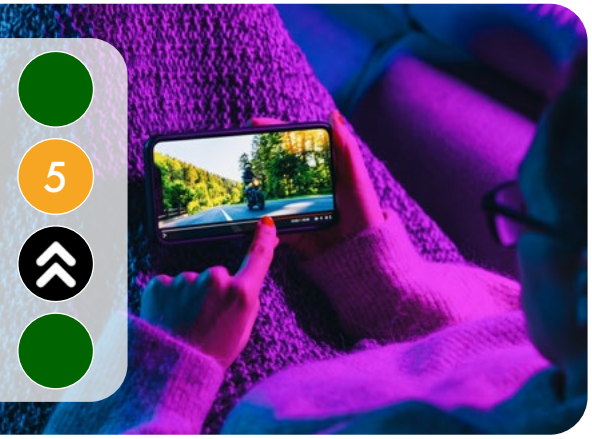
Being able to service your customers on demand for little to no cost is needless to say a very attractive proposition for organisations and done well this trend has been shown to enhance the customer experience and improve brand loyalty. However, implemented poorly it can also have the opposite effect, but as **Affective Computing** matures increasingly robo systems will be able to sense customers emotions and, if need be, modify their responses and tones accordingly which may mitigate some of these negative experiences.

EXPLORE:

- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence and Customer Experience
- New business and operating models
- Partner ecosystems and solutions

SHOPPABLE VIDEO

3RD YEAR ON THE LIST



QUICK TAKE

Movies and TV series, as well as all manner of other content categories, have made money from product placements for decades so it was inevitable that at some point someone would try to create a seamless link between consumers being able to see something on screen in one moment and being able to buy it and have it delivered to their home in the next.

This is the promise of Shoppable Video which literally lets people "Buy the screen," and it's seen by many in the content industry as being the next advertising frontier.

Data sources: Brightcove, Spott, and various.

IMPACT

With over 85% of organisations now using video as a primary marketing tool surveys have consistently shown that consumers watch interactive videos 47% longer and are much more likely to add products to their carts while doing so, with some brands seeing conversion rate increases of 80% or more. And, needless to say, the global pandemic supercharged these trends with 96% of consumers saying they watch more video than ever before.

Looking at the stats it's clear that brands, E-Commerce, and Shoppable Video are a marriage made in marketing heaven, especially given the fact that 80% of consumers remember what they see in videos and that 54% want to see more content from "the brands they support." Surveys have also found that over 50% of adults engage with a brand after watching video thereby adding even more fuel to the power of this trend.

Then, combine this trend with the rise of authentic live videos and streaming, product demos, and all manner of other more traditional types of content and video, as well as the **Metaverse**, and it's easy to see why it's a must have.

EXAMPLES

Shoppable videos offer calls to action and "Add to Cart" functionality that turns on screen inspiration into a sale within seconds, and with some brands such as Endeavour Drinks Group seeing conversion rates of over 40% on sales it's clear to see this trends potential.

Brands like CBSUniversal, Estee Lauder, Facebook, Instagram, Issuu, Levi, and Spott are also seeing significant success and are championing the ability for consumers to simply click an area of the video, or even the product in the video itself, in order to buy it rather than having to visit banner links or links below the videos.

Seen as the ultimate seamless shopping experience many of these brands, and others, are now busy expanding their programs and scaling their platforms.

While shoppable video has been around for a while it's now becoming much more personalised, refined, and integrated into the consumer viewing experience and ecosystem with other trends such as **Synthetic Content**, as well as the rise of the increasingly connected and digital society, only serving to supercharge it further.

ACT NOW

The ability of brands to use this trend to engage consumers in new ways and to boost conversion by multiples is so powerful that it gives new meaning to the trend of "Shoptainment."

EXPLORE:

- Best practises and case studies
- Brand engagement strategies
- Future of the Customer Experience, Media and Entertainment, Retail, and Synthetic Content
- Partner ecosystems and solutions

HR AND TRAINING TRENDS

CONTENTS

... AI BASED RECRUITING
... ARTIFICIAL INTELLIGENCE COACHES
... DIVERSITY AND INCLUSION
... VIRTUAL REALITY TRAINING

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

AI BASED RECRUITING

3RD YEAR ON THE LIST



QUICK TAKE

Advances in Artificial Intelligence (AI) are helping organisations find and recruit new talent cheaper, faster, and using less resource than ever before. Today over 70% of the Fortune 1,000 use AI in their recruitment process with that number increasing quickly.

However, the link between these technologies and surveillance technologies, both of which share common traits, are stoking concerns about their impact on bias, D&I, ethics, personal privacy, and security, leading many to call for increased industry regulation and transparency.

Data sources: Various.

IMPACT

While AI, mainly in the form of Big Data and Machine Learning, have been used in the recruitment process for decades today the adoption and development of increasingly sophisticated surveillance-like AI technologies, such as Deep Learning and Machine Vision, are giving HR teams unprecedented insights - both from a historic and predictive perspective - into the people they're looking to hire.

For example, today these technologies can use biometric cues to determine people's characters, personalities,their intent to criminality, and even their potential. They can also accurately determine candidates mental and physical well being, including identifying undiagnosed or undeclared health conditions that include everything from dementia, depression, and PTSD, to genetic abnormalities, high blood pressure, and heart defects.

And that's before we discuss the power of combining these data sets with other Big Data sets that can be used to analyse every aspect of an individuals academic, professional, and social background.

EXAMPLES

People are becoming an open book, and by combining these technologies with other assessment, HCM, and performance management tools organisations can now identify and catalogue the core competencies and traits of their top performers, or target hires, and then use those matrices to identify perfect matches - at the top and bottom of the hiring funnel.

Every aspect of a candidates spoken and unspoken information can be analysed - from telling when they're lying during a video interview, to using their biometric cues, micro-movements, and their voices to analyse every aspect of their response. And it can be all be presented in a convenient real-time dashboard, or fully automated.

Today, for example, companies like EightFold and HireVue, as well as many others, have developed AI hiring platforms that are both very innovative and powerful. But that said organisations need to enter this space with their eyes wide open and need to be fully aware of the pros and cons of using AI to automate and "improve" the recruiting process.

ACT NOW

While there is little to no doubt that this trend can help organisations identify and recruit the talent they need faster organisations have to be very careful in how they apply and use it and need to do their utmost to ensure that these systems are fair and transparent, and align with informed organisational policies.

EXPLORE:

- Algorithmic audits and AI and Human bias
- Emerging technologies and technology roadmaps
- Future of Human Resources, Work and the Workplace
- Future legal exposures and risks
- GRC implications
- Partner ecosystems and solutions
- Policy and regulation reform

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

ARTIFICIAL INTELLIGENCE COACHES

3RD YEAR ON THE LIST



QUICK TAKE

Traditionally knowledge and skills have all been taught by people, and technology and tools have been little more than dumb complimentary aids.

Today though technologies such as **Artificial Intelligence** (AI) are helping us personalise and improve learning outcomes in new ways via trends such as **Adaptive Learning** and increasingly AI, which has beaten world experts in numerous fields, is now coaching and training people directly in everything from empathy to strategy. Needless to say this represents a paradigm shift in how people learn.

IMPACT

While AI is increasingly able to automate and master particular jobs, tasks, and skills which increasingly, it is then able to "teach" to people, as well as to other AI, one of the most interesting complimentary trends to keep an eye on as you explore this trend is the **Centaur Principle**.

In fields as diverse as AI design, coding, combat, data science, debating, decision making, empathy, game play and game theory, investing, negotiation, product development, pure maths, science, and strategy, AI is increasingly out performing its human peers, and doing so by multiples at extreme speeds. It's also mastering many of these fields by learning them in new ways, often in simulation or via Zero Shot Learning, and from alternative perspectives - many of which are novel and foreign to the ways we humans learn.

The upshot of all this is that when people are taught by proficient AI's studies have shown they learn more, retain more, faster, and that their "performance" improves by 30% or more - all of which makes this nascent trend an increasingly interesting one to watch in the years to come.

EXAMPLES

There is no doubt that when it comes to certain tasks AI can perform them better than humans, but what's most interesting about this trend is what happens when we combine the best of AI's skills with the best of the "human condition." In many cases not only are we seeing people's point of view and learning behaviours change, but we're also seeing their performance levels being amped up and in some cases becoming "super human" especially in the elite and expert fields.

In the US, for example, AI's are teaching call center agents empathy by coaching them to listen to customers speaking patterns, in E-Sports AI's that thrashed human players are teaching players game strategy, and in the military AI's are teaching USAF pilots how to perform better in aerial combat - after it wiped the floor with them.

Meanwhile, in the boardroom AI's helping executives become better decision makers, in China it's coaching ministers in foreign policy and negotiation, and at Google it's teaching expert AI designers how to design better AI's and even computer chips ... all of which is just the beginning.

ACT NOW

While this trend is still ramping up as it matures over the next decade it will be a driving force that helps re-invent and turbo charge human learning at all levels of society. And, as this trend becomes increasingly accessible, affordable, and democratised it will no doubt move the dial and have a significant material impact on people's potential and therefore their downstream impact on global business, culture, and society.

EXPLORE:

- Benefits and use case examples
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Education, HR, and the Workforce
- Partner ecosystems and solutions

Data sources: DOD, Falcon, Github, Google, Microsoft, MIT, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

DIVERSITY AND INCLUSION

3RD YEAR ON THE LIST



QUICK TAKE

In all honesty Diversity and Inclusion (D&I) shouldn't be a trend because it should just be part of common-a-garden good business practise - especially bearing in mind that in today's rapidly changing world organisations of all shapes and sizes need to be adaptable and be able to view the world from different perspectives in order to both avoid and harness disruption for their benefit.

For these reasons organisations should be embracing cognitive, ethnic, and gender diversity, and implementing the appropriate policies accordingly.

IMPACT

In general diverse and inclusive organisations are also the most adaptable and competitive in their fields with numerous global studies bearing this out. But D&I only wins if everyone wins and if noone feels that they have been purposefully discriminated against, excluded, or over looked.

Different individual perspectives, which are the result of different backgrounds, experiences, and personality types are vitally important in today's fast paced ever changing world. Not only do they provide organisations with a creative boost that means on average inclusive organisations are 1.7 times more likely to be innovation leaders, but it also makes them 25% more productive, and much faster and adept problem solvers.

Furthermore, when we consider the impact on decision making inclusive organisations also outperform here too with diverse teams outperforming individual decision makers, in both quality and speed, 87% of the time. And then, naturally, people within more inclusive organisations also often feel more engaged which not only translates into better financial results, but also benefits brand reputation and hiring.

EXAMPLES

Today companies have two ways to embrace diversity - voluntarily or by force. And when it comes to the latter increasingly governments and institutional investors aren't afraid to use a variety of tools in their arsenal, such as withholding grants or tax incentives, or dumping shares, to 'encourage' organisations to do the right thing.

Additionally, as some organisations, such as the police, find it difficult to recruit from particular ethic groups some of them are calling on governments to change the laws so they can positively discriminate against particular groups in order to meet their D&I goals - something that many governments have said would set a dangerous, and wrong, precedent.

While getting the D&I balance right is hard organisations such as Accenture have introduced a number of initiatives that include Diversity Awareness, Diversity Management, and new Professional Development and Hiring programs, and Sodexo report that they have seen a 23% gross profit increase, a 5% bump on brand valuation, and a 4% increase in employee engagement, as a result of their inclusion initiatives.

ACT NOW

Inclusive organisations often top the charts when it comes to adaptability, creativity, decision making, innovation, and most importantly financial results, but organisations need to make sure that their D&I policies are fair and transparent, and that they do not directly or indirectly disadvantage specific groups - something that can easily happen.

EXPLORE:

- Brand assessments
- Corporate structures and policy initiatives
- Future of HR, Work and the Workplace
- Initiatives to identify and eliminate organisational and technological bias
- Investor insights, outside perspectives, and honest feedback
- Proportional representation

Data sources: BCG, Cloverpop, HBR, JBR, McKinsey & Co, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

VIRTUAL REALITY TRAINING

3RD YEAR ON THE LIST



QUICK TAKE

Irrespective of their job role at some point during their career everyone has had some form of on the job training, and while some of this will have been done online some of it will have no doubt been in the field and in person.

While online training can be delivered at scale and affordably its impact can often be questioned especially when it comes to retention and expected outcomes. In person training however generally gets better results but the counter is that it's often difficult to co-ordinate and expensive. Now though Virtual Reality (VR) is an alternative.

Data sources: Accenture, MIT, PWC, Strivr, and various.

IMPACT

When it comes to training organisations are looking for three main things, namely results and retention for minimal cost and increasingly VR training is showing itself to be better than traditional alternatives in all these areas.

As recent real world studies have shown not only does VR impact more of the learner's senses and create a stronger bond between the learner and the content, but employees trained via VR get up to speed four times faster than classroom learners and twice as fast as E-Learners. Which is staggering.

From a cost perspective those are coming down too with the cost per employee in larger enterprises now 52% less than classroom learning, and while those costs aren't on a parity with E-Learning it won't be long before they drop further and get closer to cost parity.

Things get even more interesting from a retention rate perspective though with waves of studies reporting real world retention rates of over 80% after one year compared with just 20% after traditional training. All of which makes this a trend to watch.

EXAMPLES

The number of examples increases daily but some of the more common and most interesting ones are highlighted below.

In the US T-Mobile used VR training to help its leaders practise how to manage changing business conditions as they prepared to merge with Sprint by enabling them to build their skills in handling change management conversations, both by voicing their own concerns as well as dealing with objections from resistant team members.

Elsewhere others have been using VR simulations to help teach employees about Diversity, Equity and Inclusion (DE&I) training, as well as teaching them about harassment and unconscious bias, and banks are using it to teach employees how to de-escalate situations.

And so far Walmart's trained over 20,000 associates on everything from new technology, to soft skills such as customer service and empathy, and compliance, construction companies have used it to train employees on heavy equipment, and others are using it to train engineers on installations and new equipment. The sky, it seems, is the literal limit.

ACT NOW

The ability to use VR to simulate almost any kind of training, with all of the associated beneficial impacts, increasingly makes it an ideal training medium, and while it might not be suited to all situations so far it's shown that it's more than a match for traditional forms of learning. Furthermore, as the technology and supporting ecosystem improves, as headsets morph into VR glasses and as the realism of the simulated environments gets better, there's no doubt that this trend will help learners everywhere learn better faster for less.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Education and the Workplace
- Partner ecosystems and solutions

ICT TRENDS

CONTENTS

... CLOUD COMPUTING
... DIGITAL TWINS
... DIGITISATION
... ROBOTIC PROCESS AUTOMATION

CLOUD COMPUTING

3RD YEAR ON THE LIST



QUICK TAKE

Cloud Computing represents a paradigm shift in the way that organisations buy, consume, share, and supply all manner of computing related services, and even though the concept is decades old, with projects such as ARPANET in the 1960's being an early example, this trend only really took off in a meaningful way in the early 2000's, and it's accelerating.

Fast forwards to today and almost every organisation and every consumer is using one form of cloud computing or another to access an increasingly large and diverse variety of services, hence the common term "X" as a Service.

IMPACT

Cloud's impact on the way organisations and consumers alike, as well as other computing dependent systems such as the **Internet of Things**, buy, consume, sell, and share computing resources and services is undeniable. It also represents a titanic shift in operating models as organisations race to embrace public, hybrid, and private cloud models.

In 2020 the cloud computing market was estimated to be worth over $375 Bn and by 2025 it's projected to be over $832 Bn, and while over 94% of all enterprises are now using cloud worries over the security of these systems remain with over 75% of enterprises citing cloud security as their major concern going forwards - with good justification. However, despite these concerns with over 100 Zettabytes of data stored in the cloud and 89% of all breaches due to human error over 50% of organisations say they are storing classified data in the cloud.

Today it's also estimated that cloud datacenters are responsible for processing over 95% of all ICT workloads and that **Software as a Service** (SaaS) accounts for over 75% of that workload.

EXAMPLES

When we think about examples of cloud use cases, whether it's public, hybrid, or private cloud, they're all around us, but for obvious cultural reasons many people are more inclined to focus on examples that include Amazon AWS, Dropbox, Google, IBM, Microsoft, Salesforce, and many others rather than some of the major Asian services such as those from Alibaba, Baidu, or even Huawei which in terms of ambition, scope, and size rival their western peers.

As a result of this I am going to share some more out there examples with you such as Google's Everyday Robot Project which is using **Artificial Intelligence** (AI) and the cloud to help robots learn in new ways by developing **Hive Mind Systems** that let users teach one robot new skills and then allow that robot to instantly teach that same skill to every other connected robot or device wherever they are on the planet.

We then also have the CIA and US DoD's secretive multi-billion contract awards to the likes of AWS, Microsoft, and others to stand up their own cloud platforms, and many other examples.

ACT NOW

With cloud becoming the dominant ICT operating model, as well as a means for organisations to save money by helping them avoid the costs incurred by buying, supporting, and over provisioning their own traditional on premise hardware and software it's clear that this trend is one to investigate and embrace.

EXPLORE:

- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Computing, Security, and the Workplace and Workforce
- Partner ecosystems and solutions
- New business and operating models

Data sources: Accenture, Cisco, Checkpoint, Cloudflare, Gartner, and various.

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EXPLORE STARTUPS & MORE

DIGITAL TWINS

3RD YEAR ON THE LIST



QUICK TAKE

Digital Twins which are digital clones of physical processes, products, and systems - in some cases down to the granular level - that bring the benefits of digital tools and technologies to the real world to help organisations analyse, diagnose, innovate, maintain, query, research, and visualise, them in new ways in real time or near real time.

As a result their benefits are broad and considerable, and in some cases revolutionary, which is why Digital Twins are seen as being an increasingly important part of the future digital economy.

IMPACT

Expected to have significant business, economic, environmental, health, and societal benefits it's only recently that Digital Twins, thanks to the combination and integration of different maturing **General Purpose Technologies** (GPT), have been able to be bought to life in both 2D and immersive 3D form.

By 2025 it is estimated that the Digital Twin market will be worth $35.8 Billion and that 40% of **Internet of Things** (IOT) platform vendors will integrate the capabilities, simulation platforms - which will accelerate the **Continuous Innovation** trend - and systems, needed to create and integrate them into their product and service offerings, and that 70% of the customers using them will use them to conduct process simulations and scenario evaluations, especially when it comes to things like operations optimisation, risk analysis, and supply chains.

As the GPT's that make digital twins possible improve they will become increasingly detailed and life-like which will make them more vivid, and the information that organisations can glean from them more revealing and valuable.

EXAMPLES

Today the massive availability of new data sets, which include everything from the CAD models and scans of products and systems, to real time sensor data, combined with increasingly intelligent and sophisticated simulation and visualisation systems, mean that the number of interesting Digital Twin examples is growing exponentially.

Examples include researchers who are creating Digital Twins of the Earth and humans so they can analyse them and find new ways to reverse **Climate Change** and treat healthcare conditions, researchers who have created Digital Twins of all the buildings in the US so they can analyse their energy consumption and simulate strategies to reduce them, through to organisations like BMW who have created **Factory Digital Twins** that run million of simulations to discover the most optimal manufacturing and operating environments.

And, of course, when you combine Digital Twins with Conversational AI, as GE have, engineers can diagnose and fix faults with products, such as wind turbines, using just their voices.

ACT NOW

One of the greatest benefits of Digital Twins is the ability to simulate and run different scenarios at digital speed which, unsurprisingly, accelerates all areas of their operations which, in turn, can be leveraged for serious competitive advantage.

EXPLORE:

- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Healthcare, and Manufacturing
- Partner ecosystems and solutions

Data sources: Deloitte, IDC, Markets and Markets, UKRI, and various.

DIGITISATION

3RD YEAR ON THE LIST



QUICK TAKE

Digitisation, which is the process of converting analogue systems, information, and processes into digital ones, is such a significant business, cultural, and societal transition that it is often said we live in the Digital Age.

Asides from helping organisations reduce costs and improve efficiency and insights, this trend also erodes the boundaries that separated previously distinct industries, and enables organisations to enter new markets and serve customers in new ways at a scale and speed that would have been unimaginable just 20 years ago.

Data sources: Accenture, and various.

IMPACT

Organisations around the world have been digitising their front and back office operations, as well as their customer experiences and **Supply Chains**, for decades but the trend has accelerated furiously in the last 20 years after so called Digital Native organisations rose to prominence, disrupted markets, found new ways to serve customers on demand, and reached sky high valuations within what seemed like the blink of an eye.

For better and worse digitisation has had a major impact on global business, culture, and society, and has impacted everything from **Business Models**, especially **Multi-Sided Platforms**, business operations and strategies, collaboration, cyber security, product development, and many other areas.

It also bought about the creation and re-writing of global policies and regulations, such as the Digital Markets Act in Europe and the creation of the EU Digital Single Market. However, as it became easier for organisations to trade cross border and enter new markets with impunity this trend also caused a lot of problems for competition and markets authorities as well as treasuries.

EXAMPLES

The benefits and examples of this trend are all us from Airbnb, Facebook, Google, Netflix and Uber, to Amazon, Baidu, Revolut, Spotify, Tiktok, and millions more.

When we look a the best examples of digitisation done well though it'd be hard to beat organisations like Amazon - perhaps the truest digital native of them all who's using it's multi sided business to seamlessly and abruptly move into new adjacent markets. Started in 1994 they are still a pioneer, causing the share prices of incumbents in adjacent markets to crash spectacularly when they move in on their turf. This effect was neatly highlighted when Amazon bought Whole Foods for $13 Billion - not only did Krogers and Walmart see their share prices dive but Wall Street rewarded Amazon's stock price with a $15 Billion bump which meant that virtually the organisation made a $2 Billion "profit" on the deal.

And I haven't even started talking about Google or Facebook who both count a third of the world's population as customers, Netflix the king of entertainment, Uber and their 10 Billion rides a year, and many others.

ACT NOW

With the business benefits of digitisation and the competitive environment being too great to ignore it's no longer a question if organisations will digitise, but when. As a result it's safe to say that in most countries, especially in the developed world, the vast majority of organisations already have digitisation programs in full swing with organisations such as JPMorgan Chase spending upwards of $15 Billion a year on technology as they, to quote their CEO, "Chase a once-in-a-generation transformation."

EXPLORE:

- Best practises and case studies
- Future of Business, Communications, Work and the Workplace
- Partner ecosystems and solutions
- Policy and regulation reform

ROBOTIC PROCESS AUTOMATION

3RD YEAR ON THE LIST



QUICK TAKE

Robotic Process Automation (RPA) can very much be thought of as little more than instructing a machine - in this case a bot or code - to execute mundane, repetitive, manual tasks, but while this might not sound that exciting RPA is seen by many as a revolution in Business Process Automation (BPA). Mundane it seems is cool.

It's this ability to automate everyday processes that require human action that allows organisations to use RPA to reduce costs and improve efficiency, and no matter what kind of organisation you are that's an attractive proposition.

IMPACT

At a global level it's believed that RPA could help boost global productivity growth by between 0.8 and 1.4 percent annually, which bearing in mind that some slow moving industries such as Construction, Education, Healthcare, and the Public Sector have actually seen productivity stagnating for the past few decades, obviously with caveats, is interesting in itself. This gets even more interesting though when you consider the fact, for example, in the USA alone productivity between 2007 and 2017 only grew at an annualised rate of 1%.

At a more personal level RPA gives organisations the opportunity to move their staff away from performing repetitive routine tasks, such as those associated with compliance, and take on work that's more demanding, interesting, and financially rewarding for both themselves and the organisations they work for.

Furthermore, with over 50% of enterprises already running RPA programs, and the trend on track to achieve almost universal adoption in the next few years, studies have shown savings of 35 to 65% for onshore operations and 10 to 30% for offshore.

EXAMPLES

Today compliance and productivity associated tasks are naturally at the forefront of the RPA revolution, but there are plenty of other tasks that can benefit from this trend too including financial closing, hiring and on boarding, inventory management, invoice processing, payroll, **Robo Customer Service**, system setups, and more. And, with benefits including helping eliminate human errors, improving compliance and service processing times, and increasing the overall scalability of operations there are plenty of examples to choose from.

In one example Uber used 100 bots to ensure regulatory compliance and improve the hiring experience and is now realising over $10Ml in annual savings. In another Spotify created a cross LOB citizen developer program who then developed 100 bots which helped them save over 45,500 man hours of labour and release a further 24,000 hours of capacity. Then, elsewhere, Siemens automated over 350 processes with over two thirds of them related to helping automate SAP activities. All of which is only just scratching the surface of what's possible.

ACT NOW

Every organisation is riddled with mundane and repetitive manual tasks that very few, if anyone, enjoys doing and that harm the organisations overall efficiency and productivity, so now that RPA tools are maturing it's little surprise that organisations everywhere are lining up to benefit from this trend.

EXPLORE:

- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Computing, Regulation, and the Workforce
- Partner ecosystems and solutions

Data sources: Deloitte, Gartner, Intellera, NASSC, OECD, UiPath, and various.

LEADERSHIP TRENDS

CONTENTS

... ADAPTIVE LEADERSHIP
... EXNOVATION

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EXPLORE STARTUPS & MORE

ADAPTIVE LEADERSHIP

1ST YEAR ON THE LIST



QUICK TAKE

Adaptive leadership is a rising leadership trend which emphasises a leaders agility, flexibility, and responsiveness to investigate change and embrace it. It's about leading as effectively as possible in complex and uncertain environments and situations where the solutions aren't clear cut or immediately obvious. Comprised of four dimensions it involves creating Win-Win solutions and outcomes, leading with empathy, learning through self-correction and reflection, and the ability to successfully navigate business environments - whatever those environments and conditions are.

Data sources: Harvard Kennedy, HBR, WGU, and various.

IMPACT

Adaptive leaders see change as a good thing, improve collaboration and inclusivity within their organisations, and de-prioritise the rigidity of rules - all of which ultimately help to create a more resilient and more competitive organisation, and a better workplace environment. This trend leans into the idea of using collective company intelligence to find solutions to external and internal changes, with leaders also finding it improves their decision making skills, mental clarity and focus, and their emotional resilience and mental health.

By moving from a traditional Command and Control structure to a more facilitative role leaders prioritise collaboration and shared problem solving rather than dictating solutions. This, in turn, empowers their company's employees who gain greater autonomy and ownership which in turn fosters greater engagement and skill development, and improves company loyalty. As a result, companies become significantly more resilient to both internal pressures and external shocks. They gain the ability to pivot rapidly when faced with disruption, and realise faster decision making and enhanced innovation capabilities.

EXAMPLES

Adaptive leadership is proving crucial for companies navigating today's dynamic landscape. Microsoft, under Satya Nadella, has exemplified this trend and used it effectively to accelerate Microsoft's cloud computing and AI businesses and gain market dominance. In the latter case, which is perhaps the best example, the company's swift pivot added at least $1 Trillion to their market cap and made the company's market position almost unassailable.

Similarly, energy giants like Shell have also leaned into this trend as they adapt to the **Green Energy Transition** and navigate political whipsaws, with the result being that they've added 5 Million new customers as they rapidly expand their EV charging infrastructure and integrated energy offerings. Elsewhere, Ford also embraces the trend especially when it came to **Vehicle Electrification**. With massive investments of over $15 Billion and workforce adaptation they grew EV sales 86% Q1 2024, which then whipsawed as Trump claimed his second Presidential term - showing that the job is never done, adaptability is crucial, and that the future is never certain.

ACT NOW

In a world that is constantly changing in unprecedented ways and often with unprecedented speed many companies today are forced to attempt to pivot on a dime - with **Primary Tariffs** and **Secondary Tariffs**, and other trends being a prime example of some of the external forces irking them. However, rigid organisations and leadership structures are much less likely to be able to move and pivot quickly, so in today's world organisations built for agility, flexibility, resilience and speed are a must. And this trend is one of the key pillars supporting those capabilities.

EXPLORE:

- Cultivate resilient mindsets
- Decentralised decision making
- Embrace continuous L&D
- Empower autonomous teams
- Foster adaptive cultures and psychological safety initiatives
- Prioritise rapid iteration capabilities
- Technology enablement

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

EXNOVATION

1ST YEAR ON THE LIST



QUICK TAKE

Exnovation is the strategic and deliberate process of phasing out - or sometimes viciously cutting out - the old legacy practices, products, and technologies that are holding an organisation back and preventing it from reaching its full potential and capitalising on new opportunities. It's an essential counterpart to innovation that cuts out dead wood and "bloat" by removing what's obsolete or inefficient. Done correctly it frees up resources that the organisation can reallocate to support new initiatives, boost growth, and improve the organisations agility, flexibility, resilience, and sustainability.

Data sources: Various.

IMPACT

Exnovation can have a significant impact on an organisation - its cash flows, competitiveness, culture, resilience, and more. On the one hand it signals to the company, markets, and employees that agility and competitiveness matter, and on the other by systematically shedding inefficient legacy or obsolete practises, products, and technologies it can free up substantial amounts of money, people, resources, and time which the organisation can put to much greater use elsewhere to fuel new growth engines and cement market leadership.

For competitiveness it allows your organisation to adapt, react, and pivot faster to changeable market conditions, while the resources it frees up can be reallocated to support new initiatives, including higher risk ones, and enable the organisation pursue new market opportunities faster than it might otherwise be able to. Crucially though, it also lets the leadership team and the organisation as a whole get back to focusing on what really matters - the core strategy - while having the added benefit of helping the organisation derisk itself, become fitter, leaner, and more agile - which in today's world is needed more than ever.

EXAMPLES

While there are many examples of Exnovation some of the most extreme come from the very colourful Elon Musk who not only took a literal chainsaw to the US Government but also threw out the literal kitchen sink at Twitter when he took the company over. While many argue that his efforts as the head of the US Department of Government Efficiency (DOGE) were chaotic and potentially cataclysmic, when he took over Twitter, now X, he fired 80% of the staff and to most people's surprise - while there were problems - the company didn't collapse. In fact, technologically at least X is now in better shape than it was, but unfortunately for the company it was Musk's questionable choices and leadership that tanked its revenues.

Other examples include Netflix who famously deliberately and aggressively phased out their DVD rental business in favour of streaming, and Volkswagen who deliberately stared to phase out the production of their traditional Internal Combustion Engine (ICE) vehicles in favour of their new Electric and Hybrid vehicles - which involved abandoning over a century of core manufacturing and engineering expertise.

ACT NOW

Sometimes it is necessary to de-clutter your organisation so you can have a better chance of future success. But it's hard. Exnovation is a valuable trend to explore but quite often leadership teams who practise it encounter resistance because, in many cases, individuals in the organisation over estimate the value of existing assets and struggle to undo their attachments to them. Ask any leader and they all have stories of how something in the business is holding them back and how they'd love to be able to get rid of it - Exnovation is the equivalent of the Guillotine, not many people like it, but used effectively it can have a dramatic impact on changing the status quo and your future fortunes.

EXPLORE:

- Assess long term impacts and the cost of lost inertia
- Clear communication programs
- Identify obsolete assets
- Map organisational resistance
- Plan phased removals and reallocating resources

MARKETING TRENDS

CONTENTS

... ANTI-SPONSORSHIPS
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ANTI-SPONSORSHIPS

3RD YEAR ON THE LIST



The proud anti-sponsor, Brewdog

QUICK TAKE

While some see the trend of so called Anti-Sponsorships as little more than shameless PR stunts one could easily argue that attention grabbing PR stunts have been a mainstay of many brands for as long as brands have existed.

Anti-Sponsorships, which can often compliment **Brand Jacking** and other trends, is when brands take a stance against a particular activity or event. It's also a way for them to benefit, albeit sometimes questionably, from the buzz and hype around certain events without actually having to pay the organisers any money.

Data sources: Campaign, Drum, Marketing Week, and various.

IMPACT

While there are many impacts of this trend, which range from using it as a platform to stir debate about the ethics and morals of particular events, hosts, and organisers, and raising awareness of important societal issues, ultimately this trend is about aligning your brand and its core values with important societal issues to drive long term customer engagement and loyalty.

Executed very carefully the results can be impressive especially as surveys show that more than 50% of consumers respect brands that take a stance on important issues much more than those that don't. However, if your brand has skeletons in the closet, is inauthentic, or worse has a dubious reputation itself then beware - embracing this trend can create a backlash that's difficult to contain.

Assuming you execute carefully though it can put your brand on a golden pedestal and make you the envy of your competitors with the added benefit that it allows you to "participate" and be included in the conversations about the events you're "not sponsoring" without ever having to pay the organisers a dime which is a huge saving in itself.

EXAMPLES

While there are many campaign examples some of the best, depending on your definition of that word, have been those that took a strong stance against the hosts and organisers of particular events, and which generated both criticism and praise from industry pundits, the media, and the public alike.

In 2021 during the Qatar FIFA World Cup UK beer manufacturer Brewdog declared itself the proud anti-sponsor of the tournament with a series of billboard ads protesting Qatar's human rights record, LGBTQ stance, and FIFA's bribery scandals. Not only did the "Lost Lager" campaign, the profits from which were donated to charity, generate international headlines but it also generated significant praise and outrage, stirred up frenzied armchair debates, and had critics questioning why the brand was both campaigning against the World Cup while at the same time still screening it in their bars.

Results wise though after the campaign 11% of beer drinkers said they would be less likely to buy the brand, but 24% of football fans and 31% of beer drinkers said they would be more likely to buy it, so "Score!"

ACT NOW

While many companies spend millions or even hundreds of millions of dollars securing the sponsorship rights of major events, and other things, this trend provides brands with a cheaper way to piggy back on the popularity of those events while at the same time extolling their core values and aligning them with consumer sentiment to build brand loyalty and equity. But its not without its risks which is why brands should embrace it with their eyes wide open and should have plans in place should things go south.

EXPLORE:

- Business and impact assessments
- Consumer behaviours
- Future of Media and Entertainment, and Sports
- Litigation protection
- Scenario planning

ATTENTION PRICE INFLATION

3RD YEAR ON THE LIST



QUICK TAKE

We are all used to the concept of traditional inflation, such as the Consumer and Retail Price Inflation indices, but as we continue to see the rise of **Synthetic Content** one kind of inflation that many companies are missing is the rise of Attention Price Inflation (API). As the volume of content being produced increases exponentially it will become increasingly difficult for your content to be surfaced and viewed. Ultimately, this means that in the future you will have to spend more energy and more money than you do today to get peoples attention, thereby the reason behind the name of this trend.

IMPACT

We're entering an era where the supply of content so far outstrips demand that standing out and capturing peoples attention will become exponentially harder and more expensive in the future. And if you follow Cost Per Click (CPC) rates then you'll already be seeing the tip of this trend emerging.

Furthermore, as this imbalance gets worse in the future - as more brands and creators come online and as new technologies and trends including **5G**, **Digitisation**, **Creative Machines**, and **Web 3.0** democratise content creation and distribution - it means it will be increasingly difficult for your content to be seen, let alone be acted on or stand out. Unless, of course, you're willing to pay platforms top dollar to surface it.

Ultimately, this means that brand will be the defining differentiator between businesses that thrive and those that struggle to survive, especially as next generation platforms and marketing channels that only offer a limited set of results to consumers, such as voice, will disproportionately favour businesses and content producers who have emerged as the market leaders with strong brands.

EXAMPLES

While there are many ways to measure the cost of acquiring an individuals attention overall it's difficult to quantify because there are no aggregated industry figures and even if there were they would depend on what groups and industries you're targeting, the time of year, the country or region, as well as what format your adverts take, so as all marketing agencies know it's a literal minefield. And that's before the companies selling these ad spaces change their reporting methodologies and transparency.

Despite this though in the past two years on average the cost of Google CPC for retailers in the USA has increased by well over 40%, and globally Facebook and Instagram CPC costs have doubled on average during the same period.

However, while we still see significant API we have to be thankful that it isn't as high as it was in the early years when Google CPC cost grew by over 175% between 2010 and 2015 and Facebook's grew by over 300% during the same period. But, that said while the headline numbers are somewhat suppressed today the fact is they're still growing so beware API.

ACT NOW

As the growth in the availability of content continues to far outstrip the growth in user demand inevitably brands will find themselves having to spend more effort and more money getting the content they produce in front of customers, whatever channel they're using, and whatever regions, sectors, or groups they're targeting. Ultimately this also means that the brands that get their API strategy right will win and grow at a faster rate than their peers which will only serve to increase the divide between the leaders in a respective field and the others.

EXPLORE:

- Alternative brand building, content, and Marcom strategies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Content, Entertainment and Media

Data sources: Federal Reserve, Google, Social Media Examiner, Tinuiti, VaynerMedia, and various.

BRANDALISM

3RD YEAR ON THE LIST



HSBC being flamed, Brandalism

QUICK TAKE

While many companies use marketing to promote the benefit and virtue of their products Brandalism does the opposite. A portmanteau of the words "Brand" and "Vandalism" this trend is used almost exclusively by activists around the world to bring attention to the causes they care about by removing your brands glossy marketing veneer to expose your company's dirty laundry.

It's anti-marketing at its finest, and from sharing images of cars stuck in pollution shrouded traffic jams and flights to plastic strewn beaches, this trend is gaining global momentum.

IMPACT

As the cost of marketing grows, thanks in part to **Attention Price Inflation**, and as the cost of content going viral falls thanks to the **Power of the Individual**, brands today are having to spend more than ever before to distribute and promote their carefully crafted marketing content, and that's before the Brandalism experts get these brands target consumers to question their buying choices.

As a result, and increasingly worried that their expensive ad campaigns will be hijacked and distorted this trend has prompted many brands to investing more heavily in copyright and trademark infringement, criminal damage, defamation, and removal and take down litigation.

Furthermore, as the trend gathers momentum so too does the number of brands, geographies, and issues activists target, and with an almost endless number of issues to highlight, from corporate mismanagement to **Greenwashing** and beyond, they've no shortage of material. For their next act though we're now seeing them not just target brands, but also the advertising agencies behind the brands.

EXAMPLES

There are many examples of this trend, and while some use the power of crowd sourcing to get the message across, such as a brandalism campaign in the UK that saw hundreds of street artists replace hundreds of corporate adverts with radical anti-consumerist advertising - dubbed "the largest advertising takeover in world history" - others are more nuanced and sophisticated.

With HSBC logos that are on fire to highlight the company's continued investments in fossil fuel projects alongside Nike logos that bleed to highlight poor factory working conditions, to RyanAir ads that have been re-written to advertise "RuinAir's" holidays to plastic strewn tourist beaches there are no shortages of examples.

We've also seen activists turning Volkswagen ads into "We're sorry we got caught" DieselGate ads, British Airways "Going Green" ads into illustrations of planes with golf courses in business class, Air France's UN COP sponsorship ads turned into a bribery scandal, and Lamborghini's opulent ads into equally opulent pieces of artwork promoting climate chaos.

ACT NOW

As we continue to see activism on the rise across the world brands in all sectors should be ever mindful of how their activities and marketing can be turned against them. However, while this trend might seem to have many downsides brands could also use it to their advantage either by countering it head on, or embracing and owning it, and then using it as a tool to help change organisational behaviours and culture.

EXPLORE:

- Business and impact assessments
- Corporate culture
- CSR and ESG policy reviews
- Ethical and moral obligations
- GRC reviews
- Litigation options

Data sources: CNET, DesignBoom, Drum, FT, Researchgate, and various.

BRAND ACTIVISM

3RD YEAR ON THE LIST



QUICK TAKE

As brands look to boost customer engagement and loyalty, and ergo revenues, many recognise the fact that increasingly consumers expect them to have a strong public position and take a stance on today's major societal issues - hence the term Brand Activism, and the trend **Anti-Sponsorships**. Brands also realise that sitting on the fence or staying silent is increasingly not an option, which takes many of them into uncomfortable territory especially when we consider the **Polarised Society** trend. However, while embracing this trend authentically can have its benefits, mishandled it can destroy brand value.

Data sources: Uppsala University, and various.

IMPACT

Brands have always had positions on important societal issues but historically most of these have been kept behind closed doors, or at best discretely hidden behind carefully worded marketing communications.

Today though more than 50% of consumers want brands to be open and vocal about their positions on important issues and take a stance, so it's no coincidence that being on the right side of the so called "opinions fence" can have significant upsides including increased brand equity, which can top 30% of a company's market cap, customer engagement and loyalty, revenues, and shareholder value.

Despite these benefits though you need to be acutely aware that by "picking a side" you can inadvertently alienate some of the customer groups you're courting. Furthermore, navigating this trend gets even trickier when you factor in the fact that when brands do take a stance studies have shown that customers who agree with them will check the company's language and back stories, and if they aren't authentic or consistent then even these supportive customer groups can turn on you.

EXAMPLES

When it comes to embracing this trend companies have to be all in or all out, there is generally no room for a middle ground, plus the C-Suite and board have to agree your strategy because if executed incorrectly there can be significant damage to your company's reputation and share price which can take years to repair. Despite the risks though more brands are embracing this trend today than ever before including Apple, Disney, Patagonia, and Nike.

In Apple's case they take a strong stance against the **Demise of Anonymity and Privacy** which translates into their being the brand for privacy, and in Patagonia's case every strand of the organisation supports the **Circular Economy**, environmental activism, and sustainability.

However, while some brands just benefit others experience mixed outcomes such as Disney who took a strong stance on LGBTQ rights then saw Republicans rescind their special multi-billion dollar tax breaks, then there's Nike whose sales surged when they supported Colin Kaepernick right before they saw their shares tumble, Nike gear set on fire, and calls to boycott the brand.

ACT NOW

It's always easy to stay silent in the face of adversity or wrong doing, and while this trend can be one that keeps the board awake at night and investors on tender hooks it's fairly easy to argue that we should all step up to our moral obligations and speak up as when the need arises. That said though you have to embrace this trend with your eyes wide open and with contingencies as when or if things go south.

EXPLORE:

- Business and impact assessments
- Consumer behaviours
- Corporate culture
- Scenario planning

HEADLESS BRANDS

3RD YEAR ON THE LIST



QUICK TAKE

We're all familiar with the marketing strategies for traditional brands with traditional company hierarchies and structures, but in an age where **Web 3.0** and **Tokenisation** are helping decentralise all manner of products and services as well as enabling the development of **Decentralised Autonomous Organisations** and other non-traditional business models, we're seeing the rise of what many call Headless Brands - brands built by decentralised fandom communities that collectively, albeit loosely, contribute and decide on everything from asset and product development to messaging.

Data sources: Other Internet, FT, STOA, and various.

IMPACT

Headless brands challenge the very idea that a brand is centralised, as well as our assumptions about what a brand is and how it works. Unlike traditional brands the promotion of these "alt-brands" such as **Cryptocurrencies** like Bitcoin, open source communities, and even **Virtual Nations**, is done by the community and not by any centralised marketing authority.

Built around the pillars of community, autonomy, and equity - the ability to buy into the "brand" they're building and participating in - today fandoms have been able to successfully build globally recognised alt-brands that outperform those created by some of the best and well funded marketing teams.

While the nature of this trend makes quantifying its overall impact difficult we do have some metrics that we can play with. Take Bitcoin as a prime example, in 2021 without any form of centralised marketing team or strategy it reached a market cap of $1.28 Trillion putting it on a par with the likes of Amazon, Apple, and Google. Looking further afield we saw the Github community bought by Microsoft for $7.5 Billion, as well as Kaggle by Google, and many more.

EXAMPLES

Today the convergence of different technologies and trends lets individuals with common passions come together in loose collectives to build self-enforcing, self-incentivised, contagious narratives that are irrepressible, and while many of the headless brands they create remain small every so often some of them break cover and change the world.

Undoubtedly Bitcoin is one of the most famous headless brands, along with Dogecoin, Polygon, and Tether, as are many open source communities such as Linux. Even Asgardia, the world's first self-proclaimed space nation, is in on the act. But, there are also less obvious examples on the **Dark Web** like Hydra, one of the world's largest and most notorious criminal marketplaces which, if it was a company, would be in the Global 200 with over $50 Billion in annual revenue.

Then we have an increasing number of NFT marketplaces such as the Bored Ape Yacht Club which, worth over $1 Billion, have already signed numerous corporate partnerships, and launched everything from skateboards to animated YouTube series.

ACT NOW

The business models that have served us so well this far are being stretched and re-invented before our eyes with the result being that many modern age "brands" that exist in the ether now have almost nothing in common with their predecessors. As a result I suggest marketing departments investigate the power of this trend and use it to compliment their own official strategies.

EXPLORE:

- Business and impact assessments
- Fandom communities
- Emerging technologies and technology roadmaps
- Future of the Workforce and Workplace
- New business models, operating models, and products
- Partner ecosystems and solutions

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EXPLORE STARTUPS & MORE

MARKETING TO THE PLAYGROUND

3RD YEAR ON THE LIST



Prime Hydration

QUICK TAKE

Most countries have strict rules governing how brands market their products to children and in the majority of cases brands simply fiddle around with traditional formats and tweak the content to make it more age and audience appropriate. However, as the **Global Digital Addiction Rates** increase and as social media continues to dominate children's lives influencers and marketers alike are increasingly targeting younger consumers using various antics, behavioural psychology, viral marketing, and other marketing techniques to generate hype and hysteria around their products.

Data sources: Bleacher Report, The Conversation, and various.

IMPACT

When it comes to social media despite regulators best efforts to govern it it's fair to say it's still very much the Wild West, and this has given influencers especially almost a free reign to do whatever they want to capture, entertain, and monetise their audiences - and monetising them they are.

However, while most influencers such as Selena Gomez are rather traditional in their approaches to audience monetisation others such as KSI and Logan Paul have been bolder, using their large follower bases and scarcity marketing tactics to generate hysterical levels of demand for their products among playground age children unlike anything anyone has ever seen before. Largely seen as marketing to the playground to turn their products into the next playground craze the pair and other influencers managed to whip playground children everywhere into frenzied mobs who, at the height of the craze, would do almost anything and pay almost anything to get their hands on the drinks. As a result this trend has already shown it can be used to build multi-billion dollar brands, and turn markets on their heads, in what many would regard the blink of an eye.

EXAMPLES

While many brands would love to whip their consumers into a frenzy the fact of the matter is that very few of them target children - the playground - in the same way the virality of Logan Paul's Prime campaign managed to do. And, as we see the **Power of the Individual** continue to rise, as well as the cost of creating content become easier and cheaper with the rise of **Synthetic Content** there's little doubt this will be the last time we see influencers, with no foothold in a market, create hysteria that most companies can only dream of.

In the first year alone Prime Hydration, as it's known burst onto the shelves of over 20,000 stores around the world, sold more than 300 Million bottles worldwide, and broke $250 Million in sales to rival some of the biggest companies in the world - namely Coca Cola and PepsiCo. Then, with an eye to securing the future of the brand they expanded the product lines, embraced the world of sports, penned a deal with Base Sports to expand the drink's presence into more than 60 US based youth sports to reach an additional 1.2 Million consumers, and expanded their partner program internationally.

ACT NOW

We live in an age where individuals can generate huge amounts of hype around the products they want to sell cheaper and easier than ever before, and while many brands make use of influencers increasingly it's dawning on many incumbents that these same influencers, if they know what products to develop and how to execute their campaigns, could quickly turn into their next fearsome competitor. As a result this is a trend no brand should under estimate.

EXPLORE:

- Brand building strategies
- Business and impact assessments
- Communication and content strategies
- Creative marketing campaigns
- Future of Marketing, and Media and Entertainment
- Influencer and Marcom strategies

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

SINGLE CUSTOMER VIEW

3RD YEAR ON THE LIST



QUICK TAKE

In an age where **Artificial Intelligence** (AI) and **Digitisation** are two of the world's most prevalent trends the opportunity for companies to collect and analyse vast quantities of offline and online customer data to create a Single Customer View that can be used as the basis to create hyper personalised advertsing and customer experiences has never been cheaper or easier. However, whether it's for regulatory or technical reasons, many companies still store customer data in disconnected silos preventing them from creating engaging, frictionless, or relevant experiences for their target audiences.

IMPACT

Ultimately the more you know about your customers the better you can serve and target them. However, as AI advances increasingly companies will also be able to use their customer data, augmented with data from other sources, to predict their customers needs ahead of time which in itself will be a titanic shift in capability and thinking. Today we see this already emerging.

From an on the ground perspective though 71% of customers express frustration with impersonal experiences, and research has shown that 91% of consumers are more likely to engage with companies who recognise and remember them and their individual preferences. Furthermore, these same people are also 90% more likely to buy more frequently and spend 60% more per transaction with companies that have fully invested in this trend, with those companies out selling their peers by 20% on average.

On the flip side of the coin though it's also estimated that duplicate data costs companies around the world $3 Trillion per year - let alone the cost of inaccurate data whose direct and indirect cost is likely a lot higher.

EXAMPLES

While there are many examples of this trend in action some of the most pertinent include companies such as Amazon, ASOS, Netflix, and Starbucks.

In Amazon's case it's estimated their relentless pursuit of customer data and creating a single customer view that they can then use to make persoanlised recommendations generates more than 35% of their revenues - a staggering uplift by any measure and not inconsequential in dollar terms either.

Meanwhile the story at Starbucks is similar, by using this trend to drive their mobile app and rewards program it's now estimated that it helps drive more than 40% of their global revenues.

Over at Netflix though the picture is different - in their case having a single customer view of their customers viewing habits, genre preferences, and ratings the company has reportedly saved over $1 Billion a year by reducing customer churn. Then, at ASOS according to their annual report the company reported a 16% increase in orders and a 22% increase in revenues after they rolled out their first "Fit Recommendations" feature.

ACT NOW

There's no denying the more you know about your customers - even in our increasingly faceless digital and **Mobile First** world - the better you can serve them and the more stuff you can sell them. As we continue to see the rise of the **Demise of Anonymity and Privacy**, **E-Commerce**, and worldwide digital first business models this trend means that companies can serve their customers better via their **Omni-Channel Experiences** and **Opti-Channel Experiences** than they could without this trend making it an important trend to embrace.

EXPLORE:

- Business and impact assessments
- Data privacy regulations
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, and Retail
- GRC reviews

Data sources: Accenture, EConsultancy, Razorfish, Segment, and various.

TREND JACKING

3RD YEAR ON THE LIST



QUICK TAKE

Trend Jacking, which is an upper funnel activity that helps build awareness, is the opportunity to capitalise or exploit a current brand, craze, trend, or news topic in order to strengthen your brands association with your core target audience, attract sales leads, and generate profitable outcomes.

Not only will using this trend correctly help you quickly amplify your brand voice and align your brand values to the topic in question, but done correctly it can earn you positive media attention, increase your organic reach, and significantly improve your credibility.

Data sources: BuzzSumo, Hubspot, and various.

IMPACT

Done correctly and authentically, by picking events that are relevant to your brand, by getting the timing right, and by not putting the obvious pursuit of profits first, this trend has significant upsides, can drive brand conversations and engagement, and can even help brands overcome the **Attention Price Inflation** trend. However, if you're not very careful with your content and messaging, such as jumping onto a trend that includes death or upset which is something known as "Black Hat Trend Jacking," it can have the opposite effect and send your brand equity into a death spiral.

A great way to build brand equity and loyalty the ROI of trend jacking campaigns varies massively and is incredibly difficult to guage. That said though often the results speak for themselves and you'll be hard pressed to find any brand that's not got this trend embedded into its marketing strategy so it's here to stay. And with brands like Dove managing to use the news of news anchors being fired for having grey hair to get millions of social media impressions with their #KeepTheGrey campaign it's obvious that anyone can leverage it.

EXAMPLES

While there are many examples, almost an infinite number, some of the best and most inventive come from the entertainment, retail, sporting, and technology sectors, and they range from quickly put together memes to full on video productions.

Some of them are also the least obvious with, for example, Mr Beast famously hijacking the Squid Games trend to create his own viral content which so far has topped over 360 Million YouTube views alone. Then there was Dunkin' Donuts who hijacked the infamaous Blue-Black White-Gold dress trend a few years back to earn themselves a staggering number of likes and shares across their social media platforms, Budlight who hijacked the Storm Area51 trend with mock ups of glowing beer cans, and Oreo who even used power outages across the US to promote their "Dunking in the Dark" campaign.

Elsewhere Adidas, Nike, Under Armour, as well as Netflix and Microsoft are also famous for trend jacking everything from big societal topics and beyond, and even the UN jumped on this trend by hijacking Oscar announcements to promote womens equality.

ACT NOW

Trend jacking done right is a very powerful way for brands to increase their organic reach for relatively little cost to boost customer engagement and loyalty, but it can't be done in a thoughtless or haphazard way. This is a trend that all brands should explore and experiment with but company executives have to be on board and there should always be clear guidelines in place, you still have to be respectful of other companies IP and Trademarks, and you should always be on guard for your own brand being trend jacked.

EXPLORE:

- Advertising guidelines
- Alternative branding strategies
- Business and impact assessments
- Future of Content, Media and Entertainment
- Trend jacking defensive plays

OPERATING MODEL TRENDS

CONTENTS

... ADAPTIVE OPERATING MODELS
... ALGORITHMIC DECISION MAKING

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

ADAPTIVE OPERATING MODELS

3RD YEAR ON THE LIST



QUICK TAKE

The **Accelerating Rate of Change** not only means that our world is changing faster than ever before, it also means that organisations everywhere are faced with trying to predict and react to cycles of disruption and shifting consumer demands that are getting faster and more intense over time. And, bearing in mind that the vast majority of organisations have problems adapting and, if required, pivoting at speed this trend, which prioritises discrete modular plug and play capabilities, frictionless interactions, on demand resourcing, optimised processes, and human centric design, is now coming of age.

Data sources: HBR, Innosight, McKinsey, and various.

IMPACT

In today's age, and even more so in the future, having the culture and tools that let you adapt and react to changes in your marketplace at speed is vital. In fact it is increasingly being seen by many as not just necessary, but as the new competitive advantage.

One of the most over used statistics today is the one that quotes the average length of time organisations remain in the S&P 500. While it used to be an average of 61 years in 1958 today it's less than 18, with many analysts believing that by 2027 75% of the organisations in today's S&P will have disappeared. This figure is also why the trend of **Creative Destruction** has now become so popular.

Organisations that embrace this trend design their operating models around their customers and employees, and operate in much the same way as a modern technology platform does. They do this by being able to frictionlessly integrate and interact with different ecosystems, by focusing on continuous improvement, optimisation, outcomes, and standard interfaces, and by being able to scale modular-like plug and play resources on demand.

EXAMPLES

When it comes to reacting to market changes whether it's disruption, new competitors, shifting customer demands and government policies, new technologies, or all manner of other things, most organisations are too big, too slow, and too bogged down by their culture and processes to be able to react in time to either take advantage of them or defend their market positions.

Many of the organisations embracing this trend are known for their market dominance and adaptability including Alibaba, Amazon, Facebook, Google, and other such organisations. However, Huawei and Samsung both of whom operate in highly disruptive and competitive environments, are perhaps the most interesting examples.

In Huawei's case they have over 240 foresight professionals in their 2012, consumer, and enterprise divisions who scan the future and interact with local ecosystems, these signals are then fed into the board who prioritise R&D and LOB activities based on market intelligence and adapt and pivot the organisation accordingly. The same goes for Samsung and their 3,000 strong Chaos Lab in Seoul ...

ACT NOW

The ability to be both proactive and reactive to change and be able to adapt to it at speed, or to put it another way to be able to rebuild the aircraft in mid flight, is no longer just a nice to have it's necessary in today and tomorrows environments.

EXPLORE:

- Best practise and case studies
- Emerging technologies and technology roadmaps
- Future of Work
- Partner ecosystems and solutions
- New business and operating models

ALGORITHMIC DECISION MAKING

3RD YEAR ON THE LIST



QUICK TAKE

Historically it was always humans who made the decisions. Technology and tools were just dumb prosthetics - screwdrivers and steam trains. Today though **Artificial Intelligence** (AI) - both Machine Learning and Deep Learning systems - is changing that paradigm. Capable of basic "If This Then That" decision making as well as more advanced strategic "What If" decision making today this class of AI's are being used by organisations and boards to both augment decision making and make decisions - all of which makes **Explainable Artificial Intelligence** even more necessary.

Data sources: Various.

IMPACT

As we cede more decision making to the machines we also cede human responsibility for those decisions and put more trust in those machines. All of which has system level impacts and ultimately re-enforces the **Algorithmic Society** where our personal and professional lives are increasingly directed and influenced by those same machines for better and worse.

As AI decision making systems rise to prominence and as the decisions they make become more critical, for example in the Defense, Financial Services, Government, and Healthcare sectors, Explainable Artificial Intelligence that allows stakeholders to understand their decision making processes becomes an increasingly vital tool.

Furthermore, as **Behavioural Computing** lets customers, employees, executives, and stakeholders alike interact with and leverage these systems more it is inevitable that, as we are already seeing, they will be responsible for more inter and intra organisation decision making, including **AI Based Recruiting**, corporate strategy and M&A, as well as many other B2B and B2C related decision making activities.

EXAMPLES

While there are plenty of examples how AI is being used to make all manner of business related decisions, whether it's customer credit decisions or deciding which suppliers to prioritise or use, I've highlighted some of the most interesting examples below.

Examples such as an investment management firm in Hong Kong who, on the brink of bankruptcy, decided to use an AI to make its investment decisions for it with the result being that it saved the company and was officially "promoted" to become a member of the board with no future investment decisions being made until it was "consulted."

Then there is the example of a fully autonomous hedge fund based out of Wall Street whose AI is responsible for all investment decisions with the founders stating that if they died it would just keep on running.

Elsewhere the US military is using AI to run war games and make in theatre decisions, healthcare organisations are using it to create and recommend treatment plans, and many more mundane examples as well.

ACT NOW

While the use of AI to augment and automate decision making has its advantages unless stakeholders are able to quantify and query the accuracy of those decisions, and the reasons behind them, then they risk their organisations becoming little more than algorithmic black boxes with limited to no control or oversight, and a whole host of compliance, ethical, and regulatory problems.

EXPLORE:

- Best practises and case studies
- Customer and employee escalation, service, and support
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Ethics, Government, and the Workforce
- GRC, policy, and regulation reform
- New business and operating models

R&D TRENDS

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... CONTINUOUS INNOVATION
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EXPLORE STARTUPS & MORE

ARPA EVERYTHING

3RD YEAR ON THE LIST



Stealth projects in 1974 laid the B-2A foundation

QUICK TAKE

As governments increasingly see innovation as a means to help them increase **Global GDP**, as well as move the dial on **Wealth Inequality**, and many other trends, as well as win the geopolitically charged **Innovation Cold War,** it shoudn't come as much of a surprise that increasingly they're trying to replicate the US Defense Advanced Research Projects Agency (DARPA) model which has been responsible for developing many of the world's most impactful innovations. The result is that today many countries are developing their own country specific or sector specific ARPA initiatives.

Data sources: Various.

IMPACT

There is no denying the impact that DARPA, the US military's bleeding edge research agency, has had on the world at large. What is most surprising though is that at any one point in time the agency is running more than 200 projects on what many would regard as a relatively meagre budget of just a few billion dollars per year with a lean staff whose sole purpose is to "develop breakthrough capabilities, concepts, and technologies" for US national security.

With historic world changing innovations that include everything from self-driving cars, drones, GPS, and the internet, through to RISC computing, stealth, and many others, across an incredibly diverse range of themes, today you'd be very hard pressed to find anyone who doesn't agree that the agency has been one of the world's greatest innovation success stories and that the US economy hasn't greatly benefited from its research.

Despite all these successes though it can be argued the agency's just getting started which is why today governments everywhere, from China and Japan, to the UK, are creating their own country and sector specific ARPA programs.

EXAMPLES

While many people will look to DARPA's past successes the agency never rests and it's fair to say that the research they conduct is often at least two generations (N+2) ahead of today's bleeding edge capabilities. This means that today their projects include everything from the development of knowledge uploading and memory transfer technologies, through to the development of airborne aircraft carriers, biological cyborgs, in vivo human pharmacies, living sensors, and much more - many of which appear in my complimentary Exponential Technology Codex and on our website.

Moving beyond DARPA though so far the US government has created many spin offs including ARPA-Climate (ARPA-C), ARPA-Energy (ARPA-E), ARPA-Health (ARPA-H), as well as Intelligence-ARPA (IARPA), and others, and while their success remains to be seen ARPA everything seems inevitable.

In 2016 China created Junweikejiwei it's own high risk high reward DARPA clone, Europe launched JEDI, India launched DRDO, Russia launched the Skolkovo Institute, the UK launched ARIA, and there are many others emerging, including in Japan and elsewhere.

ACT NOW

DARPA's success on the world stage means that today there are a large number of governments who are trying to replicate it and create their own Advanced Research Project Agency (ARPA) programs. However, while the ARPA model is attractive and successful, so far, replicating it is by no means an easy task.

EXPLORE:

- Emerging technology and technology roadmaps
- Partner ecosystems
- New business and operating models
- Policy and regulation reform

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EXPLORE STARTUPS & MORE

CONTINUOUS INNOVATION

3RD YEAR ON THE LIST



QUICK TAKE

Continuous Innovation, where products can be constantly and in many cases automatically and autonomously designed, iterated, and produced on the fly in real time, is now possible because of the convergence of several powerful technologies and technology capabilities.

Not only will this give organisations a significant competitive advantage in the marketplace, but it will also let them significantly reduce the cost and time it takes to produce products in some cases by up to 99 percent.

Data sources: Autodesk, Brookings, ECB, and various.

IMPACT

Continuous innovation, or innovation at digital speed, allows organisations to create and iterate new products and get them into the market at speeds that would have been unimaginable just twenty years ago. And, as the technologies that underpin this trend evolve and mature, we could soon see a time where both digital and physical products and services are designed, iterated, produced ,and updated in real time.

Today we are witnessing the beginning of a new **Innovation Cold War** and inevitably this trend could widen the gap between those who embrace it for economic and political advantage and those who don't. Furthermore, when combined with **Creative Destruction**, and other trends, it's no understatement to say that it could change the world order as countries, as well as organisations, leverage it for competitive advantage.

Innovation has long been known to help fuel economic growth and improve productivity, and as the pace of innovation accelerates in the future we can expect these benefits to be even more pronounced.

EXAMPLES

By combining together the benefits of **5G**, **Additive Manufacturing**, **Digital Twins**, **Internet of Things** (IoT), **Synthetic Innovation**, and other technologies and trends today products embedded with intelligence and sensors can relay information about their behaviours and usage patterns to Creative Machines that can then use that information to iterate new and improved versions in simulation. These products can then be digitally generated, or in the case of physical products manufacturing processes can be optimised in Digital Twin environments before being fabricated in factories using Additive Manufacturing or robotics technologies.

As an early stage trend organisations such as Airbus, BMW, General Motors, Google, NASA, and others are leveraging it, and parts of it, to help them innovate everything from cars and computer chips to aircraft, space habitats and vehicles, and software.

In time it is inevitable that this will become the defacto way all organisations design, innovate, and iterate new generations of products.

ACT NOW

The ability to continuously design, iterate, and produce products in real time, and therefore all but eliminate the often lengthy product development cycles that we have today, will not only transform the innovation process but it will also call for a radical re-think of how organisations develop, connect, integrate, and support their products.

EXPLORE:

- Business and impact assessments
- Future of Artificial Intelligence, Communications, Creativity and Innovation, and Manufacturing
- Integrated ICT and OT stacks
- Partner ecosystems and solutions
- New business and operating models
- Policy and regulation reform
- Product innovation initiatives

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

CREATIVE DESTRUCTION

3RD YEAR ON THE LIST



QUICK TAKE

Creative Destruction, which is the dismantling and ergo "destruction" of long standing organisational cultures, products, and practices, has been around for hundreds of years.

Today though, as the global rate of industry disruption and associated "Economic Destruction" accelerate which, for example, is highlighted by the increasing churn we see in the S&P 500, this trend is now going into overdrive as all manner of organisations experiment with new ideas and innovations and try to re-invent their markets and create new ones.

Data sources: INSEAD, Invesco, MIT, and various.

IMPACT

Creative destruction is often seen as the economic driver of growth in modern economies and has both positive and negative impacts on society. It's generally accepted though that the benefits far outweigh the costs with the trend ultimately creating more resilient organisations and societies, better income equality and living standards, greater wealth, as well as often improving the customer experience. It also does all this in a way that regular economic stagnation can't replicate.

Throughout history we've seen creative destruction impact the fortunes of many industries, from the agricultural industry in the 1900's to the communications, construction, energy, entertainment, manufacturing, retail, space, technology, and transportation industries,and many others, today.

While there are many ways to measure its impact recent studies have shown it increases economic productivity by over 50 percent, and that each year it's responsible for destroying 10 percent of all jobs, as well as being responsible for creating about the same number of new ones.

EXAMPLES

While it is only natural for people to fear change and uncertainty, both of which this trend can introduce into the market, and focus on the trends losers we can clearly see today that there are a huge number of benefactors from it.

While organisations such as Amazon, Apple, Microsoft, Netflix, SpaceX, and Tesla, as well as others, have embedded this trend into their corporate culture and destroyed a lot of the value held by older more traditional industry incumbents such as Sears, Nokia, IBM, Blockbuster, Boeing, and General Motors respectively, along with others, it can be easily argued that they have created even more wealth and prosperity than if the status quo had been allowed to perpetuate. And this is the principle power of this trend.

Ultimately as long as we live in a capitalist society the forces of competition and innovation will always compel organisations to develop new products and services, and those who remain stagnant will be hurt by them. As a result the lesson, if there is one to be taken from this trend, is to never sit still and, as Jeff Bezos says: "Always treat every day as day one."

ACT NOW

In a world that is increasingly volatile and complex, and where the **Accelerating Rate of Change** lets organisations disrupt the status quo at speeds that were unimaginable just twenty years ago, this trend must be at the forefront of your thinking.

EXPLORE:

- Emerging technology and technology roadmaps
- Future of Disruption
- New business and operating models
- Partner ecosystems and solutions
- Product innovation initiatives

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EXPLORE STARTUPS & MORE

ROBO-LABS

3RD YEAR ON THE LIST



QUICK TAKE

As access to increasingly affordable and powerful automation technologies increases, which include advanced computing, **Artificial Intelligence** (AI), and **Robotics**, more organisations are semi or fully automating their laboratories and laboratory processes - the primary benefits of which include reduced costs and improved efficiency, speed and the automation of repetitive tasks, and the ability of these technologies to self-refine their experiments based on the outputs.

IMPACT

Today there are many experiments that rely on repetition and repetitive processes, and Robo-Labs are already showing that they can perform experiments thousands of times faster than their human counterparts - if for no other reason that the robots performing the experiments can work around the clock without breaks. As a consequence this means that new scientific breakthroughs and product development is sped up dramatically with all the benefits that brings.

Additionally, as the technologies that make Robo-Labs possible continue to mature, and as robotics technologies become both easier to program - in some cases programming themselves as is the case with General Purpose Robotics - and become more adaptable, in time these labs will only get faster and more capable which, in turn, will multiply the benefits.

EXAMPLES

The majority of robots used in Robo-Labs today wouldn't look too out of place in a factory production line and are dependent on Machine Learning to perform their duties, but there isn't denying their value when it comes to helping researchers run their experiments faster and more efficiently.

Often described as autonomous mobile workers these LiDAR equipped robots be dropped into a wide variety of different lab environments and use the equipment that is already there without either any, or much, modification.

Furthermore, in general if people can use the equipment then so too can the wireless robots - and from measuring and dispensing chemicals to measuring the outputs and deciding the best course of action and modifying and optimising their workflows accordingly they're certainly proving their worth.

While the field is still young organisations like Kuka Robotics are taking the lead with university researchers predominantly in the West leveraging the trend.

ACT NOW

Designed and incorporated into the R&D workflows properly Robo-Labs can be of great benefit. But, at the moment they are often better suited to particular environments and use cases. Therefore, In our estimation organisations should explore this trend as well as other trends in this section to find the one that is most optimal for your ambitions and circumstances.

EXPLORE:

- Automation strategies
- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Creativity and Innovation, and Robotics
- Partner ecosystems and solutions
- Proof of Concepts

Data sources: Kuka, MIT, University of Liverpool, and various.

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EXPLORE STARTUPS & MORE

SCIENTIFIC REPLICATION CRISIS

3RD YEAR ON THE LIST



QUICK TAKE

The Scientific Replication Crisis, which increased 10 fold in just 10 years from 2010, with retractions now running at an average rate of 4 papers for every 10,000, is a crisis that impacts the methodology of scientific research. Over time several scientific reseach bodies have noticed that the results of many scientific studies are hard, nearly impossible, or even impossible to replicate. Having started in psychology the crisis now affects many different scientific fields, and is not only affecting the community's reputation but is having a wide range of commercial, cultural, political, and societal consequences.

Data sources: Nature, PLOS, PNAS, Science, and various.

IMPACT

The reproducibility of empirical data is essential for the scientific method, so naturally difficulty in reproducing the results of different studies not only undermines confidence in the scientific community, but also people's trust in it. Furthermore, bearing in mind that scientific papers are used in everything from the awarding of grants, as well as in news publications and even the measurement of a country's Innovation Quotient (iQ), the impact of this trend extends far beyond just being bad or incorrect science. It also impacts future research activities and outcomes.

In a poll of 1,500 scientists recently over 70% reported that they'd had problems reproducing studies. Chemists led the pack with 87%, then biologists with 77%, engineers and physisists with 69%, medical with 67%, then Earth and environmental researchers with 64%. Most oddly though was the fact that 50% of those questioned had had problems reproducing their own research, and then elsewhere researchers found that on average non-replicable papers recieve 16 more citations per year than replicable ones, or 153 over time, further confounding the crisis ... or did they!?

EXAMPLES

Low reproducibility is caused by a variety of factors that range from outright fraud and publication bias, where studies can become statistically skewed in the pursuit of significant results and overwhelm the correct results, all the way through to thew use of contaminated research equipment and questionable data analysis such as research data dredging, degrees of freedom, and HARKing. And it can also be the result of bad scientific practise.

In Biomedicine and Cancer research where annual grants now exceed $100 Bn, noone knows how bad the crisis acutally is. Not only does this affect the development of new Cancer treatments, for example, but in some cases study results have caused lines of study to be cancelled and grants pulled. To highlight the problem in 2013 - albeit a while ago - just 11% of 53 Cancer studies were reproducable.

The scientific community's "Publish or Perish" slogan also puts adverse pressure on researchers to publish papers, and with so many examples of researchers being banned from Kaidi and Nosek to Obokata and Wakefield, the question is now how to fix the crisis.

ACT NOW

While this trend affects a relatively small percentage of the total number of studies published every year it has shaken the scientific community to its core and had wide ranging consequences for everything from grants and trust, to the future of research itself as well as the products and solutions that the research produced would have helped develop. As a result both researchers and organisations that rely on it should be on their guard and have methods in place to validate research they're interested in.

EXPLORE:

- Future of Innovation
- In lab validation
- Metascience
- Open research initiatives
- Registered replication reports
- Robust compliance, governance, and standards initiatives

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EXPLORE STARTUPS & MORE

SYNTHETIC INNOVATION

3RD YEAR ON THE LIST



QUICK TAKE

Made possible by increasingly powerful technologies that are capable of designing and generating new product concepts either in software and, or via virtual simulations Synthetic Innovation is game changing trend that can accelerate an organisations innovation pipelines by billions fold.

Furthermore, as the technologies underpinning this trend mature, and as the data sets and virtual modelling engines become more complex and robust, the complexity and variety of product concepts that these platforms will be able to create will improve.

IMPACT

The implications of being able to design, innovate, and test new product concepts, from computer chips and drugs, to cars, clothing and beyond in simulation at speeds that are millions to billions of times faster than using traditional innovation techniques are, needless to say, numerous. And asides from being able to innovate new products at previously unimaginable speeds the biggest impact this trend will have on society will be the ability to design and bring new products to market up to 99% faster than previously possible.

Today over $1.7 Trillion is spent globally on R&D every year, and that is increasing on average at a rate of 12%. However, given Synthetic Innovations' comparatively low costs another one of its many advantages is the fact that it could let organisations flatten or even reduce their R&D spending while still generating even better results and increasing their innovation pipeline.

As more organisations embrace this trend, which will increasingly be delivered via platforms as a service, they should take great care to ensure the security of their data and IP.

EXAMPLES

As the technologies that underpin this trend continue to mature, including Artificial Intelligence (AI) and Simulation Engines, the products these systems are able to design, innovate, and iterate, are becoming increasingly complex and sophisticated.

While some examples of their benefits are tactical, such as Airbus, GM, and NASA's use of them to design lighter weight aircraft, cars, rovers and rockets, there are plenty of more strategic examples such as Google who are using them to design AI computer chips, Insilico who are using them to design thousands of new drugs at extreme speed, and Toyota who have used the technology to design new electric vehicle batteries 90% faster than using traditional techniques. And, all this is before we discuss Amazon and Under Armour who are using them to design new fashion lines and apparel.

ACT NOW

There is no question that Synthetic Innovation will change how organisations innovate and help them dramatically increase their so called Concept to Shelf times. Therefore, in our estimation organisations should explore this trend as a matter of urgency.

EXPLORE:

- Data privacy and security trends
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Creativity, and Innovation
- IP protection strategies
- Partner ecosystems and solutions
- Proof of concepts

Data sources: Autodesk, Google, NASA, Nvidia, OpenAI, and various.

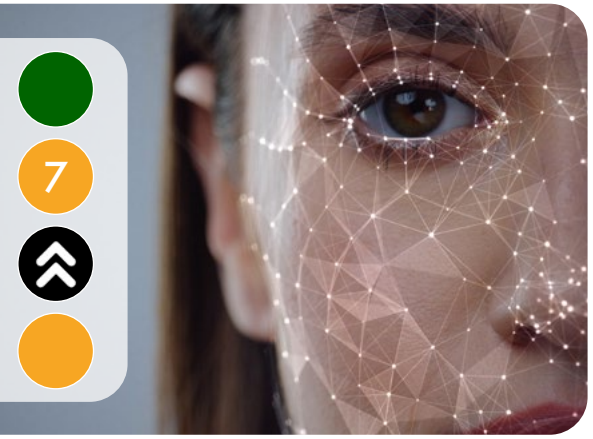
SECURITY TRENDS

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... BIOMETRIC SPOOFING
... CYBERCRIME AS A SERVICE
... RANSOMWARE
... ZERO TRUST

BIOMETRIC SPOOFING

3RD YEAR ON THE LIST



QUICK TAKE

We are all used to our various messaging systems and passwords being spoofed but as more organisations make the switch to biometric based authentication and identification systems criminals are making the switch too.

By using **Artificial Intelligence** (AI) and the same technologies behind **Synthetic Content** criminals and researchers have been able to spoof biometrics and generate everything from synthetic "master" fingerprints, synthetic video, and synthetic voices that let them commit behavioural attacks and access protected systems.

Data sources: Pymnts, SCMP, Thales, Verizon, and various.

IMPACT

When criminal actors compromise your passwords you can change them, but when they clone or spoof your biometrics it's not so easy. In fact it's darn near impossible unless of course, you opt for plastic surgery, have your fingerprints lased, or have voice training, but it's unlikely those are options.

While the biggest benefit of biometrics is their uniqueness, and while we have new **Biometric Authentication** solutions coming through all the time, this trend should concern everyone.

With over 61% of all cyber attacks relying on compromised passwords everyone in the industry agrees we should all switch to biometric authentication quickly, and as a result enterprising criminals are responding and discovering new ways to crack these systems at scale - with "at scale" being the phrase to watch.

To date most biometric spoofing has been targeted and conducted by relatively well resourced and sophisticated actors, but in time as the methods get cheaper and easier to execute we'll see the barriers fall.

EXAMPLES

While this area is still relatively nascet when it starts taking off it will take off at an exponential rate.

So far some of the best examples of people's biometrics being spoofed include criminal actors cloning the voice of a German energy company CEO to convince his CFO to wire over $250,000 to a Ukrainian bank account, and researchers using AI Deep Learning technology to create a synthetic master fingerprint that can unlock any device.

However, both of those notable events dwarf in size and impact when compared to a biometric spoofing attack on a Chinese government facial recognition ID authentication tool which saw attackers use photos of people to create synthetic videos of them "looking live" by blinking, nodding, shaking, and opening their mouths to beat a biometric Presentation Attack Detection (PAD) system and create fake tax invoices. Uncovered recently over a period of two years the attackers net over $80 Million.

Given the trajectory of this trend you can consider all of this as just the beginning of a very dangerous new era in cyber crime.

ACT NOW

With more people using biometric authentication organisations must ensure they don't put too much faith in the technology and must remain as vigilent always to new attacks and threat vectors that could let criminal actors gain access to systems and do harm at scale and speed.

EXPLORE:

- Best practises and case studies
- Detection tools
- Emerging technology and technology roadmaps
- Future of Artificial Intelligence, Security, and Synthetic Content
- Partner ecosystems and solutions
- Process review and pen testing

CYBERCRIME AS A SERVICE

3RD YEAR ON THE LIST



QUICK TAKE

This trend is responsible for helping drop the cost, resources, and skills needed to launch and profit from cybercrime to near zero, and increasingly it is encompassing every kind of crime and value add cybercrime service.

With nothing more than an internet connection this trend gives anyone anywhere in the world the ability to enlist the help of seasoned criminals and hackers skills to execute a wide range of cyber attacks and sell or launder the proceeds. At a basic level this means crippling your organisation can cost less than your child's weekly allowance.

Data sources: Digital Shadows, McAfee, Trend Micro, and various.

IMPACT

As with anything that is offered as a service one of the primary impacts of this trend is to make it cheaper and easier to launch increasingly destructive and sophisticated cybercrimes against a variety of global targets. Also, as criminals and hackers increasingly take a percentage of the proceeds of the crimes they help carry out this means that in many cases the up front costs of launching attacks is zero - with the added benefit that people no longer need to maintain their own attack infrastructure.

The net impact of this then means that cybercrime and cyber attacks become more brazen, more common, and more financially lucrative with little chance of arrest, and with estimates and projections putting the proceeds of cybercrime in the trillions of dollars you can quickly see the appeal of this trend, which then makes trends like **Zero Trust** even more important to adopt.

EXAMPLES

Broadly if you can think of a cybercrime service then the chances are it exists, and just as we see in the legalised world of business the scope of cybercrime related services knows no bounds - from fully outsourced and managed cybercrime activities through to the provision of dedicated customer care centers to field and support both attackers and victims enquiries.

What is perhaps most interesting though is the multi-sided nature of this industry. Much in the same way that arms dealers might sell to and therefore profit from both sides in a war there are cybercrime service providers that focus on helping both attackers and victims which, unsurprisingly, increases their addressable market opportunity and boosts profits.

For example, as happened a while ago with the EDA2 and Hidden Tear Ransomware attacks, on the one hand wannabe criminals were able to use services to execute attacks while on the other victims were able to use alternative services to help them find weaknesses in the code that made it easier for them to decrypt their data and avoid paying the ransoms.

ACT NOW

Wannabe criminals and individuals can leverage this trend to their advantage, and while the odds might seem stacked in the aggressors favour careful open minded organisations can also ironically benefit from this trend - albeit by exercising extreme caution at all times and by working hand in hand with ethical trustworthy partners.

EXPLORE:

- Best practises and case studies
- Future of Artificial Intelligence and Security
- New business and operating models
- Partner ecosystems and solutions
- White Hat hacker communities

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EXPLORE STARTUPS & MORE

RANSOMWARE

3RD YEAR ON THE LIST



QUICK TAKE

Ransomware is almost the perfect example of how criminals are able to weaponise technologies that are designed to protect us, in this case encryption, and turn it against us for their own gain.

Fuelled by force multipliers such an increasingly digital and connected society, as well as the development of pseudo-anonymous and anonymous cryptocurrencies such as Bitcoin and Monero, this trend, the damage it inflicts, and criminal proceeds are all expanding fast.

Data sources: Cyence, FBI, Sophos, and various.

IMPACT

While many people might think that Ransomware attacks are new the first recorded attack, names the AIDS Trojan, took place in 1989 against an American hospital, and ironically the healthcare industry is still very much in the cross hairs today and is seen by many criminal organisations as a prime target - albeit an unethical one which is where some groups draw the line.

Ransomware has posed a threat for some time now, however in 2017 the FBI recorded 1,783 Ransomware complaints that cost victims over $2.3 million, and today it's estimated that figure is 184 million globally and growing. It's also estimated that criminals have so far extorted over $350 Billion from organisations and individuals alike with new Ransomware variants growing at a rate of at least 46% per year, 4,000 attacks a day being launched, and 1 in every 3,000 E-Mails containing Ransomware payloads.

Furthermore, as the audacity of criminals, including state actors, grows and as critical infrastructure increasingly becomes a target the only thing preventing a catastrophic loss of life or worse are criminal ethics.

EXAMPLES

While there are many examples WannaCry launched in 2017, and which caused global panic, is still considered to be the biggest and most widespread Ransomware attack with estimates suggesting it crippled more than 200,000 computers across 150 countries and caused more than $4 Billion in damages - all numbers that are probably too low.

While it's estimated that most larger organisations pay on average $170,000 per ransom, with ironically only 65% of their data actually being restored, it's also estimated that those who do not pay incur average costs of $1.85 Million, including downtime and recovering their systems, with the average downtime being 19 days.

In many cases it's this downtime and the downstream impacts rather than these capital costs that do the real damage to businesses as we saw with Travelex in 2020 who seven months after a crippling attack fell into administration with the loss of all 1,300 jobs. And this is merely one example of hundreds.

ACT NOW

Most Ransomware attacks, but not all, are indiscriminate so it seems fitting that the trail of destruction they leave behind is also indiscriminate. As more individuals and organisations get savvy to this kind of attack we will in time see perpetrators switch tactics and innovate new kinds of attacks, but that said Ransomware will likely remain an important weapon in the criminal arsenal for decades to come.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Back up, Recovery, and Archive (BURA) policies and procedures
- Emerging technologies and technology roadmaps
- Future of Security
- Infrastructure containment and confinement strategies
- Employee education programs
- Partner ecosystems and solutions

ZERO TRUST

3RD YEAR ON THE LIST



QUICK TAKE

The Zero Trust model recognises that trust, in all its forms, is a security threat especially since trust can be compromised and misplaced. As a result zero trust systems, which operate on a "Never trust always verify" basis eliminate the concept of trust from an organisation's network architecture by leveraging network segmentation, preventing attackers from moving laterally within an organisations systems, providing Layer 7 threat prevention, and by simplifying granular user access control. And, in today's connected world zero trust is now considered the defacto security posture.

IMPACT

Traditional security models operate on the outdated assumption that everything inside an organisation's network should be trusted. So, needless to say under this broken trust model it's assumed that a user's identity hasn't been compromised and that all users act responsibly and can be trusted. As we know though this isn't always the case which is why we continue to see wave after devastating wave of attacks.

As a result globally 72% of CISO's have either already moved to a zero trust model or plan to do so in the coming years, and 96% say it's critical to their success - especially as they embrace new workplace trends post pandemic. The upshot of this means that the market is expected to grow at a rate of 16% CAGR until 2028 to reach $60 Billion.

At a more practical level though surveys have also shown that enterprises who haven't deployed zero trust on average face costs of $5.04 million, where as those with mature deployments see those costs decrease by $1.76 million, and that even those in the early stage of deployment see reductions of $660,000.

EXAMPLES

Ransomware is just one prime example of what happens when trust is compromised and is also a prime example of why tradtional security models are struggling to cope with today's realities.

While there are alot of zero trust case studies I could highlight one of the most interesting examples of this trends potential to avert disaster was the DarkSide groups ransomware attack on the US Colonial Pipeline which in 2021 caused the 5,500 mile long pipeline, which carries over 45% of all the US East Coast's diesel, gasoline, and other fuels, to shut down for more than a week which then, needless to say, caused havoc.

Given how the attackers gained entry into Colonial's system had Colonial deployed zero trust many experts don't think the attack would have been successful. And this is just one example of many.

ACT NOW

We live in an increasingly interconnected world where humans and trillions of smart things and smart entities, including increasingly autonomous AI's and bots, are all becoming inextricably connected and inter-reliant on one another. Ultimately, with all the benefits this brings it also means there is a greater need to authenticate everyone and everything than ever before to ensure they're all who they say they are.

EXPLORE:

- Best practises and case studies
- Emerging technology and technology roadmaps
- Future of Artificial Intelligence and Security
- Partner ecosystems and solutions

Data sources: Grandview Research, Microsoft, Palo Alto, Statista, and various.

SUPPLY CHAIN TRENDS

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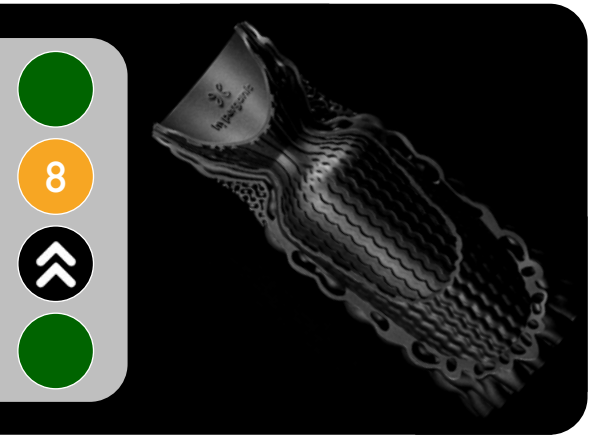
... FLATTENING SUPPLY CHAINS
... PRODUCT TRACEABILITY
... QUANTUM SUPPLY CHAINS
... SELECTIVE DECOUPLING

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FLATTENING SUPPLY CHAINS

3RD YEAR ON THE LIST



An AI created rocket engine, Hyperganic

QUICK TAKE

In the mid 1900's the world, especially the West, went through a period where giant manufacturing conglomerates, like GE and GM for example, were the kings of all industries, and during this time the vast majority of physical products that were manufactured often required thousands, if not tens of thousands, of different components. Not only did this trend persist for decades but it also led to the development of incredibly complex global supply chains. Now though new innovations are reducing the number of components needed and giving rise to the trend of Flattened Supply Chains.

IMPACT

The impact that complex supply chains have on an organisations ability to compete to source products, adapt, as well ensure that they get all the components they need at the right time to ensure continuous product availability is well understood.

The unsustainable complexity of today's supply chains was bought into sharp focus by the COVID-19 Pandemic which, wreaking havoc on global supply chains and manufacturing capacity alike, meant many key components were in short supply which then inevitably led to significant product shortages as well as massive share price volatility with Meta, as an eccentric example, loosing over $220 Bn of market cap as the issues hit advertisers budgets, and the share prices of other affected organisations falling by an average 22%.

One answer to this problem is to reduce the number of components used to build products, which then in turn reduces the number of suppliers, and today in some cases trends such as **Additive Manufacturing**, the **Circular Economy**, and **Creative Machines** are reducing the number of components needed by up to 90% - or more.

EXAMPLES

With the average car containing over 30,000 components a shortage of just one, such as a computer chip, can have dramatic consequences on product availability. However, while the number of components in cars are falling, in part thanks to the trend of **Vehicle Electrification** which alone eliminates the 1,800 parts needed to make Internal Combustion Engines (ICE), there are other better examples we can look at.

These include the development of System on a Chip (SoC) architectures from organisations like ARM that collapse previously separate compute components, such as CPU, controllers, GPU, memory, modems, and more into a single device.

Then, for those who think reducing the number of components is difficult, others include Hyperganic's use of a Creative Machine to develop a new rocket engine made from just a single part, the development of the 216Ft long 3D printed Terran R rocket from Relativity Space which has over 100 times fewer components than traditional rockets, and then Adidas and Nike's ability to 3D print sports apparel on demand in the backs of their stores.

ACT NOW

The fact is the fewer parts your product has the simpler your supply chains will become. Then, get to the point where your products can be fully 3D printed on demand in situ, and all of a sudden your supply chains aren't just simpler, they're collapsed and almost "eliminated." Today we have a raft of new technology paradigms that make this reality not just possible but feasible.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Creativity and Innovation, Logistics, Manufacturing, Materials, and Transportation
- New business and operating models
- Partner ecosystems and solutions
- Product development and innovation

Data sources: Europa, Financial Times, SP Global, The Whitehouse, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

PRODUCT TRACEABILITY

3RD YEAR ON THE LIST



An edible electronic tag to track soft fruits

QUICK TAKE

Product traceability is the ability trace the history, distribution, and use of a product throughout its entire life cycle. It plays a vital role in helping organisations prove the provenance, safety, and sustainability of their products and supply chains, as well as helping them counter fraud and human rights violations.

As processes and technologies improve brands are able to surface and solve problems faster, earn the confidence of their customers, and it is increasingly becoming a competitive differentiator.

IMPACT

Ultimately, the more information an organisation has about its products and supply chains the more informed its decision making can be. Not only does this help organisations improve the cost and efficiency of their supply chains, as well as ensuring their resilience, and help identify and mitigate risk, but in the event of problems it lets organisations react accurately and quickly.

Recently the number of multi-billion dollar recalls has risen dramatically whether it's been exploding phones, faulty cars or faulty replacement hips, infected food, and many other examples with the top ten largest recalls costing organisations $50Bn - excluding indirect costs and brand damage costs.

While no industry escapes on average automotive and industrial recalls account for 71% of all recalls, followed by food and beverage at 16%, with the other industries bringing up the tail with averages of between 3% and <1%. Furthermore, 43% of all recalls are the result of defective products or workmanship, and 31% are due to human error. However you slice the numbers there's no denying that product traceability is a good thing.

EXAMPLES

Over recent years there have been many significant developments that have helped organisations improve product traceability. From better ERP systems and the use of game changing technologies such as blockchain that help organisations enhance supply chain efficiency, speed, and trust, to the development of more subtle Internet of Things (IoT) technologies such as genetically engineered spores and printable edible electronic tags that let organisations precisely track the origin, distribution, and history of everything from common a garden food items to advanced electronics.

Used wisely these and other technologies can be used to help organisations achieve higher efficiency, production, and sustainability standards, help drive innovation and revenue growth, decrease risk, and improve brand reputation. While there are many examples in most cases organisations embracing this trend are able to decrease recall costs by over 40%, automate over 60% of transactions and increase transaction speeds by over 70%, and eliminate over 80% of human errors and over 90% of fraud.

ACT NOW

As compute, electronics, and sensors of all kinds continue to miniaturise and get cheaper it is becoming increasingly easy to capture and analyse product and supply chain data in real time in ways that were never possible before.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- GRC implications
- Partner ecosystems and solutions
- New business and operating models, and products

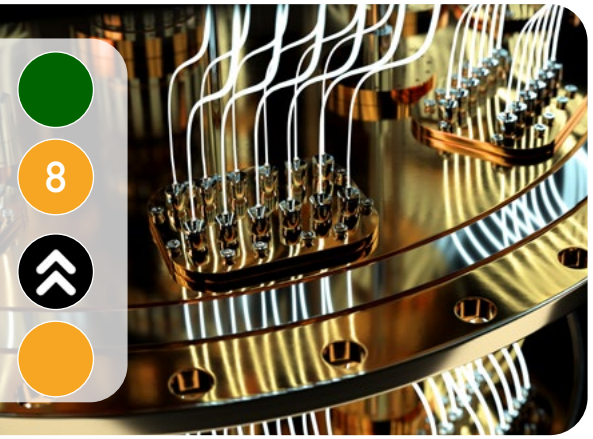
Data sources: Accenture, AIG, Allianz, AON, FDA, IBM, and various.

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EXPLORE STARTUPS & MORE

QUANTUM SUPPLY CHAINS

3RD YEAR ON THE LIST



Close up of a Quantum Computer

QUICK TAKE

Quantum computers are a revolutionary form of computer platform that can solve even the most complex optimisation problems billions of times faster than traditional computing platforms.

It's this ability that makes them the perfect tool of choice when it comes to helping organisations optimise their supply chains, whether it is in terms of miles travelled or optimising their overall flow, and thereby reducing all manner of supply chain associated costs and risks.

IMPACT

As organisations everywhere embed sensors into their operations and products, thereby generating vast amounts of granular real time data, quantum computers can easily analyse these vast data sets, as well as external data sets, at speed in a decision making model to give executives the intelligence they need to optimise all aspects of their supply chains on the fly.

This is also before we discuss the imperative organisations have to be agile in today's world and discuss the need for them to be able to adapt their supply chains to swift changes in demand and supply, as well as mitigate impacts from climate, cyber, geopolitical, and other dynamic risks.

In addition to the above quantum computers can also solve the "Travelling Salesman" problem, something that can generate trillions of possible outcomes, almost instantly, and as customers become increasingly accustomed to ordering tailored products, something that will introduce extra complexity into supply chains, organisations can use QSC to save time and money while improving organisational agility and customer service.

EXAMPLES

Quantum computers are becoming increasingly powerful and are available for anyone to try as a service (QCaaS), and some of the pioneers in the space, from a supply chain perspective, are companies such as BMW and Volkswagen who have not only been experimenting with quantum technologies for some years now, but who are also now starting to commercially deploy it for their own advantage.

Needless to say though there are millions of organisations who could benefit from new supply chain optimisation technologies and while these companies are the pioneers there is no doubt that in the coming years they will be swiftly joined by all manner of others.

ACT NOW

As supply chains become more complex, and as supply chain related risks increase quantum computers give executives a powerful new tool to keep their businesses agile and operating.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Computing
- Hiring and talent requirements
- Partner ecosystems and solutions

Data sources: Cambridge Quantum Computing, IBM, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

SELECTIVE DECOUPLING

3RD YEAR ON THE LIST



QUICK TAKE

Increased geopolitical instability, as we enter into a **Bi-Polar and Multi-Polar World**, as well as the rise of other trends such as **Export Controls**, **Sanctions**, **Trade Wars** and tariffs, mean we are entering into a period of time where the world order is going through a significant adjustment, and this is creating new fault lines and exacerbating old ones. As a result many organisations, who are keen to limit the damage these trends have on their daily operations, are actively looking for new ways to improve supply chain resilience with one option being to decouple themselves from unfavourable countries.

IMPACT

While some of the initial reactions by organisations to growing global instability is often to try and absorb increasing costs and then pass those increases onto consumers unless organisations have confidence in the future the next step they'll often take in these situations is the tough decision to rework their supply chains in an attempt to negate as many of the negative consequences as possible. And, from **Flattening Supply Chains**, moving operations wholesale to other countries, re-routing shipments, and switching suppliers there are a variety of options open to them.

As expensive as it is to re-shape supply chains and decouple from countries such as China in studies the vast majority of organisations believe that the expenses are manageable with estimates also suggesting that, for example, to decouple all foreign manufacturing in China that is not intended for domestic consumption there would cost $1 Trillion over a five year period and reduce Return on Capital Employed (ROCE) by 0.7%. Ultimately this would then mean that the organisations left in China are in China for China only. Needless to say though China isn't the only illustration.

EXAMPLES

While many people in the West talk about selectively decoupling from China in China they talk about selectively decoupling from everyone else, hence the rise of the **Standards Shadow War**, and while this trend has many winners and losers South Korea and Vietnam especially are two countries benefiting handsomely from it.

While the rise of different trends has accelerated the shift from China in particular the fact of the matter was that costs in China were increasing for a long time anyway, so recent geopolitical wrangling, such as Trump Vs Xi, has simply hastened many organisations exits. However, that said, this is a trend that's affecting multiple countries, including the USA, as organisations seek out countries and partners with more collaborative, predictable, and stable regimes.

On the ground though Apple and its supplier Foxconn, for example, despite having collectively invested over $275 Bn in China are now just two examples of organisations decoupling from China with both having moved at least 30% of their production capacity to countries including Taiwan and Vietnam.

ACT NOW

The fact of the matter is that if something is bad for your business then you're more than likely going to try and find a way to reduce or eliminate its impact, and as we see multiple trends on the rise it's inevitable that this trend will be present for decades to come. As a result organisations should do their best to develop resilient supply chains with no single points of failure and find new ways to reduce supply chain complexity.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Creativity and Innovation, Financial Services, Government, Logistics, and Manufacturing
- Product development and innovation

Data sources: Bain, Barrons, BCG, Pew Research, SCMP, Rabbobank, and various.

SUSTAINABILITY TRENDS

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... CIRCULAR ECONOMY
... CORPORATE SOCIAL RESPONSIBILITY
... ENVIRONMENTAL, SOCIAL, AND GOVERNANCE
... SUSTAINABLE PROCUREMENT
... ZERO WASTE PLEDGES

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EXPLORE STARTUPS & MORE

CARBON NEGATIVE PLEDGES

3RD YEAR ON THE LIST



Bhutan

QUICK TAKE

While many governments and organisations commit to **Net Zero Pledges** some, realising that these pledges simply stop **Climate Change** rather than reversing it, are going further and committing to Carbon Negative Pledges.

Not only are these kinds of pledges ambitious but they will also help boost investment and research in **Carbon Capture and Storage** (CCS) solutions, and help reverse climate change faster. It also raises the question: If the **Polluter Pays** should the preservationist benefit?

Data sources: IEA, Microsoft, United Nations, and various.

IMPACT

Carbon Dioxide accounts for roughly 75% of all human generated Greenhouse Gas Emissions (GHG), with the remainder including Hydroflurocarbons, Methane, and Nitrous Oxide, so if they are developed then Carbon Negative Pledges have to be taken seriously by the organisations embracing and promoting them.

Becoming carbon negative also means organisations have to undertake fundamental shifts in their **Corporate Social Responsibility** (CSR) and **Environmental, Social and Governance** (ESG) reporting, strategies, thinking, and visions as they relate to everything from their business and operating models as well as their building certifications, HR, product development, and supply chain strategies.

Ultimately if everyone took up a Carbon Negative Pledge then here would be hope that the environment and humanity could avoid some of the worst effects of climate change, but looking at the progress so far there are far too few governments and organisations committing to anything like this.

EXAMPLES

Today there are still comparatively few governments and organisations pledging to be carbon negative there are some worth highlighting.

Bhutan, for example, which in 2009 at the UNGA "abandoned economic growth as its compass," and with its rich hydroelectricity supplies and huge forests, which cover 70% of the country, is the world's first officially recognised carbon negative country.

Then, in 2020 Microsoft announced a $1 Bn climate innovation fund, and that by 2030 it would be carbon negative, and that by 2050 it would remove all of the historic carbon emissions it had emitted, either "directly or by electrical consumption," since its founding in 1975. To achieve these admirable goals they're taking a "Principled approach," which includes the following pillars: **Corporate Foreign Policy** initiatives that allow them to be vocal about carbon related public policy issues, empowering customers by promoting **Digitisation**, enlisting employees, investing in new CCS technologies, taking a maths and science approach and responsibility for its carbon footprint, and by being transparent.

ACT NOW

Reaching Net Zero simply stops the damage caused to our environment and society from excess GHG's getting worse - it doesn't reverse it and that's arguably what we need. Consequently, it is good to see some governments and organisations going beyond what they are expected to, being bold, and trying to lead by example. Now we need more of them.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Ethical Capitalism
- Future of Energy, Manufacturing, Supply Chains, and Transportation
- Partner ecosystems and solutions
- Policy and regulation reform

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EXPLORE STARTUPS & MORE

CIRCULAR ECONOMY

3RD YEAR ON THE LIST



The iVision Circular, BMW

QUICK TAKE

The Circular Economy is an alternative to a Linear Economy which the norm of make, use, dispose, is replaced by make, use, recycle, and re-use, and where materials, products, and other resources are used and recycled for as long as possible.

It is also an especially pertinent trend given the overall growth in global consumption and population, and the problem of growing global **Resource Scarcity**.

IMPACT

On average it is estimated that 80% of a products environmental impact are the result of decisions made during its design stage, which is why it is crucially important that organisations explore ways to "design out" waste when products are still at the concept stage.

Every year more than 100 Billion tonnes of resources enter the global economy, which includes everything from fossil fuels, metals, and minerals, to organic materials from plants and animals, and only 8.6% of this gets recycled and used again.

Since the 1970's global resource use has tripled and it's estimated that it will double again by 2050, and in a world of finite resources where we are already experiencing worrying Resource Scarcity that's an issue. A Circular Economy isn't just about fixing these environmental wrongs though, it can bring big opportunities and positive impacts across business, culture, and society.

EXAMPLES

When people think about the Circular Economy they often think about recycling. But it's more than that - the Circular Economy is a business philosophy. Recycling begins when a product has reached the end of its useful life - the "Get rid of it" stage - but Circular Economy thinking looks at how waste and pollution can be prevented from the very beginning - before the product has even been designed - and the trend encourages people to look at waste and pollution as product design flaws.

Examples of such thinking include creating food products with edible packaging, BMW's iVision Circular car concept which makes use of new adhesives and materials, as well as other mainstream products such as sports apparel from organisations like Adidas who partnered with Parley to create Circular Economy sneakers under their "Made to be Remade" initiative.

When we think bigger other examples include 3D printed buildings made from local materials such as clays and muds, and carbon neutral rockets from Relativity Space designed with 90% fewer components.

ACT NOW

To create a Circular Economy you have to see waste as a design flaw and design it out during the products design stage. It is only by taking this all in approach that you will be truly successful.

EXPLORE:

- Best practises and case studies
- Adhesive and materials research
- Designing out waste
- Emerging technologies and technology roadmaps
- Future of Materials, Recycling, Supply Chains, and Sustainability
- New business and operating models
- Recycling trends

Data sources: Ellen Macarthur Foundation, WRI, and various.

CORPORATE SOCIAL RESPONSIBILITY (CSR)

3RD YEAR ON THE LIST



QUICK TAKE

Corporate Social Responsibility (CSR) helps organisations develop sustainable business strategies and integrate their economic, environmental, ethical, philanthropic, and social performance strategies with their business operations and interactions with shareholders and stakeholders.

Research also shows CSR accounts for 40% of a brands reputation, and that organisations who vocally communicate, as well as demonstrate their commitment to CSR via affirmative action, have significantly more loyal customer bases, and better investment potential.

Data sources: OECD, RepTrak, Reuters, UNIDO, and various.

IMPACT

In what represents a paradigm shift in thinking over the past decade, and to show the growing importance of CSR, today over 90% of S&P 500 organisations publish CSR reports compared to just 20% in 2011 - and 73% of investors say these play an important role in investment decision making.

CSR also plays an increasingly vital role in helping organisations communicate and demonstrate their purpose and commitment to ethical, sustainable business practices - which are now more important than ever.

Additionally, 76% of customers say they would be more likely to defend, protect, trust, and be loyal to organisations with strong CSR strategies. And 66% say CSR - or an organisations commitments and purpose - play a role in purchase decisions, with 71% saying that in the event that two organisations products are identical they'd purchase from the more purposeful of the two. Diving deeper, another 49% of customers also believe that organisations who don't speak out on social issues don't care, and 80% want organisations to play active roles in solving societal issues.

EXAMPLES

Whichever way you look at it it's clear that CSR and **Environment, Social and Governance** (ESG) are both playing an increasingly important role in brand reputation, as well as customer and investor decision making, and with CSR now accounting for more than 40% of a brands reputation and playing a role in 66% of customers decision making, the importance of getting CSR right is high.

Some of the organisations with the highest CSR reputations include Adidas, Bosch, Lego, Microsoft, Netflix, Patagonia, Rolex, and the Walt Disney Company.

While there are many ways to measure CSR reputation, as well as its impact on the triple bottom line - Profit, People, Planet - all of which broadly fall under the umbrella of "organisations saying and doing the right thing," the most popular metrics include measurements that relate to community involvement, investability, the buying and recommendation of products and services, environmental and sustainability commitments, positive commentary, and working conditions.

ACT NOW

While CSR has always been important it's more important than ever today and has a qualitative and quantitative impact on businesses. It's also not enough for organisations to simply play a good CSR marketing game - they have to be able to show customers, investors, and stakeholders alike that they have taken their CSR responsibilities to heart and are actively implementing and investing in them.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Ethical Capitalism
- Future of Sustainability, and Work and the Workplace
- Policy reform

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EXPLORE STARTUPS & MORE

ENVIRONMENTAL, SOCIAL, AND GOVERNANCE

3RD YEAR ON THE LIST



QUICK TAKE

Environmental, Social, and Governance (ESG) is a set of standards that environmentally and socially conscious business leaders and investors use to evaluate, measure, and monitor the impact that organisations have on the environment and society.

ESG environmental criteria evaluate and measure everything from an organisations energy and natural resource usage, pollution, and waste to their treatment of animals, while the social criteria evaluate and measure the impact of their business relationships on communities and society.

IMPACT

In the past socially responsible boards and investors often had to make trade offs between investments, returns, and business strategy that were in opposition with one another. However, now that boards, governments, and investors alike are all now aligned on the importance of ESG, as well as actively promoting and supporting it at global, national, and regional levels, that's increasingly no longer the case.

Not only is ESG a top of table conversation, but when implemented correctly it gives organisations and investors alike a greater chance of avoiding situations like those that embroiled BP and Volkswagen, with Deep Horizon oil spill and the emissions scandal.

Today ESG investments account for over a third of all global Assets Under Management (AUM), and by 2025 they are on track to exceed $53 Trillion with an annual projected growth of 15%, while at the same time ESG Exchange Traded Funds (ETFs) have reached over $1 Trillion mark. And these figures alone show how important strong ESG performance and robust strategies are for both businesses and investors.

EXAMPLES

Around the world more governments, investors, and organisations than ever before are promoting the importance and value of Sustainable Finance strategies, with Europe for example leading the way and introducing transitional finance initiatives and instruments, such as the European Green Bond scheme, that ease the transition from traditional investment practises to more sustainable ones which, in turn, compliment Europe's Sustainable Economy initiative.

When implemented well ESG has been shown to have a positive impact on organisations top line growth as it creates stronger communities and aligns with many modern B2B and B2C buying trends. It also helps reduce costs through reduced energy consumption and wastage, boost employee engagement and improve talent hiring and retention, and enhances investor returns via the better allocation of long term capital.

The past five years worth of data also shows each ESG rating upgrade generated an extra 0.5% investor return, and a downgrade resulted in -1.2% - with ESG laggards consistently under performing the market.

ACT NOW

ESG, along with **Net Negative Pledges**, **Net Zero Pledges**, and **Zero Waste Pledges**, provides organisations with the opportunity to benefit and profit from ethical and sustainable business practises while at the same time helping develop and strengthen a healthy planet and healthy communities.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology solutions
- ESG best practises, policy reform, rankings and ratings
- Future of Financial Services, Government, and Sustainability
- Investment strategies

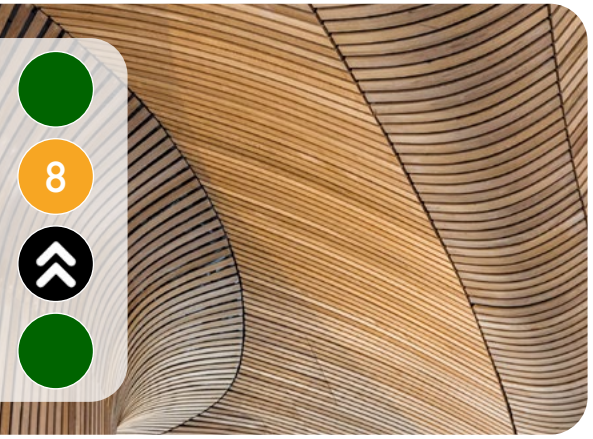
Data sources: Bloomberg, Europa, McKinsey, University of Newcastle, and various.

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EXPLORE STARTUPS & MORE

SUSTAINABLE PROCUREMENT

3RD YEAR ON THE LIST



QUICK TAKE

Let's face it, when it comes to minimising our environmental and societal impact we can all do better and make smarter procurement choices - whether it's buying energy from renewable sources, buying locally grown organic vegetables that aren't wrapped in plastic, or all manner of other things. However, depending on your location, despite having all these and many other choices the vast majority of organisations still don't buy as sustainably as they could by any stretch of the imagination, and at its heart this is really what this trend is about - making better buying decisions that benefit people and planet.

IMPACT

Sustainability goals are now at the top of almost every executive agenda with 63% of executives saying sustainability is "Very important" compared to just 23% two years ago. And, even though many feared that the global COVID-19 pandemic would negatively impact global sustainability progress surveys have found the opposite to be true with 93% of organisations saying that despite the turbulence their sustainability commitments and investments held steady which is good news given the fact that investors often put an 11% to 14% premium on the best performing organisations, and that 58% of employees list sustainability as a key factor in their employment decisions.

When it comes to sustainable procurement however there's still a notable, albeit narrowing gap in aspirations, with 69% saying they take a suppliers **Environmental, Social, and Governance** (ESG) performance into account when sourcing and selecting new suppliers, up from 51% in 2019. Furthermore, with 48% of respondents believing that delivering on these goals, especially in the supply chain, is still a work in progress, it's clear there's much work left to do.

EXAMPLES

As with all initiatives things have to be measurable, and while we're still seeing a rapid increase in the number of new sustainability scorecards emerging almost all of them assess an organisations impact on the following areas: Environment, Ethics, Human Rights, and Labour Practises. It's also clear there are many ways to improve an organisations credentials.

From playing a role in helping your organisations R&D teams design **Circular Economy** products, **Flattening Supply Chains**, and helping improve **Product Traceability**, to sourcing sustainable raw materials, and more sustainable buildings and equipment, procurement has a much more vital role to play in helping organisations achieve their sustainability goals than they might at first imagine.

Some of the more notable examples of this include Apple who design their products to be safe for anyone who assembles or recycles them, Dell who promote programs to recycle and reduce **E-Waste**, McDonalds who cut its energy consumption by over 25% by sourcing energy efficient appliance, and many others.

ACT NOW

As environmental and political trends such as **Bio-Diversity Collapse**, **Climate Change**, **Net Zero**, **Plastic Planet**, and others continue to dominate global agendas and headlines sustainability is no longer a nice to have it's becoming table stakes in all kinds of areas, whether it's in helping attract investment, improve an organisations brand reputation, value, and hiring potential, and all manner of other areas. As a consequence this is a trend that should be at the forefront of everyone's minds.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Creativity and Innovation, Materials, Sustainability, and Work
- Partner ecosystems and solutions
- Reporting strategies

Data sources: Ecovadis, Gartner, McKinsey, UNGM, Stanford Graduate Business School, and various.

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EXPLORE STARTUPS & MORE

ZERO WASTE PLEDGES

3RD YEAR ON THE LIST



QUICK TAKE

While Zero Waste Pledges sound more like a marketing gimmick rather than a sound business strategy the trend plays well into the **Ethical Capitalism** trend, as well as others, and so far the organisations who have embraced it are reaping significant dividends including improved financial performance, increased customer and employee loyalty and satisfaction, and many other benefits.

With capitalism seen by many as being unsustainable to both people and planet this trend offers organisations a way to reset the balance and set an example.

Data sources: Apple, Microsoft, World Bank, and various.

IMPACT

It's fair to say that most zero waste pledges start life as organisations trying to reduce the amount of waste they and their products produce, whether it's through the development of **Circular Economy** products, **E-Waste** or **Plastic Planet** initiatives, or others, then using those as stepping stones to eliminate waste across their organisations, supply chains, and product lifecycles.

Whichever way you look at the statistics the amount of waste the world generates every year is shocking and it's estimated it will increase by at least another 70% by the year 2050 if left unchecked. Snapshotting it, every year the beauty industry alone, for example, creates over 120 Billion units of packaging, most of which ends up as waste, but even that figure pales into insignificance when you realise that every year the world is consuming over 110 Billion tonnes of raw materials, which in turn contributes to **Resource Scarcity**, with just 9% of it being recycled and a further 15.6 Billion tonnes of "finished products" going straight to landfill. Move the dial on any of these metrics by just 1% and you'll have an impact, then keep on going.

EXAMPLES

While there are alot of organisations committed to reducing the amount of resources they use and the amount of waste they and their products generate throughout their lifetimes very few of them have zero waste pledges.

One organisation that does though is Apple who began their zero waste journey in earnest in 2018 and who've been working to reduce waste across the board including chemicals, emissions, hazardous and non-hazardous materials, water waste, and other areas including product design, manufacturing, recycling, and re-use, as well as embracing **Sustainable Procurement**.

Another notable example is Microsoft who in 2020 announced they would hit their own zero waste pledge by 2030 by banning single use plastics, embracing **Digitisation**, empowering customers, improving waste data collection and analysis, and by tackling datacenter E-Waste by creating what they call Circular Centers which use **Artificial Intelligence** (AI) to help the company process, recycle, and re-purpose datacenter related waste.

ACT NOW

While zero waste commitments are a bold step many organisations, even the leaders in the space, are finding it difficult to meet their commitments while still trying to grow their businesses. At the moment it seems as though the two aren't as mutually compatible as they would like. However, that said in many cases the organisations embracing this trend are moving the dial and eliminating hundreds of millions of tonnes of waste per year, and not only are they benefiting commercially from reduced operating costs and improved customer sentiment but the more they learn the faster their results accelerate.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Creativity and Innovation, Materials, Sustainability, and Work
- Partner ecosystems and solutions

WORKFORCE TRENDS

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... COGNITIVE AUTOMATION
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... GIG ECONOMY
... HYBRID CO-WORKERS
... TELE-OPERATIONS

CENTAUR PRINCIPLE

3RD YEAR ON THE LIST



QUICK TAKE

In the future we will continue to see a dramatic rise in the amount of job related Manual and **Cognitive Automation** which will impact the workforce. However, while this will cause a huge amount of dislocation and disruption in the jobs market as with every story there's a flip side.

In this case it's the use of **Artificial Intelligence** (AI), **AI Coaches**, and other so called Cognitive technologies to create "Centaurs," in other words people who use technology, as well as **Behavioural Computing**, to become hyper productive and "Super Human."

Data sources: NBER, Schroeders, and various.

IMPACT

The humanity versus the machine narrative has been a Hollywood staple for decades as script writers from 2001: A Space Odyssey to Blade Runner to the Matrix to Terminator envisioned a world where AI and machines took over.

One narrative though that you will only find in the real world is the story of a future where humanity and machines work together as **Hybrid Co-Workers** - each leveraging the best of the other. In this future human capability, creativity, and intelligence are all augmented, complimented, and super charged by increasingly connected and intelligent machines and systems, or to put it in another way by technologies and tools such as AI and robotics.

New technologies have always helped increase human productivity but the benefits have often been distributed widely and unevenly. They've also been hard to measure and quantify at both an individual and national level, but that said on the main there is a loose consensus that new technologies have helped improve productivity at the national level by between 1.2 and 6 percent for the periods between 1990 and today.

EXAMPLES

Let me ask you this question: Are you more or less productive because the internet exists? Does being able to access all the world's information in seconds help you learn more and do more faster? The answer's likely yes to both - depending on how you spend your time of course. This is a simple example of how "technology" has helped individuals become more productive over time, and **Democratised Skills** will be another.

This ability for humans to leverage the best that new technologies have to offer to improve our own "game" - our own abilities, capabilities, and skills - is perhaps best demonstrated by Gary Kasparov, the Chess Grand Master, and Lee Sedol the world Go champion who were both beaten by AI opponents. In both cases when asked if they were worried by a future dominated by AI they both answered "No" because in both cases their AI opponents, which acted, learned, and thought differently to them, taught them new moves and new strategies that, to quote them again, neither of them had ever thought of before - such as DeepMind's now infamous "Move 37" thus making them even better game players ...

ACT NOW

The Centaur Model has already shown that when you combine - hence the term - human capability, creativity, and intelligence with the best attributes of new technologies such as AI, which learn and see the world very differently to the way we do, they can make us even more capable and powerful. So, now imagine what happens to human potential when we consider all of the new technologies coming down the line ...

EXPLORE:

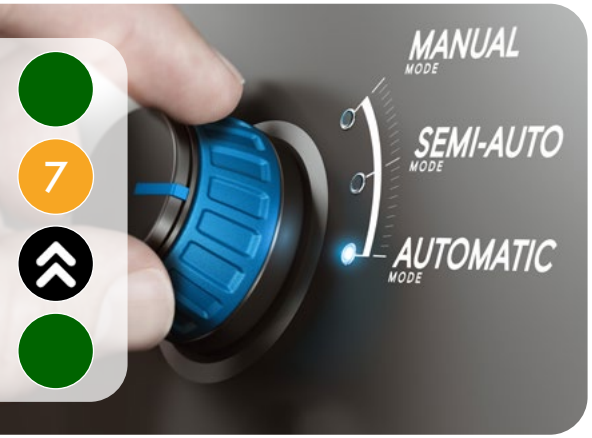
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Computing, Creativity and Innovation, Education, Manufacturing, Robotics, and Work
- Partner ecosystems and solutions

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EXPLORE STARTUPS & MORE

COGNITIVE AUTOMATION

3RD YEAR ON THE LIST



QUICK TAKE

The development of increasingly sophisticated **Artificial Intelligence** (AI) and automation technologies, including **Robotic Process Automation** (RPA), are allowing organisations to automate cognitive roles and tasks at an increasingly rapid rate. However, many of the roles and tasks being automated today are highly standardised and repetitive as well as, in some cases, being low value and low risk. As automation technologies improve in capability and sophistication though in time they will move up the stack to automate more complex roles and tasks.

Data sources: OECD, PWC, and various.

IMPACT

Automation in general is a double edged sword - on the one hand it lets organisations lower operating costs and improve productivity and efficiency, and ergo competitiveness, but on the other there is a quantifiable impact on human workers and jobs as well as the local communities that rely on those jobs and their associated spending power.

By the mid 2030's it is estimated that automation, firstly in the form of algorithmic AI, which will then be followed by AI based augmentation, and eventually full autonomy, could contribute over $15 Trillion in extra value to the global economy, and that it will affect every sector.

It is also estimated that in the same time period at least 30% of jobs are at risk of full automation, with another 50% at risk of partial automation, and that workers with the lowest levels of education will be the worst affected.

Furthermore, from a gender perspective in the short to medium term research shows that women will suffer the greatest risk of automation, but that by the mid 2030's this will flip and it will be men who take the main brunt.

EXAMPLES

Ironically if there's one thing that we humans are good at it's finding ways to make ourselves redundant - literally and figuratively - the examples of which are littered throughout history, from the automation of agriculture and manufacturing, to the automation of equities trading, insurance claims processing, and beyond.

Historically though most of the roles and tasks that were automated were automated by mechanical machinery, but today software is taking up the mantle and that's not only a game changer, but it means that the variety of roles and tasks that can be automated is growing at an exponential rate.

Today there's no shortage of examples so I will lead with this: If you can break a role down into its constituent tasks then you can encode those tasks in algorithms and develop an AI that can automate that role.

This holds true for every role - from call center agents to Goldman Sachs automating the 160 step IPO process, to Autodesk and others automating human creativity and innovation, to Tesla and gang automating professional drivers ...

ACT NOW

While being able to automate various roles and tasks within your organisation is appealing, from both a cost and an efficiency perspective, organisations must be able to comprehend, empathise, and mitigate automation's negative impacts on their human workers and customers, and should not always automate for automation's sake.

EXPLORE:

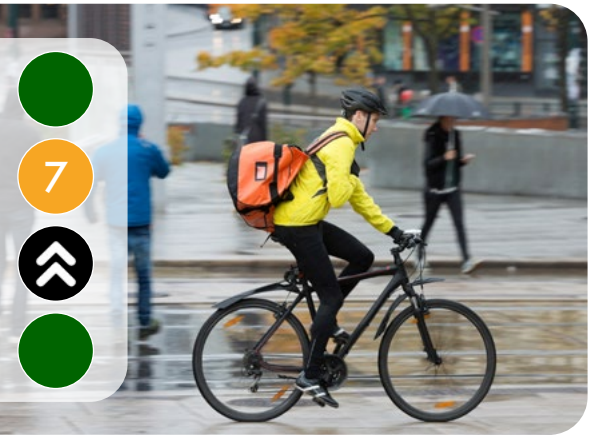
- Autonomous Organisations and new business models
- Education and re-training initiatives
- Employee mobility initiatives
- Emerging technologies and technology roadmaps
- Future of Creativity and Innovation, Customer Experience, and Work

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EXPLORE STARTUPS & MORE

GIG ECONOMY

3RD YEAR ON THE LIST



QUICK TAKE

The Gig Economy, which is enabled by big data and digitisation, among other trends, is really just the official term for Workers on Demand, and when you look at it from this perspective it's easy to see why it's so appealing to many of today's business leaders.

However, while being able to tap into the Gig Economy, which covers almost all kinds of work types now, from application development and marketing, to couriers, drivers, and warehouse staff, has its benefits, as many organisations are also now finding out it has its pitfalls too.

IMPACT

The impact of the Gig Economy on society is not to be underestimated - whether it's the fact that many of us interact with it every day or know people who work in it, or the fact that during hard times it's a safety net for people who might otherwise find themselves claiming benefits.

As a result it has much more of an out-sized impact on our societies and strategy development than many people might at first think and should not be ignored.

Globally it's estimated that the Gig Economy contributes over $350 Billion and is growing at a rate of 17% with design and technology being the most active sectors and 44% of people using it as their primary income with just under 40% of workers being between the ages of 18 and 34.

Then, at a continental level 37% of Americans participate in it, and just under 100 million in Europe with 64% of people in full time employment wanting to do what they see as "side hustles" to earn extra money - which gives the Gig Economy plenty of room to expand in both size and scope.

EXAMPLES

The Gig Economy has been front of mind for many people and organisations for a long time now with companies like Uber being responsible for making it a mainstream term. And at the most basic level the Gig Economy is enabled by digital platforms that connect people with opportunities.

However, while the model is now ubiquitous it's been the subject of many ethical and legal debates and rulings that include everything from the dubious practise of using Artificial Intelligence (AI) to manage, monitor, and automatically fire under performing workers, as well as furious debates about the status of workers and workers rights.

Those asides though the number of companies who rely on the Gig Economy is growing fast and includes industry stalwarts such as Airbnb with an estimated 4 million hosts, Care with over 32 million providers, Etsy with 4.5 million sellers, Fiverr with over 1 million freelancers, Github with 40 million developers, Uber with over 4 million drivers, and many other examples.

ACT NOW

While being able to tap into workers on demand can be a significant advantage for organisations it can also have its pitfalls - especially if your entire organisation relies on Gig Economy workers for its prosperity and survival.

EXPLORE:

- Business and impact assessments
- Case studies and examples
- Decentralised organisations and new business models
- Emerging technologies and technology roadmaps
- Employment law and liability risks

Data sources: Bureau of Labor, Deloitte, Gallup, Statista, and various.

HYBRID CO-WORKERS

3RD YEAR ON THE LIST



QUICK TAKE

Today we are all used to using technology but all too often it's dumb and little more than a passive prosthetic.

Increasingly though powerful technologies are helping us develop increasingly intelligent **Artificial Intelligence** (AI), **Behavioural Computing**, **Digital Humans**, and other platforms, which not only change how we interact with technology, but also lets it increasingly become our intelligent co-worker - the result of which means that in the future more of your co-workers - as well as directors and managers - could be "machines."

Data sources: Various.

IMPACT

We are all used to working alongside and with other human beings, but as we see the rise of **Algorithmic Organisations**, as well as other significant trends, we'll all also increasingly have to come to terms with working alongside, with, and even for machines - whether they take the form of AI's that are hidden from view, or digital humans and robots which have a more tangible and physical presence.

The impact of this future of work will be varied. It will be positive in some ways, negative in others, and create new frictions and debates about ethics in the workforce especially as AI takes on a more central role when it comes to hiring, monitoring and managing, and also firing human workers as we've already seen happen in the **AI Based Recruiting** and **Gig Economy** trends, as well as in other places.

On a less controversial note, human workers who work alongside and with machine co-bots and co-workers will also, on the one hand, have to learn how to work effectively with one another, but they could also see significant productivity gains as we've witnessed with the **Centaur Principle.**

EXAMPLES

Today there are plenty of both good, bad, and quirky examples of what happens when humans work alongside, for, and with machines.

While factory workers have worked alongside robots for decades one of the oddest examples of what happens when robots infiltrate new workplaces is the example of Flippy the burger flipping robot which was hired by CaliBurger. Created to automate burger fry cooking Flippy was fired because it was too fast for human workers to keep up with. Caliburger then re-trained the human workers to work better with it, and Flippy was "re-hired" and rolled out nationally. Elsewhere, we've also seen Amazon and Uber being taken to court for using AI to automatically monitor and fire employees, and there are even examples of AI being promoted to company boards in Hong Kong.

However, as dystopian as all that sounds we've also seen the benefits of workers teaming with cognitive AI's like IBM Watson, as well as digital humans, to help them find new leads and other data insights that help them be more productive and get better results for both themselves and their organisations.

ACT NOW

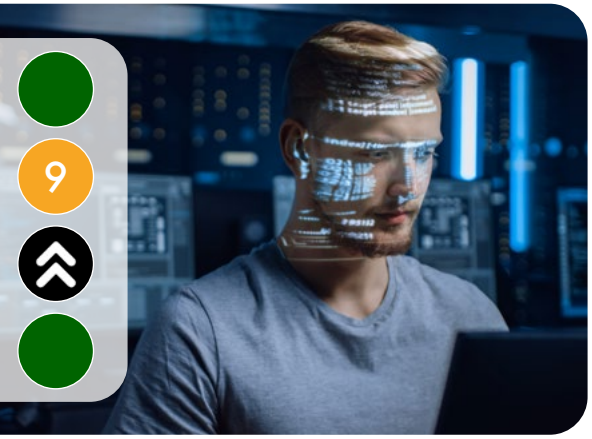
As human workers increasingly work alongside, for, and with machines of all kinds it's important that organisations walk into this trend with their eyes open and that their HR and operating policies don't devalue people and what they bring to the table.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Ethical Capitalism
- Ethics
- Future of Artificial Intelligence, Education, and the Workforce
- Policy and regulation reform

SKILLS DEMOCRATISATION

3RD YEAR ON THE LIST



QUICK TAKE

Have you ever found that in your mind you can imagine all these amazing things but you lack the knowledge or skills to make them a reality, or have to rely on others to do things for you? Then you're not alone - we all have things we're good at and not so good at. But what if technology could democratise access to all the skills and "resources" you need, and help you unlock your full potential? This is already being bought to life by advances in **Artificial Intelligence** (AI), **Behavioural Computing**, the **Centaur Principle**, **Creative Machines**, **Digitisation**, and other powerful trends.

IMPACT

Ultimately when we talk about democratising access to all manner of different skills - whether it's the ability of non-lawyers to use AI to automatically check and create legal contracts, or non-programmers to use AI to automatically create new applications, and all manner of other sci-fi like examples which I'll discuss in the next section - the impact will be nothing short of society changing at every level.

Imagine this - rather than relying on others to "do work" or "things" for you or having to learn these skills technology will help you do these things for yourself, ironically by doing it for you. Technology will literally be your co-pilot. And, as we venture into this future it's no exaggeration to say that this trend will increasingly let us unlock human capital and potential and finally let each one of us, irrespective of our backgrounds or skills, create what we imagine in our minds in the real world.

Which then brings us to trying to measure its impact ... just what figure or stats do you put against a trend that unlocks the full range of human potential? After all, just one Elon Musk changed the world ...

EXAMPLES

Ironically democratising access to skills first means we have to use technology to automate those skills, and by association jobs, which then leads us into conversations about the impact of Manual and **Cognitive Automation** and **Autonomous Organisations**.

Giving you tangible examples of this trend in action, today if you're a non-programmer you can simply talk to so called "No-Code" AI's like Microsoft DeepCoder, describe the app you want them to create and they will use Natural Language Processing (NLP) to understand what you say and mean - the context of your request - then scavenge code from Github and Stackoverflow, bring it together and compile it for you. No programming knowledge or skills needed.

Then there's being able to use Robo-Lawyers to check and create your contracts for you - as JPMorgan are doing currently - all without the need for human lawyers. We can also see a time when you can talk to Creative Machines and ask them to create and design content and products for you on demand. And many more examples ...

ACT NOW

The power to democratise access to skills - affordably and digitally - and use this trend to unlock human potential at global scale - to let people design everything from new computer chips, content, drugs, software, vehicles, and much more - is truly revolutionary. It also provides a positive counter narrative to today's doom mongers who all too often highlight the societal dangers of automation at the expense of all other news.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Artificial intelligence, Creativity and Innovation, Education, Manufacturing, and the Workforce
- Policy and regulation reform

Data sources: Google, JPMorgan, Microsoft, World Futures Forum, and various.

TELE-OPERATIONS

3RD YEAR ON THE LIST



QUICK TAKE

It used to be the case that in order to perform the majority of jobs workers had to be physically present where those jobs were taking place. However, while many people can **Work From Anywhere** there are still some jobs, such as those in construction and healthcare, that are harder to "dislocate" than others. But that's changing as new technologies let even the most "tethered" jobs be performed from anywhere, and not only is this trend helping de-centralise those jobs, but it's also opening up new opportunities for countries to increase productivity and GDP.

Data sources: Various.

IMPACT

The impact of being able to de-centralise almost all kinds of jobs and make location irrelevant is huge. For example, just being able to perform **Remote Surgeries** using **5G** and **Robotics**, where the surgeon is physically located in one place and the patient they're operating on is anywhere else on the planet, could save over 17 Million lives and improve the lives of another 143 Million people who today don't have access to safe surgical healthcare services. Then there's the commercial benefit of, in this case, the healthcare industry being able to avoid the $420 Billion of capital expenditure they'd have to spend if they were solving this problem the traditional way. And this is the impact that just a single "job type" embracing tele-operations would have.

This rising trend also means that for the first time almost all manner of workers, performing all manner of jobs and tasks, could be based out of a single city or country and be delivering all manner of high value services to any other location in the world which in itself could literally dislocate trillions of dollars worth of value and "services" revenues.

EXAMPLES

The number of jobs and tasks that can be performed using tele-operations is increasing every day as organisations get their heads around what this new capability means for their top and bottom lines, as well as how they deliver services and manage their workforces.

While I've already discussed the ability to use tele-operations to perform remote surgeries, with real world examples including surgeons in China, India, and the US performing everything from brain surgery to heart surgery on patients who were hundreds of miles away from them, there are plenty of other examples.

Examples such as Doosan who used a combination of 5G and drone construction equipment to enable workers based in Germany to build buildings in South Korea 8,500km away, and T-Mobile and Halo who used a similar approach to enable "drivers" based at a central location to remotely control and drive taxis around Las Vegas as they picked up paying passengers. All of which is just the tip of the iceberg.

ACT NOW

The ability to use high capacity low latency networks and combinations of drone machines and robots to "extend" a workers physical presence to anywhere on the planet is revolutionary. Not only will it let organisations change how they deliver services and where they base their operations and staff, but it will also let them realise new cost efficiencies and scale into new markets easier and faster than ever before.

EXPLORE:

- Best practises, case studies, and examples
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Robotics, and Work
- New business and operating models
- Policy and regulation reform

WORKPLACE TRENDS

CONTENTS

... CHI WORKSPACES
... HYBRID WORKPLACES
... WORK FROM ANYWHERE
... VIRTUAL WORKSPACES

CHI WORKSPACES

3RD YEAR ON THE LIST



QUICK TAKE

Even before the global pandemic having "Chi" workspaces that energised and revitalised employees mental, physical, and spiritual well being was important. And now these workspaces, that encourage people to engage with one another, be mobile, and that promote equality and inclusion, as well as mental and physical well being, have never been needed more. This trend offers organisations a way to encourage and promote employee inclusivity and wellness, improve belonging, loyalty, and productivity, and ultimately become more attractive dutiful employers with minimal employee churn.

IMPACT

Workspaces play a vital role in encouraging and nurturing positive inclusive work cultures, but despite this not every organisation gives much thought to their design or layout.

Not only has this lack of forethought and planning been shown to contribute to the dismal **Employee Engagement** stats we see, where just 34% of the workforce feels engaged, but it's also a key factor in the rise of mental health issues in the workplace with 1 in 7 now saying that they experience mental health problems in the workplace which then, in turn, accounts for approximately 13% of all sickness absences.

Furthermore, with 1 in 4 people having a physical health condition, with 1 in 3 of those being long term, and with 42% of those employees having conditions that affect their work, it's easy to see how having comfortable workspaces can help boost engagement, morale, and productivity.

Likewise, with respect to **Diversity and Inclusion** (D&I) inclusive workspaces also improve overall productivity by up to 25%, and boost an organisations ability to adapt and innovate.

EXAMPLES

Workspaces that nourish, promote, and revitalise peoples mental, physical, and spiritual well being have been shown time and time again to be good not just for the employees but also their employers brand reputation and top and bottom lines. Some of the best examples of organisations that get this right include organisations such as Cisco, Google, Hubspot, Intuit, Netflix, Salesforce, Zoom, and Mars - the latter of which has also been working hard to promote **Ethical Capitalism**.

While workspaces are just one part of an organisations overall culture and value they're arguably one of the most vital and it's important that their design and layout are aligned with your organisations overall purpose.

In Salesforce's case workspaces are designed with their Vision, Values, Methods, Obstacles and Metrics (V2MOM) strategy in mind. The result is the creation of what they call "Immersive Spaces" and "Community Hubs," the latter of which are a form of **Hybrid Workspaces**, that "foster human collaboration and connections" and "reflect their culture as a company."

ACT NOW

It's not rocket science that happier employees are more engaged and productive employees, and there's no reason why every organisation and every employee for that better can benefit from this trend.

EXPLORE:

- Case studies and examples
- Design and technology solution
- Emerging technologies and technology roadmaps
- Future of Work
- Hybrid work strategies
- Organisation brand and culture impacts

Data sources: BCG, CIPD, Gallup, Royal College of Psychiatrists, and various.

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HYBRID WORKPLACES

3RD YEAR ON THE LIST



QUICK TAKE

A trend even before the COVID-19 pandemic post pandemic the debate and development of hybrid workplaces has accelerated as people and organisations alike adopt more flexible working practises.

Hybrid workplaces are designed to support distributed workforces that consist of both in office and remote workers, and as a consequence need to balance the right levels of flexibility and support with the organisations need to empower employee productivity and wellbeing.

IMPACT

There is no doubt that the global pandemic changed the nature of work and the workplace as everyone was forced to work from home, and even though the memories of that time will eventually fade in the short to medium term surveys have consistently found that 1 in 3 employees say they will quit if they're not allowed to work from home, over 80% of company leaders plan to allow work from home, over 60% of employees want more in-person time with colleagues, and that over 40% of employees struggled with group work during the pandemic.

Furthermore, and to add some confusion into the mix, when it comes to what many organisations care the most about though, namely employee productivity, over 70% of the most productive people identified in surveys cited a stronger sense of connection with their colleagues as being their primary differentiator.

While organisations need to carefully weigh the pros and cons of hybrid workspaces it is clear they can add value if properly implemented, but that finding the right balance could be difficult.

EXAMPLES

While hybrid workplaces are nothing new they were arguably thrust much more into the spotlight by supporters in Silicon Valley, such as Facebook, Google, and the throng of new Unicorns and Decacorns, who used them as a means to attract and retain talent, and by companies such as WeWork who embraced the model and scaled it globally.

When it comes to implementation strategies there are three models organisations can rally around such as Remote First that puts remote work policies first, Office Occasional which allows random drop ins per se, and Office First Remote Allowed which prioritises being in the office. Needless to say which one of these organisations favour depends on a variety of factors.

When Microsoft embraced the hybrid workplace model they found that they needed to develop a new operating model and strategy that encompassed flexible working, inclusive space design, and innovative technology solutions, but they also found it enriched their culture, bought in fresh perspectives and unique local viewpoints, and increased their customer touch points.

ACT NOW

An organisations HQ and global offices - its physical presence and spaces - often embody and help strengthen its brand and values in a way that is often difficult to achieve digitally, but as HR and workforce habits change it is imperative that organisations understand the pros and cons of hybrid workplaces and maintain an open mind to implementing them.

EXPLORE:

- Case studies and examples
- Design and technology solutions
- Employee availability expectations and equal employee engagement policies
- Fostering in person connections
- Hybrid work strategies
- Organisation brand and culture impacts

Data sources: Gartner, Forbes, HBR, Microsoft, and various.

WORK FROM ANYWHERE

3RD YEAR ON THE LIST



QUICK TAKE

While the majority of organisations debate Work From Home (WFH) initiatives technology has long enabled us to Work From Anywhere (WFA) - provided there's an internet connection and then even that's optional.

When it comes to WFA versus WFH there are distinct and significant differences between the two in terms of employee availability, benefits, culture, location, productivity, and strategy, therefore as technology and the workforce evolve we argue organisations should increasingly consider the benefits of WFA over WFH.

Data sources: HBR, and various.

IMPACT

While there are many WFA benefits, many of which overlap with WFH benefits, perhaps the greatest is improved staff well-being thanks to the ability to eliminate stressful commutes, being able to sleep longer, spending more time with family, and being able to exercise and eat healthily. Meanwhile, other organisational benefits, among the many we could cite, include being able to avoid costly immigration and visa issues, and research that shows WFA employees are 20% more productive.

However, while organisations might only focus on these and other tangible benefits such as employee expense and wage benefits, as well as tax incentives and sustainability benefits, increasingly millennials and military spouses are excited about the prospect of WFA and being able to travel the world while still working - something that provides organisations with a hiring dividend.

WFA also allows employees to save money on having to rent apartments in expensive neighbourhoods next to physical offices, such as those in London or San Francisco, which is yet another important consideration when thinking about the benefits of WFA.

EXAMPLES

The large scale transition from traditional working practises to the adoption of working remotely first began in 1973 when the OPEC oil embargo made commuting to work both expensive and in some cases impossible - and it's been a growing trend ever since.

While there are many examples of organisations who have embraced WFA, rather than just WFH, some of the more notable examples include Microsoft owned Github who are the world's largest all-remote company with 1,300 employees, as well as Automatic and Zapa whose employees are spread across 50 and 23 countries respectively with none of them being co-located.

While these companies have fully embraced WFA for all their employees other organisations such as TCS, the Indian technology services giant permit over 75% of their 500,000 strong workforce to WFA, and the USPTO have several thousand WFA employees. And, of course, there are many others I could cite.

ACT NOW

While many see WFA and WFH being interchangeable there are distinct differences between the two which means that organisations need to be clear about which one they focus on and offer to their employees so everyone's expectations are aligned.

EXPLORE:

- Case studies and examples
- Cultural reform
- Future of Work
- HR, pay, and workforce policies
- Organisation brand and culture impacts

VIRTUAL WORKSPACES

3RD YEAR ON THE LIST



Work in virtual space, MeetingVR

QUICK TAKE

While the majority of people pay attention to where people work from, whether it's in the form of **Tele-Operations** or **Work From Anywhere**, as well as the physical environments they work in such as **Hybrid Workspaces**, fewer people are paying attention to the upcoming trend of Virtual Workspaces.

Essentially an extension of the **Metaverse** this trend lets individuals and organisations completely re-invent their workspace environments as well as how they collaborate and work with customers and other stakeholders.

Data sources: Meta, and various.

IMPACT

Ultimately the ability to re-imagine and tailor worlds and workspaces in the virtual world, which don't have to obey the laws or limitations of the real world, and that help you and your employees become more productive and engage with customers and stakeholders in new ways, is a fascinating concept that many people have yet to experience or experiment with.

Furthermore, as **Immersive Reality** (A/M/VR) environments increase in convenience, responsiveness, and resolution, and as the bulky gadgets and headsets we use to access them evolve into smaller more compact form factors, such as Smart Contact Lenses and VR glasses, in time we could see organisations ditching the laptops in favour of nothing more than a pair of glasses that literally "teleport" their employees into purpose built virtual workspaces.

While nascent it's also worth noting that this trend will be supercharged by the convergence and development of many other complimentary exponential and **General Purpose Technologies**, and could become the new norm.

EXAMPLES

On the one hand this trend lets people, via the use of avatars and virtual environments, digitise their physical presence and teleport themselves into the virtual world. On the other though it also lets them change how they collaborate and work with others, and create more productive workspaces by, for example, letting them configure multiple virtual monitors.

Taking productivity to the next level, and as a demonstration of the art of the possible these worlds open up, Stanford University have been experimenting with giving avatars a virtual third arm and as odd as that sounds once their staff got used to using it in the virtual world they found that their productivity increased by 30%.

Elsewhere we have organisations including Meta and Microsoft heavily promoting their own virtual office platforms such as Infinite Office on Oculus.

ACT NOW

While culture and the availability and cost of hardware currently holds this trend back it's seen by many as the future of work and collaboration. It's not surprising therefore that some of the world's largest organisations are now investing heavily and pivoting to make it a reality.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Media and Entertainment, and Work
- Partner ecosystems and solutions
- Policy and regulation reform

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AEROSPACE INDUSTRY TRENDS

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... SINGLE STAGE TO ORBIT

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WHAT IF ... EVERYONE COULD ACCESS SPACE?

EVERYTHING CHANGED when in a ground breaking move Blue Origin, SpaceX, and an international coalition of aerospace organisations launched the "Space for All" initiative that, by leveraging advancements in reusable rocket technology, economies of scale, and international subsidies saw the cost of accessing Low Earth Orbit plummet to the cost of an international commercial flight. Space - once the domain of astronauts and the wealthy - was now accessible to everyone.

Initially public reaction was a mix of awe, ethical debate, and excitement. Crowd funding campaigns sky rocketed to send underprivileged youth and community leaders to space, offering perspectives and opportunities previously unimaginable, while schools around the world added the "Galactic Learners Program" to their curricula, incorporating real-time virtual classroom sessions conducted from space stations - bringing a new dimension to STEM education and inspiring a generation that now saw space as an attainable workplace.

Despite these upsides though the democratisation of space also had its drawbacks. Space junk grew exponentially as everyone excitedly launched everything from time capsules and urns to their own mini-satellites into space, and environmentalists amped up their warnings about the impact frequent rocket launches were having on the Earth's fragile biosphere. Ethical debates raged too over who had the right to claim and exploit extraterrestrial resources, and questions about the jurisdiction and governance of new celestial territories became pressing issues for the UN, leading to the formation of a new branch specifically focused on extraterrestrial law and diplomacy.

Despite the challenges though, the human perspective underwent a seismic shift. The famous NASA astronaut "Overview Effect," first coined in 1987 and until now only experienced by a handful of astronauts, became a widespread phenomenon. Humanity saw its home planet without borders, a fragile blue sphere hanging in the vast emptiness of space, and the urgency to address Earth's environmental, political, and societal issues gained new momentum, fuelled by a universal epiphany of our planet's vulnerability and humanity's interconnectedness.

STATS THAT MATTER

30 %

USA AEROSPACE SPEND, PERCENT, GLOBAL TOTAL

MODORI

1.26 KG

SMALLEST SATELLITE IN ORBIT, 2023

ISRO

2.5 ML

PEOPLE EMPLOYED, GLOBAL TOTAL 2023

ITA

$2.7 TR

IMPACT OF INDUSTRY ON GLOBAL GDP, 2023

AIAA

311 Global Advisory Forecasting Innovation Strategy

$1,400 PER KG

COST OF LAUNCHING 1KG INTO ORBIT, SPACEX FALCON HEAVY

WHO

$741 BN

INDUSTRY REVENUES, GLOBAL 2022

PWC

$107 k

AVG AEROSPACE ENGINEER SALARY, US 2022

BLS

AEROSPACE

186

ORBITAL LAUNCHES, GLOBAL TOTAL 2022

NATURE

7,702 SATELLITES

NUMBER OF SATELLITES IN ORBIT, GLOBAL TOTAL 2022

ORBITING NOW

31

TOTAL SPACEX LAUNCHES, 2022

SPACEX

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EXPLORE STARTUPS & MORE

ALTERNATIVE LAUNCH SYSTEMS

3RD YEAR ON THE LIST



The Suborbital Accelerator, SpinLaunch

QUICK TAKE

New technologies and new wealth are **Democratising Space Access** and helping accelerate the **Privatisation Of Space**. As a consequence there has been a significant increase in competition, and therefore innovation, in the sector innovators from all corners of the world now doing their level best to create the launch systems that could dominate the 21st Century.

However, while there are many approaches everyone in this space is ultimately trying to get people and goods into space for the lowest possible cost at the fastest possible rates.

Data sources: AMR, PWC, SpinLaunch, and various.

IMPACT

This trend will further lower the cost of accessing space while at the same time increasing launch frequency, both of which will have significant impacts on businesses in space as well as here on Earth. It has also had another impact, namely the creation of a new space race, which some have dubbed Space Race 2.0, and led many to question the future role and viability of government sponsored space agencies such as ESA, JAXA, NASA, and ROSCOSMOS, among others, who in time will either be replaced by these organisations or become their customers.

In 2019 the global space launch services market was valued at just under $10 Bn and it's projected to grow by 15.7% CAGR to reach over $32 Bn in 2027, and that's before we factor in new use cases enabled by this, and other associated trends, such as the ability to transport both civilian and military cargo and people trans-globally via Low Earth Orbit (LEO). Additionally, the increase in launch volumes and their environmental impact has sparked a race to create greener rocket fuels and the ultimate sustainable launch systems such as **Single Stage To Orbit** (SSTO) systems.

EXAMPLES

With lowering costs and increasing launch frequency and reliability all a priority for the sector there's naturally alot of activity and innovation in this space. While we have seen dramatic advances in the development of **Reusable Rockets** from organisations such as SpaceX and others we have also seen the parallel development of pylon mounted launch systems from organisations such as Stratolaunch and Virgin Orbit as well as centrifugal kinetic launch systems from the likes of SpinLaunch. All of which is before we discuss other promising launch systems such as electromagnetic and rocket sled launch systems and developments in the SSTO space. The latter of which has Boeing very excited.

While all of these developments are significant in their own ways though when it comes to what is arguably the most efficient way to get goods and people into space, namely Space Elevators, not only have JAXA successfully tested a space based proof of concept, moving goods between two tethered satellites, but the Chinese have now developed new Carbon Nanotube based materials that might be able to manage the stresses and strains.

ACT NOW

When we watch science fiction films very few of them, if any include spacecraft that look like anything we have today, but as long as we live on a planet with gravity we're going to have to try and find the most optimal way of breaking free of it and, as the space industry continues to grow it's clear that in the future we will have many options.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Energy, Manufacturing, and Space
- New business and operating models
- Partner ecosystems and solutions

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DEMOCRATISING SPACE ACCESS

3RD YEAR ON THE LIST



The asteroid Psyche

QUICK TAKE

One of the greatest hurdles to opening up space to pioneers and others used to be the cost and complexity of launching goods and people into space, but now thanks to new business models, launch systems, and other enabling technologies both of these have fallen by hundreds of multiples and are continuing to fall further.

Furthermore, as we project forwards it's increasingly easy to see a point in time where accessing space will be as easy and cheap as boarding a commercial aircraft, at which point accessing space will become commonplace for all.

Data sources: Morgan Stanley, and various.

IMPACT

When it comes to assessing the impact of increased access to space - both from a military and a commercial perspective - there are a lot of variables to take into account.

On the one hand it's estimated that commercial revenues from the sector will grow from circa $250 Billion to over $550 Billion by the year 2030, but on the other new technologies that open up new opportunities could push that figure into truly astronomical territory - one such example would be emergence of commercially viable asteroid mining with just one asteroid alone, Psyche, being worth between an estimated $700 and $10,000 Quadrillion in resources. As you can see when these "non-traditional" or new business opportunities are included in the models everything gets wildly skewed.

Coming back down to Earth though, metaphorically at least, we are now seeing the emergence of true space tourism, preparation for the first permanent Mars and Moon colonies, as well as new space based internet systems, space based manufacturing facilities, and solar plants, and much more - and we're just getting started ...

EXAMPLES

In the 1980's and the Space Shuttle era the cost of getting one kilo into space was $54,500 and the average vehicle turn around time was 54 days.

Fast forwards to today and those figures are $2,750 with a 1 day turnaround, and in the very near future with rockets such as the SpaceX Falcon Heavy that will fall even further to $2,350 to get to LEO and $5,620 to GTO orbits. Putting this into perspective within just a few short decades the cost of accessing space will have fallen by a staggering 99% and it's only going to get lower as the cost of producing fuels such as LPG and Methane plummet and as the reusable launch systems become cheaper, more reliable, and more cost effective.

These near term future costs also don't take into account the ability to 3D print assets on Earth and in space, the development of **Alternative Launch Systems** and **Single Stage to Orbit** systems, or perform **Off World Re-Fuelling**. So, while 99% might sound impressive as you can see we have plenty of scope to go even lower and make going into space as commonplace as getting on a bus.

ACT NOW

As the costs of accessing space continue to fall this opens up a vast array of new opportunities for companies that are prepared to invest and have vision.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Space
- New business and operating models
- New space based product concepts
- Partner ecosystems and solutions

OFF WORLD RE-FUELLING

3RD YEAR ON THE LIST



Starship in orbit re-fuelling system, SpaceX

QUICK TAKE

As mentioned in the **Privatisation Of Space** trend Jeff Bezos is building a "road into space" that other entrepreneurs can follow and build on top of, and as we all know every road needs re-fuelling stations that ultimately let those people travel further and farther than they could have otherwise.

Consequently, as the process of Democratising Space Access continues governments and organisations alike are building the technologies and systems that will let space pioneers re-fuel their vehicles in orbit as well on distant planets and moons.

Data sources: Various.

IMPACT

Re-fuelling, or as some call it "re-filling," in orbit and off world has always been a problem and it's one of the primary reasons why satellites and other space assets end up crashing into the Earth's oceans when their finite fuel reserves run out.

While the ability to re-fuel satellites in orbit will extend their mission life it will also give them greater manoeuvrability because operators won't have to be so sparing their orbital manoeuvres. However, while there is a huge demand for satellite in orbit re-fuelling there is also an increasing demand, from almost all quarters, for the ability to refuel larger spacecraft, space stations, and other space assets including manufacturing and mining assets, in orbit and on the surface of moons and planets, as and when needed.

Not only will the ability to re-fuel off world significantly increase the lifespan of almost all space assets but it will also mean organisations can build rockets with smaller fuel tanks which, in the case of Elon Musk's interplanetary transport system, means he can build Starships just a tenth the size of what he would have had to if it wasn't an option.

EXAMPLES

With a wide variety of space assets benefiting from this trend organisations have had to develop new universal docking systems such as ESA's ASSIST system and Lockheed Martin's RAFTI system, whether those are for in orbit or ground based re-fuelling.

When it comes to the formats of the re-fuelling systems and tankers though there's a lot more design leeway with most in orbit re-fuelling systems naturally taking the shape of tankers, albeit advanced ones, and ground based systems taking the form of everything from what look like traditional Earth gas stations to more advanced and sustainable biofuel stations and farms.

This also highlights the double edged problem that organisations in this market are having to confront because as new fuels start coming online they not only increase the number of options space operators have to power their assets with but, in many cases, force either total or incremental design changes - all of which then have an impact on the cost, form, and function of these systems.

ACT NOW

Noone would ever imagine designing a car that had to carry all the fuel it would ever need with it, but for decades that's how rockets and other space assets have had to be designed. As off world re-fuelling breaks this paradigm it opens up a raft of new opportunities and markets for space pioneers so it is worth watching closely.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Energy, Manufacturing, and Space
- New business and operating models

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PRIVATISATION OF SPACE

3RD YEAR ON THE LIST



Oribtal Reef, Blue Origin

QUICK TAKE

Getting into space and being able to utilise it used to take government sized budgets, and today it still does, but not quite as much. However, while the cost of space programs are still high, and in most people's eyes still unaffordable for mere mortals and organisations, in the past couple of decades the significant increase in the number of ultra wealthy individuals, and their wealth, now means that funding these multi-billion dollar programs is little more than pocket change. And it's this, which also contributes to the **Wealth Inequality** trend, that's now changing the future of space and the space industry.

Data sources: Blue Origin, Forbes, and various.

IMPACT

One of the greatest impacts of this trend is that governments no longer dominate or own the future space agenda. In other words, in the past while they would have listened to the voices of private industry they ultimately had the last say. Now though, for the most part, the shoe is on the other foot and while private industry still has to abide by certain regulations and rules they are increasingly free to pursue and promote their own agendas.

One apt analogy perhaps would be that the pilot in the aircraft has changed, and now it's governments who are increasingly coming along for the ride.

While this might not sound great from a government perspective there are significant advantages for everyone involved. For example, free from having to build the space stations and rockets - the space "hotels" and "taxis" - to ferry and house people and goods into space organisations like NASA can now focus instead on higher value missions and tasks. It also increases commercial competition, which then helps when it comes to **Democratising Space Access**, which then accelerates all space based innovation activities.

EXAMPLES

Whether it's private individuals, to an extent, or private organisations taking the lead there are now all manner of examples that highlight the impact of this trend which just twenty years ago wasn't even on many people's radars.

Today these "privateers," which include companies as diverse as Axiom, Blue Origin, Boeing, Orion Span, Rocket Labs, and SpaceX, are busy building and planning everything from private space colonies and private space stations, complete with business parks, hotels, and research centers, to space based communications constellations - for both Earth and inter-planetary communications - and space based manufacturing facilities. And all of this is before we examine how they are opening up the door to space tourism.

So, when we say space is the new frontier, it literally is, and as Jeff Bezos has put it succinctly in the past, as far as he is concerned he wants to "Build the road that other entrepreneurs can build on top of."

ACT NOW

As the cost of accessing and launching people and goods into space continues to drop dramatically more people, many more than in the past, see space as a developing business opportunity. It's for this reason, along with others, why investment in space and the industry as a whole is now at record highs and why competition in the sector is hotting up.

EXPLORE:

- Future of Agriculture, Communications, Leisure and Tourism, Manufacturing, and Space
- New business and operating models

REUSABLE ROCKETS

3RD YEAR ON THE LIST



The Falcon 9 rocket, SpaceX

QUICK TAKE

As Elon Musk, the CEO of SpaceX famously said: "You don't throw an aircraft away after every flight." But for decades that was exactly what the space industry was doing and it was the major reason why the cost of launching goods and people into space remained so high for so many decades.

However, in 2017 after 15 years of effort that changed with the launch of the first Falcon 9 rocket and the rest, as they say, is history. And now every space organisation and program is following his lead with gusto and trying to best him.

Data sources: Relativity Space, SpaceX, and various.

IMPACT

The ultimate impact of this trend is to dramatically lower the cost of rocket launches, and therefore the cost of getting goods and people into space, and dramatically increase the frequency of rocket launches but getting to the point where rockets are as reusable as commercial aircraft has not been easy.

The concept of re-usability in the space industry is nothing new but it's always been seen by many as being impossible. However, now that SpaceX have cracked the code the genie is out of the bottle and over time we will see rockets performing multiple launches per day at increasingly accessible and affordable prices which, in turn, will then accelerate the maturation of the sector.

As the technology improves in both cost and reliability one of the more down to Earth based opportunities it will open up will be the use of rockets for inter-continental goods and passenger transportation - something which in time could very well end up disrupting the traditional airline and logistics industry.

EXAMPLES

While SpaceX is the undisputed leader of reusable rocket design there are plenty of organisations now working hard to best them with some now also focusing on the development of **Alternative Launch Systems** and **Single Stage To Orbit** systems.

Organisations such as Boeing and Rocket Labs who have been developing launch vehicles similar to SpaceX's, and organisations such as Relativity Space whose two stage reusable rockets, compared to SpaceX's single stage reusable rockets, are 3D printed with up to 99% fewer parts which, when netted out, would give them a comparable launch cost of $12 Million per rocket versus SpaceX's Falcon 9 cost of $60 Million.

However, as the race for space literally heats up other players such as Virgin Orbit are trialling Boeing 747 pylon based launches and other organisations are developing everything from centrifugal launch systems through to single stage Aerospike designs - all of which shows that there is now plenty of innovation in the sector which will have a material impact on the cost and frequency of future launches.

ACT NOW

Re-usability is a key factor in future rocket design and not only does it change the economics of the industry for the better, but it also has a dramatic impact on **Democratising Space Access**.

EXPLORE:

- Emerging technology and technology roadmaps
- Future of Energy, Manufacturing, and Space
- New business and operating models
- New space based product concepts
- Partner ecosystems and solutions

SINGLE STAGE TO ORBIT

3RD YEAR ON THE LIST



The Radian One SSTO, Radian

QUICK TAKE

While organisations around the world develop and invest in a variety of **Alternative Launch Systems** many argue that the ultimate launch system is a heavy lift reusable Single Stage to Orbit (SSTO) system that can take off and land in the same way that conventional aircraft do today, and while these have been in development for decades new technologies and methods of manufacture are now making them look increasingly likely and viable.

IMPACT

While there are still questions about the economic viability of SSTO's, especially when compared to more traditional vertical launch systems, SSTO's and their ability to standardise launch operations in a package that is operationally simple and much less complex than today's mutli-stage launch systems seemingly make them an ideal candidate to transport mid and large size payloads into orbit. But that said creating a practical and reusable SSTO that needs no, or minimal, refurbishment after each journey is no easy feat as researchers have been finding out first hand for the past thirty or so years.

At the moment current projections estimate that SSTO's could help reduce satellite launch costs from $18,000 per kg to $900 per kg which, needless to say, would be a significant decrease.

The question here though is then as **Democratising Space Access** continues to push launch prices down to historic lows can they get to those figures fast enough and carve out a market for themselves before the sector's other operators crowd them out.

EXAMPLES

Today there aren't many organisations actively developing SSTO vehicles, but that said the few that there are such as Aerojet Rocketdyne, NextAero, Radian, and Reaction Engines, are making significant enough progress that several organisations, including Lockheed Martin and NASA, have been trying to buy and partner with them.

Among the myriad of challenges facing the organisations in this space some of the most pressing include developing single stage engines capable of breathing and operating at orbital speeds in Earth's atmosphere, fuel selection and fuel to cargo ratios, material selection, miniaturisation, reusability, and, of course, "just plain engineering."

It's for these reasons why the space community remain divided on the future of SSTO, but with Reaction Engine's ammonia powered hypersonic SSTO SABRE engine and Skylon platform, Radian's delta wing rocket sled SSTO concept, and numerous Aerospike engines being developed and their test beds expanded it still looks like a case of when these vehicles will appear rather than if.

ACT NOW

When you watch science fiction franchises like Star Wars the rebels jump into their X-Wings and launch into space. There are no multi-stage systems there, or in any science fiction movie for that matter, and as we all know the visions the genre paint all too often have a way of becoming science fact so for my bet it's not a question if SSTO's will emerge it's when.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Energy, Manufacturing, Transportation, and Space
- Partner ecosystems and solutions
- New business and operating models

Data sources: Boeing, NASA, Radian, Reaction Engines, Science Direct, and various.

AGRICULTURE INDUSTRY TRENDS

CONTENTS

... AUTONOMOUS FARMS
... CELLULAR AGRICULTURE
... PRECISION AGRICULTURE
... VERTICAL FARMS

BOOK AN EXPERT CALL

WHAT IF ... NOONE IN THE WORLD WENT HUNGRY?

IN A watershed moment for humanity officials marked the end of hunger worldwide. Fuelled by the combination of innovative AgTech 2.0 technologies, efficient and secure food distribution networks, and unprecedented international cooperation, governments and organisations finally succeeded in providing food security to every person on Earth and every corner of the globe.

The Director General of the UN declared this feat as the "single greatest achievement in human history," and for good reason. Eliminating hunger has triggered a cascade of positive outcomes. Education attendance and grades soar as children, no longer weakened by malnutrition or conscripted by their parents to farm the land, attend school with renewed energy, focus, and optimism, and globally productivity spikes across all sectors as adults everywhere put their physical and cognitive potential to full use, as rural communities flourish thanks to the adoption and ubiquitous availability of eco-friendly, high yield, and sustainable food production technologies.

Additionally, the world's healthcare systems, now unburdened by diseases related to malnutrition, divert vital resources to tackle other chronic conditions and emerging challenges, and social unrest recedes as the struggle for survival subsides, replaced instead by a surge in civic engagement and community projects. And topping it off the "Maslow Effect," as psychologists come to call it, reveals how fulfilling one basic human need has unlocked new levels of creativity and innovation across society.

However, the victory hasn't come without its challenges. Regulations on food production and distribution become a key focus to sustain this new world, and debates arise about the ethics of new food production methodologies, genetic diversity, and one of the greatest challenges of all - ensuring that the technologies enabling this golden age of plenty remain open source and accessible for all - sees the formation of a new UN branch, the International Food Stability Organisation (UNIFSO), which is tasked with monitoring these issues and ensuring that the world's food supply remains equitable and sustainable.

STATS THAT MATTER

AGRICULTURE

70 %

FRESH WATER USAGE, PCT. OF GLOBAL TOTAL 2022

UN FAO

690 ML

MALNOURISHED PEOPLE, GLOBAL TOTAL 2022

UN FAO

800 ML

PEOPLE EMPLOYED, GLOBAL TOTAL 2023

UN FAO

23.7 BN

NUMBER OF CHICKENS, GLOBAL TOTAL 2022

UN FAO

2.769 BILLION TONNES

APPROXIMATE TIER 1 CROP PRODUCTION, GLOBAL TOTAL 2021

UN FAO

50 %

HABITABLE LAND USED AS FARM LAND, GLOBAL

UN FAO

77 %

PERCENT OF FARM LAND USED FOR LIVESTOCK

UN FAO

176 ML

FISH PRODUCTION, TONNES, GLOBAL TOTAL

UN FAO

340 MILLION TONNES

MEAT PRODUCTION, GLOBAL TOTAL

UN FAO

1.3 BN

ANNUAL FOOD WASTE, TONNES, GLOBAL TOTAL

WRI

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EXPLORE STARTUPS & MORE

AUTONOMOUS FARMS

3RD YEAR ON THE LIST



QUICK TAKE

As the agriculture industry tries to improve productivity while reducing costs it's inevitable that, as with any industry, we are going to see technology taking a more central role and, among other things, that means automation and the increased use of robotics.

Over a century after the industry was mechanised, and accelerated by worker shortages of pickers in the US and Europe, which were exacerbated by sudden changes in immigration and visa policies, we are now seeing fully autonomous farms appear.

Data sources: World Bank, and various.

IMPACT

The ability to fully automate farm operations, from the tilling of soil and sowing of seeds to the monitoring and harvesting of crops, and in time certain livestock, using robotic systems and software, transforms the industry's operating model and, when you also consider the associated benefits of **Precision Agriculture** systems, increases yields while reducing costs.

In raw figures this trend increases food yields by at least 30% and reduces costs by up to 80%, but this also means that globally up to 1 Billion peoples jobs are at risk and, as we all know, many of these people are already among the poorest in society so this trend could accelerate **Wealth Inequality**. But this challenge isn't unique to this industry or trend.

As autonomous farms emerge though they do so against the backdrop of new alternative disruptive Agritech trends such as **Cellular Agriculture** and **Vertical Farms** which are already eating into traditional farmers markets and solving many of the problems this trend can't solve such as the impact of **Extreme Weather** on crop yields and other negative factors.

EXAMPLES

While there are plenty of examples of semi-automation in the farming community, such as autonomous vehicles and drone farm machinery, as well as all manner of autonomous robotic harvesting systems that can pick tens of thousands of soft fruits an hour, so far there are very few fully autonomous farms in commercial operation. However, given the trajectory of the trend, the problems it solves, and the pressure on global food supply it's inevitable it will become more common place over time.

The world's first traditional fully autonomous farm was developed in the UK in 2017, and by traditional farm I'm talking about the automation of an open air farm with fields. Dubbed the Hands Free Hectare Project no human was involved and machines managed everything from the drilling of channels for the Barley seeds to be planted by an autonomous tractor, to the spraying of chemicals and the tending of crops, to the harvesting of the crop using autonomous combines. Now, elsewhere organisations like Iron Ox, who have created their own fully autonomous vertical farms, are taking this trend into the future.

ACT NOW

As automation technologies, including **Artificial Intelligence** (AI) and **Robotics**, improve to the point where they can automate all manner of human and machine tasks we have the opportunity close the gap on food poverty, but it comes at another cost, a human cost, and we need to be careful to maximise the upsides while minimising the downsides as the industry transitions to new food production methods.

EXPLORE:

- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Agriculture, Artificial Intelligence, Robotics, and the Workforce
- Operating models
- Partner ecosystems and solutions
- Policy and regulation reform

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EXPLORE STARTUPS & MORE

CELLULAR AGRICULTURE

3RD YEAR ON THE LIST



QUICK TAKE

Nature has been doing it for billions of years, namely growing meat, proteins, and other animal products via the natural process of cell division and replication inside animals.

Today though innovative entrepreneurs and new technologies are letting us replicate these processes outside of the animal in bioreactors which means that, for the first time, we have a way to feed everyone in the world wherever they are with animal free dairy, meats, and other products at sustainable quantities and scale, as well as avoid future "Food Wars" as the global population grows.

Data sources: Various.

IMPACT

The impact of being able to grow different animal products without the animal is not only game changing, it changes society's view of food and the role of animals in the human food chain, as well as our future health prospects. This trend also solves global hunger and answers the question of how we feed a growing global population and burgeoning middle class, but when you consider that animal products produced in this way are harm and hormone free, and organic, this trend becomes even more impactful and interesting.

Another benefit of this trend, or to be more accurate, technology is that it's scalable and that at its heart it's a manufacturing process meaning that over time, as we are already seeing, the cost of producing products in this way declines exponentially.

This trend is so disruptive to the existing farming status quo that in 2019 US farmers petitioned Congress to ban organisations producing meats in this way from using the word "meat" and while they won investors, markets, and regulators have since embraced and accelerated this trend, and it's now on the cusp of going mainstream.

EXAMPLES

The ability to produce all manner of animal products without the need for the animal by simply taking the appropriate cells from an animal - any animal even exotic ones - and growing them in a lab, or "food factory," to produce dairy, eggs, meat, soy and even leather, does nothing short of transform human culture and society and unwind humanity's relationship with traditional food production techniques.

While there are many examples some of the most pertinent that I'll share here include organisations like Just using chicken feathers to create chicken nuggets which can now be bought and consumed in Singapore restaurants after regulators approved them for sale.

Elsewhere organisations like Finless Foods are taking cells from fish to create Salmon and Tuna fillets, again in this case without the need to ever catch a fish. And the same story continues for dairy, whey, and soy products.

We can even use this same process to make proteins, which can be used to create alternative meats, from air using nothing more than air, bacteria, and electricity - courtesy of NASA.

ACT NOW

This trend makes it possible to make dairy, meat, proteins, and other food products anywhere on the planet using almost zero resources, asides from the infrastructure. Furthermore, with the development of synthetic growth hormones the industry finally has a path to deliver organic, zero emission, and near zero impact products at a delivered cost to the consumer of less that $5 per pound for meat - at which point they are cheaper than products sourced from traditional suppliers.

EXPLORE:

- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Agriculture and Sustainability
- New business and operating models

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EXPLORE STARTUPS & MORE

PRECISION AGRICULTURE

3RD YEAR ON THE LIST



QUICK TAKE

Precision agriculture is the practice of using different technologies and tools that allow farmers to optimise and increase soil quality and food production with minimal cost and resources. It's also increasingly being referred to as Agriculture 4.0 which is a hat tip to Industry 4.0.

While all types of farming can benefit from this trend the main advantages are better productivity, a reduction in costs and waste, and less impact on the environment - all of which improve as the industry becomes increasingly automated and tech savvy.

Data sources: AEM, Statista, World Bank, and various.

IMPACT

Worldwide increases in food demands continue to soar, as the global population continues to grow and as people become richer, and that creates both opportunities and downwards pressure on producers who have to grapple with variable costs and increasingly variable weather conditions. And precision agriculture helps alleviate some of these pressures.

By 2028 it is estimated that the market will be worth $17 Billion and grow at 15% CAGR. However, as the technologies and tools powering the trend become cheaper and more ubiquitous adoption will inevitably accelerate as food producers around the world use it to better predict food yields and therefore farm revenues, as well as reduce costs and resource waste - which includes everything from equipment and fuel usage to herbicide, pesticide and water usage - while improving land quality and value, profitability, and sustainability, among many other benefits.

The trend will also help improve food security, and there are many other intangible benefits too.

EXAMPLES

By using everything from remote sensing and satellite technologies to fleets of agribots, drones, and smart devices which all collect and stream data that can be analysed by increasingly sophisticated AI models food producers now have a veritable army of cutting edge tools at their disposal to help them revolutionise their trade.

The consequence of this is that rural areas are now increasingly dominated by autonomous farm machinery and survey drones, texting cows, and all manner of smart crop monitoring, irrigation, and weeding systems, that are tied together and controlled by sophisticated farm management software. And as farms become increasingly automated and autonomous, with the first examples already here in the UK collectively these systems of systems will literally become the farmers of the future.

While some of the leaders in the space will be household names, such as Bosch and John Deere, there are literally hundreds of startups who are now trying to make their mark.

ACT NOW

Precision agriculture is just one tool that food producers have at their disposal to increase yields and quality, and reduce costs, and it's a powerful one whose benefits cannot be underestimated. It is therefore our advice that you experiment and investigate this trend.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Agriculture, Robotics, Space, and Transportation
- Partner ecosystems and solutions

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EXPLORE STARTUPS & MORE

VERTICAL FARMS

3RD YEAR ON THE LIST



QUICK TAKE

Agriculture has always been dependent on being able to find appropriate land to cultivate crops and the weather - both of which impact costs, productivity, and the food miles that produce has to travel to reach its markets.

Vertical farms however, where crops are grown in indoor spaces, such as containers and warehouses, give producers the opportunity to sustainably grow multiple crops per year in controlled conditions under factory-like conditions that allow them to improve yields and drop costs over time as the processes and technologies are refined.

Data sources: Edengreen, OECD, World Bank, and various.

IMPACT

The impact of vertical farms, on everything from the productivity and sustainability of farming, through to the price, safety, taste, and quality of the produce, is not to be under estimated - especially as climate change and extreme weather events continues to negatively impact traditional farming methods.

Today agriculture, as it relates to food production, is responsible for 11% of all greenhouse gas emissions which have increased by 14% since the year 2000, and is a large net contributor to global Methane and Nitrous Oxide gas emissions which are also harmful to the environment. It also accounts for 70% of all global freshwater use.

However, because vertical farms are closed loop systems and improve as technologies improve they can produce eight crops per year with no chemicals, herbicides, or pesticides, and with 99% less water. Furthermore food can be grown locally, eliminating food miles, can be powered using renewable energy, automated with robotics, and yields are not only organic but can be up to 40% higher thanks to the use of precision agriculture tools.

EXAMPLES

One of the greatest challenges vertical farms have faced is reducing the cost of food production to the point where it is commercially viable and competitive, and that line was crossed a number of years ago. Other challenges also include the types of crops that can be grown - salads, for example, are easy to grow, but fruits and rice are much harder.

Despite this though there is plenty of market opportunity for producers and there are plenty of investors pouring money into the trend as organisations such as Alesca, Amazon, Ocado, and Walmart continue to invest billions to build vertical farms on the outskirts of cities with a million inhabitants or more around the world.

Elsewhere organisations such as Ox Robotics have developed the world's first fully autonomous vertical farms which treats food production as a manufacturing process, which will inevitably drop the costs to near zero over time, and others such as Aero Farms and Plenty are rapidly expanding operations and the types of food that can be grown. Even large food buyers such as McDonalds are piling in ...

ACT NOW

Vertical farms represent a paradigm shift in how food is produced and will play a pivotal role in helping us feed an ever increasing human population which will reach 9.8 Billion people by 2050 and require a 70% increase in food production. As a result it is our advice that you experiment and investigate this trend.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Agriculture, Manufacturing, and Robotics
- Partner ecosystems and solutions

AVIATION INDUSTRY TRENDS

CONTENTS

... AIRCRAFT ELECTRIFICATION
... AUTONOMOUS AIRCRAFT
... FLYING TAXI SERVICES
... INVISIBLE E-BORDERS

BOOK AN EXPERT CALL

WHAT IF ... AIRLINE PASSENGER NUMBERS DOUBLE?

IN AN unprecedented shift in global mobility the number of airline passengers has doubled, a development that's not just redrawing flight paths but also reshaping economic, environmental, and cultural landscapes worldwide. This surge, experts say, is fueled by a combination of economic growth and technological innovation. As the middle class in emerging economies swelled, as in Asia, millions more people can afford to fly, while at the same time advancements in aviation technology have made flights more affordable and sustainable, attracting a new wave of eco-conscious travelers, and changing how the industry is taxed.

The transformation is most noticable at the world's largest airports which have morphed into sprawling hubs of commerce. No longer just departure points many are now destinations in their own right, buzzing with eateries and retail outlets, and digital entertainment experiences that blur the lines between local and global.

Tourism patterns have undergone a seismic shift as well. Hitherto overlooked destinations are becomming more prominent on the global stage, inviting both excitement and concern. And, while the economic windfall from tourism is undeniable this over tourism comes with pressing concerns about its impact on local culture and the environment with debates about these regions ability, suitability, and willingness to host these large tourist influxes, as well as their impact on the wellbeing of the locals, continue to swirl.

Elsewhere though residents living in the shadow of major airports have witnessed a different revolution. Advances in clean energy and noise reduction technologies, as well as ATC flight planning, have helped reduce both the acoustic footprint and pollution associated with the industry which, in turn, has improved residents wellbeing and in some cases tempered their objections to new airport expansion plans. Furthermore, as SAF and hybrid LiON-Hydrogen aircraft entered service, airlines and aircraft manufacturers alike have ramped up their investments in cleaner, greener technologies, thus solidifying the industry's commitment to a sustainable, brighter future which means that, looking forwards again, we could see even more people taking to the skies ...

STATS THAT MATTER

29 %

FUEL, PERCENTAGE OF AIRLINE COSTS, 2022

IATA

31 %

LABOUR, PERCENTAGE OF AIRLINE COSTS, 2022

IATA

250 BN

CARGO KM (CTK) FLOWN, GLOBAL TOTAL 2022

IATA

$6 TR

VALUE OF GOODS FLOWN, GLOBAL TOTAL 2022

IATA

23,200

AIRCRAFT IN OPERATION, GLOBAL TOTAL 2022

IATA

41 %

DOMESTIC FLIGHTS, PERCENT OF TOTAL, 2022

ACI WORLD

59 %

INTERNATIONAL FLIGHTS, PERCENT OF TOTAL, 2022

ACI WORLD

AVIATION

31 ML

COMMERCIAL FLIGHTS, GLOBAL TOTAL 2022

CIRIUM DATA

4.8 TRILLION MILES

AIRCRAFT MILES FLOWN, GLOBAL TOTAL 2022

IATA

7 BN

PASSENGER NUMBERS, GLOBAL TOTAL 2022

ACI WORLD

AIRCRAFT ELECTRIFICATION

3RD YEAR ON THE LIST



A regional electric Zunum Aero aircraft

QUICK TAKE

Fuel is one of the aviation industry's biggest and most unpredictable expenses, and with aviation contributing over 2% to global greenhouse gas emissions it's also one of the industry's sore spots - especially as climate change continues to dominate the global political and social agendas. It shouldn't come as any surprise therefore that the industry is keen on electrifying its fleets.

However, up until recently batteries, including LiON batteries, haven't had sufficient energy density to give aircraft manufacturers the option of switching - but increasingly that isn't an issue.

Data sources: ATAG, Statista, and various.

IMPACT

Fuel costs on average account for 20% of the aviation industry's total expenditure with between 30% and 50% of an airlines annual fuel consumption being hedged, and while this practice is designed to help airlines forward buy oil at the most competitive rates if they misinterpret future oil prices then needless to say it can have a significant impact on their bottom lines and their ability to compete in the market.

Asides from the fact that electric aircraft are also quieter and emission free than their traditional counterparts it's primarily this industry practise that makes electrification an even more attractive proposition for airlines because unlike fuel prices which are in a state of almost constant flux electricity prices - especially those from renewable sources - are generally stable, highly predictable, and even better, reduce over time as energy generation costs continue to plummet.

All that said though aircraft electrification will not succeed without parallel development in airport infrastructure, power supply and distribution, but that will come in time.

EXAMPLES

While the aviation industry has long had its eye on producing electric aircraft it's only recently that LiON batteries have been able to pack significantly more energy density into small or moderate form factor batteries, and ironically it's only been made possible thanks to research and investment in electric vehicles.

The past couple of years have seen huge strides made in the development of new electric aircraft airframes and powertrains, and today we're seeing the first regional electric aircraft take to the skies. However, while most of these early electric aircraft have passenger capacities of 30 or less it's estimated that by 2030 we'll see the first 100 seater passenger aircraft entering service.

Today the leaders in the field include organisations like Zunum Aero, which is backed by Boeing, as well as smaller aircraft manufacturers such as Ampaire, Bye Aerospace, Magnix, and Pipisrel but larger players, including Airbus and Rolls-Royce, are also entering the space with their own designs and future visions.

ACT NOW

There's little doubt that the future of aviation is electric, but in spite of the surge in research and development in electric aircraft there are multiple ways to achieve that goal including batteries, hydrogen, and multiple other alternatives and investment in all of the is surging.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Aviation, Energy, Manufacturing, and Transportation
- New business models, operating models, and products

AUTONOMOUS AIRCRAFT

3RD YEAR ON THE LIST



QUICK TAKE

In many ways the same technologies that have helped companies remove the operator from other types of vehicles are the same technologies that commercial aviation organisations are now using to create the first generations of autonomous aircraft.

However, while it will still be a while before regulators and the travelling public are ready to embrace autonomous aircraft from an operators viewpoint the trend is appealing because it will help them improve efficiency and reduce operating costs.

IMPACT

By 2037 it is estimated that global air traffic will double and that at least 37,000 new passenger and freight aircraft will be needed which will in turn require more than half a million new pilots to fly them so it's no wonder that operators are now considering the use of autonomous aircraft to alleviate future pilot shortages and safely meet the growing demand for global air travel.

As we have seen elsewhere though with other autonomous vehicles it's also believed this trend could help increase air traffic density by between 30% to 50%, letting operators make more efficient use of air space, and that operators could realise operational cost savings in the range of 30%.

EXAMPLES

At the moment there are very few examples of autonomous aircraft, other than Urban Air Mobility (UAM) vehicles, but there have been trials by organisations such as Airbus whose demonstrator aircraft are able to take off and land autonomously without having to rely on traditional external infrastructure like the Instrument Landing System (ILS) or GPS signals - all of which help reduce infrastructure costs.

Despite successful trials though the key challenge for self-piloting aircraft is how they respond to unforeseen events such as bird strikes, engine failures, and so on, and as a result it's a big jump to go from systems that are simply automated to ones that are fully autonomous and can replace human pilots.

ACT NOW

Autonomous aircraft will offer operators the opportunity to increase freight and passenger revenues while at the same time cutting infrastructure and operational costs - especially when coupled with increasingly automated and autonomous airport systems and ground support.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Aviation and Transportation
- New business and operating models

Data sources: Airbus, IATA, and various.

FLYING TAXI SERVICES

3RD YEAR ON THE LIST



QUICK TAKE

Flying cars have been discussed since the 1960's, but a variety of different technologies have matured enough for organisations to develop commercially viable, fully autonomous and electric flying taxis - all of which have more in common with aircraft and large drones than cars.

As cities around the world continue to struggle with traffic congestion, and the impact that has on their economies and societies many see flying taxis and the use of 3D airspace as an increasingly attractive proposition - albeit with restrained optimism.

Data sources: Bloomberg, INRIX, Nexa, and various.

IMPACT

Initially higher levels of traffic congestion are associated with a country's positive economic growth. However, once it reaches a certain threshold, for example on highways the threshold is estimated to be a value of 11,000 Annual Average Daily Traffic (AADT), it becomes a drag on growth. Furthermore, on average across a study of over 1,300 of the world's largest cities across 7 continents most cities loose between $7Bn and a whopping $34Bn each in lost productivity, with New York topping the rankings.

Needless to say traffic congestion also has a detrimental impact on people's mental and physical health, the environment, productivity, and in extreme cases, for example in many Indian cities, it can be so bad that it affects organisations ability to hire.

To make a dent flying taxi's will need to offer cost effective ride choices - it's estimated they will match the cost of a car journey within five years time - and they will need to scale fast and to huge numbers - especially when you consider on average 3,700 people travel on one lane of highway in peak times - something they should achieve by 2050.

EXAMPLES

Stoked, to some degree, by sci-fi and popular culture, flying taxis are seen by many as the medium to long term future of the transportation. Furthermore, as their capabilities, range, and size increase they will also have a big impact on the organisations supplying the regional aviation industry.

Made possible by the combination and development of different exponential technologies including Artificial Intelligence and Machine Vision, for autonomous navigation, energy dense power sources and optimised propulsion systems that offer high lift to weight ratios, and other technologies, we are seeing the cost of manufacturing and operating these vehicles fall substantially, to the point where they are commercially feasible.

Today, as governments help develop new UAM air traffic management systems, almost every aviation and automotive manufacturer, from Airbus and GM, to Aston Martin and BMW, as well as many startups, all have their own EVOTL variants with ranges of up to 400km, speeds of up to 300km/h, and seats for up to 8 passengers - all of which will increase in time.

ACT NOW

It is easy to dismiss flying taxi services as a boutique hobby for the elite few but as costs drop exponentially, and as the ecosystem to support them grows they are becoming an increasingly viable form of transport. They will also increasingly compete with established operators in various fields - from established airlines and helicopter operators, to buses and taxis.

EXPLORE:

- Consumer trends
- Emerging technologies and technology roadmaps
- Feasibility studies
- Future of Transportation
- Partner ecosystems and solutions

INVISIBLE E-BORDERS

3RD YEAR ON THE LIST



QUICK TAKE

The days of having to stop multiple times at different checkpoints within airports and other ports of entry is slowly becoming a thing of the past as digital and touchless biometric, security, and vetting systems turn what was once a country's distinct hard border into an invisible one that authorised passengers can traverse through without stopping and without interruption. While this would have sounded like science fiction just a few years ago significant developments in multiple areas are now converging to make this a reality as different countries and organisations begin roll outs.

Data sources: AirHelp, and various.

IMPACT

While this trend has multiple benefits, with the main one being its ability to improve the customer experience, it's only being made possible because of the convergence of multiple trends, such as **Biometrics**, **Customer Experience**, **Digital ID Systems**, **Digitisation**, **Single Customer View**, and various technology trends including **5G**, **Artificial Intelligence** (AI), **Internet of Things** (IoT), **Machine Vision** (MV), and others.

By using AI, UHD CCTV, and increasingly sensitive and sophisticated sensor systems, such as mmWave, Optical, and Ultrasound, that can identify and scan passengers bodies, faces, fingerprints, luggage, voices, and even heart beats at a distance it's now possible for authorities to automatically authenticate and vet 90% of passengers as they walk through terminals in milliseconds without the need for any human intervention.

Not only does this significantly reduce the number of border agents needed but it also helps reduce queues and average passenger transit times by at least 50% or more depending on the airport and give passengers more time to shop.

EXAMPLES

The ability to deploy systems that are able to authorise, process, and vet passengers at speed as they transit airports without the need for any human intervention, or for passengers to stop, has been a dream for many decades but now this trend is gathering momentum and maturing.

One of the first countries to explore this trend in earnest was Australia and their Department of Immigration and Border Protection (DIBP). Part of the Seamless Traveller Programme which originally launched in 2015 the program sought to do away with physical passports, and to replace immigration officers with electronic stations and automatic triage, and in 2020 it began being deployed nationally.

Then, elsewhere in Dubai authorities announced their own similar program and began deploying LED lined virtual aquarium tunnels that scanned passengers faces and iris's using over 80 hidden cameras as passengers looked around at the simulated aquarium experience. If the passengers are registered they receive a green welcoming message, and if not then a red message and an officer appears.

ACT NOW

The ability to authorise passengers without them having to stop as they transit an airport, whether it's a busy regional hub or an international airport, not only improves the overall customer experience but it can also save operators significant amounts of time and money if implemented well, as well as giving passengers more time to shop which further helps boost operator incomes. However, before deploying these systems everyone involved should think carefully about the fallibility and security of their processes and systems.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Security, Technology, and Transportation
- New operating models
- Partner ecosystems and solutions

CONSTRUCTION INDUSTRY TRENDS

CONTENTS

... 3D PRINTED BUILDINGS
... CLIMATE RESILIENT INFRASTRUCTURE
... GREEN CONSTRUCTION
... REMOTE CONSTRUCTION

BOOK AN EXPERT CALL

WHAT IF ... BUILDINGS EVOLVED WITH THE TIMES?

IN A visionary re-imagining of architectural evolution we can envision a world where buildings, like organisms, adapt and flourish in harmony with the ever-changing landscape. Picture a city where skyscrapers are not mere static monuments, but living entities pulsating with vitality and intelligence that are able to adapt and morph their functionality and spaces in unison with the demands put on them and the changing technological and societal environment. In this reality our infrastructure is imbued with the remarkable ability to respond dynamically to its environment and evolve its internal and external form and function over time. Just as organisms evolve to optimise survival, buildings too can now undergo genetic transformations to maximise efficiency, functionality, and sustainability.

Imagine a city skyline where towers sprout delicate membranes, capable of harvesting solar energy using artificial photosynthesis. These biological skins breathe and flex, adjusting their transparency to regulate internal temperature and light levels, ensuring optimal comfort for inhabitants while minimizing energy consumption. In this biologically inspired world buildings communicate with each other through intricate neural networks embedded within their structures to exchange data on resource usage, environmental conditions, and human activity, fostering a collective intelligence that optimises urban living and the built environment.

Furthermore, these bio-engineered edifices possess the remarkable ability to heal and regenerate. Like living organisms, they repair damage autonomously, ensuring longevity and resilience against the ravages of time and nature.

In collaboration with cutting edge technologies these architectural designs embrace bio-mimicry, drawing inspiration from the elegant efficiency of natural systems. Through this harmonious fusion of biology and technology, we envisage a future where buildings not only serve as shelters but as living, breathing entities that enrich and sustain the urban fabric.

STATS THAT MATTER

3

TALLEST 3D PRINTED BUILDING, STOREYS, 2023

ILO

18.9 ML

BIGGEST BUILDING IN THE WORLD, SQ FT, 2022

NBBJ

160 ML

PEOPLE EMPLOYED, GLOBAL TOTAL 2022

ILO

$10 TR

INDUSTRY RVENUES, GLOBAL TOTAL 2022

MCKINSEY & CO



10 BILLION TONNES

ANNUAL CONCRETE PRODUCTION, GLOBAL TOTAL 2022

COLUMBIA U

100 BN

RESOURCES USED, TONNES, GLOBAL TOTAL 2022

CIRCULARITY GAP

700 ML

WASTE PRODUCED, TONNES, GLOBAL TOTAL 2022

EPA

CONSTRUCTION

150 ML

NEW HOMES BUILT, GLOBAL TOTAL 2022

GLOBAL ABC

2.3 BILLION

NUMBER OF HOUSES, CENSUS ESTIMATE, GLOBAL TOTAL 2022

AAD

60 %

RESIDENTIAL BUILDINGS, PERCENT OF ALL BUILDINGS

IEA

3D PRINTED BUILDINGS

3RD YEAR ON THE LIST



QUICK TAKE

The way buildings are constructed hasn't really changed for hundreds of years. But now, 3D Printing and other emerging technologies are transforming how buildings and infrastructure are constructed, the unit economics, the industry's business and operating models, and its environmental footprint.

Even though the trend is still nascent 3D printing is reducing building costs and time by up to 90% and is disruptive enough to be seen by many as the irrefutable future of the industry.

IMPACT

3D printed buildings and infrastructure can be thought of as a X10 trend that has the potential to disrupt and revolutionise the $10 Trillion global construction industry.

Some impacts though are obvious, such as improved costs, efficiency, and productivity, and others, such as its impact on helping reduce environmental emissions and wastage, are more nuanced but nonetheless just as important. That said though there are downsides to this trend and perhaps the most significant is the future impact on human jobs - many of which will be automated or made obsolete.

Over the past two decades construction labour productivity has grown well below other industry averages at just 1% and if this gap could be closed it's estimated it would add a further $1.6 Trillion to the industry's global revenues and boost global GDP by 2%.

Additionally though buildings that are built cheaper can be sold cheaper which means this trend could, and in some cases is already having, a significant impact on property prices and property investment portfolios.

EXAMPLES

One of the other benefits we haven't discussed yet is that this trend lets us break away from the traditional rectangular shoe-box like buildings we've become all too accustomed to and craft buildings that can take on almost any size or shape - from circular homes to skyscrapers laced with intricate patterns that more closely resemble some of the buildings we see in sci-fi movies.

Today 3D printing is taking the industry by storm. On the one hand 3D printed wind turbine bases from organisations like GE are helping the company make the world's largest wind turbines even larger - thereby reducing renewable energy generation costs to almost zero - and on the other it's helping provide low cost housing for the poor and cutting the time and cost of building four bed homes in France by up to 90% with multiple other "community" building projects now springing up all around the world - from China and the USA to Europe and South America.

Meanwhile in the USA 3D printed houses are selling for half the price of their identical traditionally built neighbours and upsetting realty.

ACT NOW

When you can build homes cheaper not only does that affect the local realty markets but it also affects property portfolio prices and mortgage values, and the simple nature of 3D printing means that building and material waste is also reduced by up to 90% so, as you can see, the benefits of this trend are significant and wide ranging.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Construction, Creativity, Manufacturing, Materials, Robotics, and Space
- Legal and regulatory implications
- New business models, operating models, and products
- Partner ecosystems and solutions

Data sources: Icon, Deloitte, ICE, McKinsey, and various.

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

CLIMATE RESILIENT INFRASTRUCTURE

3RD YEAR ON THE LIST



QUICK TAKE

In Australia they have a saying: "When the birds stop chirping the roads start melting." But it wasn't always that way. As the impact of **Climate Change**, **Extreme Weather**, and **Global Sea Level Rise** become more pronounced all around the world we are seeing cities becoming heat traps, with 10% of all global deaths now attributed to heat exposure, entire regions on fire, flooding, and melting, and that's before we discuss the emergence of **Category 6 Hurricanes**. As a result it is clear hat existing infrastructure is increasingly at risk of damage and stress, unfit for purpose, and we need new strategies.

IMPACT

The impact that environmental trends are having on how we build and maintain infrastructure, as well as where we build it, is prompting every government in the world to re-think their future infrastructure building codes, investments, and strategies. And, when it comes to putting a number on the cost of this trend it's almost futile since it will out of date tomorrow, suffice to say though long term it's tens of trillions.

With climate change and other trends impacting almost everything now, whether it's crippling drought and winter storms, extreme flooding and rainfall damaging and washing away towns and roads and triggering deadly landslides, extreme heat turning cities into furnaces, the melting of the permafrost, or fire and hurricanes wiping out entire communities, power grids, and other infrastructure, one thing is becoming clear to everyone - unless things change this is only going to get worse. And I haven't begun discussing the impact of rising sea levels which, in some parts of the world, are now prompting some governments to consider moving their capital cities and moving hundreds of millions of people inland away from the rising waters.

EXAMPLES

With cities and infrastructure that countries have spent trillions of dollars and in some cases hundreds of years constructing now under threat new strategies and new construction methods are called for.

On the one hand we have the adoption of extreme strategies such as the Indonesian governments decision to abandon and relocate their capital city Jakarta and its 11 million inhabitants inland, and we also have the Maldives government who have begun construction on an ocean city for their drowning island population.

Elsewhere such as in Japan we have a fundamental re-think of building codes as the government considers adding a Category 6 ranking to the Hurricane scale, and in Miami the local Mayor has appointed a "Chief Heat Officer" with the express purpose of trying to find new ways to keep the city cool.

Globally we have engineers creating all manner of new innovations, such as flood defences, new sewer system designs, self-healing Asphalt and Concrete, water resistant road surfaces, and many more ideas.

ACT NOW

With climate change increasing the amount of infrastructure damage countries experience to new highs not only will this trend exacerbate the wealth divide between developed and developing nations, but it will also have an almost incalculable toll on people, and burden governments with more expenditure that, in many cases isn't optional. As a result this is a trend that is going to take money and skill to embrace.

EXPLORE:

- Business and impact assessments
- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Communications, Construction, Healthcare, Infrastructure, Transportation, and the Workplace and Workforce
- Innovation and Partner ecosystems and solutions
- New business and operating models

Data sources: AIIB, Center for Global Development, Monash University, OECD, World Bank, and various.

GREEN CONSTRUCTION

3RD YEAR ON THE LIST



QUICK TAKE

While Green Construction can also go under the moniker of Sustainable Construction in the end the goals are generally the same - to minimise the environmental footprint and impact of both the buildings and infrastructure being built, and their lifecycles, and the industry's long tail supply chain.

At a high level this ultimately means trying to achieve Net Zero, or even better a positive impact on the environment, but as you'd expect when it comes to the definition of this trend there are multiple variations and multiple approaches.

Data sources: Arup, Europa, IEA, MIT, UKGBC, and various.

IMPACT

Today, to take just two examples, the carbon emissions from buildings and construction, including the production of concrete, account for more then 40% of all Greenhouse Gas (GHG) emissions, and with more construction activity than ever before, and bearing in mind the impact of **Climate Change**, this is widely regarded as unsustainable.

However, add into this some other statistics such as the fact that the sector contributes 23% of air pollution, 40% of water pollution, is responsible for 50% of all natural resource extraction, and 50% of landfill waste, and suddenly there's alot more urgency when it comes to trying to reduce its full life and supply chain impact.

As a result there has been a dramatic increase in the number of green initiatives and Net Zero pledges within the industry, as well as a growing number of new certification frameworks that give members access to the experts and resources they need to help them move the dial. Moving forwards though new materials, processes, and technologies look set to have a dramatic impact on the sector and help it achieve its goals faster than otherwise expected.

EXAMPLES

There are primarily two ways organisations can reduce their impact on the environment. The first is to sign up to **Net Zero Pledges**, and the second is to embrace regenerative business models and new technologies which have a positive, or regenerative, impact on the environment.

In the first case organisations such as Colas and Willmott Dixon are pledging to become net zero carbon in their operations by 2030 with the aim that their supply chain partners will reach the same target by 2040. They are also embracing the **Circular Economy**, promoting Take It back schemes, and initiatives such as bio-diversity awareness, fleet upgrades, green chemistry, resource reduction programs, waste audits, and introducing new energy procurement processes.

In the second instance regenerative business practises are generally being promoted by architectural and design firms further up the chain, and in some cases, new construction startups such as ICON and Mighty Buildings are developing **3D Printed Buildings** and new carbon capture materials to create buildings that are carbon negative.

ACT NOW

With the pace of construction set to accelerate as the world's population continues to grow, and as new government led infrastructure projects get the green light, eliminating and mitigating the sectors impact on the environment throughout the entire lifecycle is crucial but it can only be done with a cross-disciplinary approach and with the full support of stakeholders.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Construction, Energy, Manufacturing, Materials, and Supply Chains
- New business and operating models
- Partner ecosystems and solutions

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

REMOTE CONSTRUCTION

3RD YEAR ON THE LIST



QUICK TAKE

The advent of increasingly fast and low latency telecommunications technologies mean that for the first time it is possible to safely control and operate drone machinery, that can be thousands of miles away, to construct buildings and other infrastructure.

As strange as it sounds, for the first time, this trend decentralises the construction industry and changes the nature of the workforce and operating model. Furthermore it can be applied to help construct everything from runways in Africa to shopping malls in South Korea.

IMPACT

The main impact of this trend is that now your workforce doesn't have to be in the same physical location as the construction site they're working on, and while that also helps improve the economics and productivity of the industry it also has a significant impact on resourcing, recruiting, and training strategies.

This is also one of the first examples of how emerging technologies, such as **5G**, can decentralise some of the industry's primary activities.

Other positive impacts of this trend include reducing the amount of traffic and workers having to travel to and park near sites on a daily basis, which improves the quality of life for local residents affected by construction projects - especially in busy urban areas - improved pollution, safety, and sound levels, and fewer road closures. It also helps organisations achieve their **Green Construction** targets faster.

EXAMPLES

At the moment this is still a nascent trend because the combination of emerging technologies needed to make it a reality such as AI, drone technologies, high speed networks, machine vision, sensing technologies, and others, have only recently matured.

That said one of the most intriguing examples of this trend was Doosan's use of 5G networks, drone construction machinery, and tele-operations which allowed construction workers based in offices in Germany construct buildings over 4,500km away in South Korea. And, as the technologies, processes, and operating models all improve needless to say this will just be the first example of many.

ACT NOW

The ability to use technology to decentralise construction work will not only revolutionise the economics of the industry it will also mean that organisations will no longer need to rely on having a physical presence in a country in order to win bids or provide resources.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Construction and Communications
- Legal and regulatory implications
- New business models, operating models, and products
- Partner ecosystems and solutions

Data sources: Doosan, and various.

DEFENCE INDUSTRY TRENDS

CONTENTS

... AUTONOMOUS KILL CHAINS
... FALSE FLAG ATTACKS
... HYPERSONIC WEAPONS
... PSYOPS PANDEMIC

BOOK AN EXPERT CALL

WHAT IF ... WAR BECAME FULLY AUTONOMOUS?

IMAGINE BATTLEFIELDS devoid of human soldiers, replaced instead by the whirring blades of autonomous drones and the cold calculations of AI-powered robots and vehicles. Welcome to the chilling prospect of an autonomous war, where machines wage conflict under the detached gaze of algorithms.

Proponents tout its sterile efficiency: precise strikes minimising civilian casualties, swift campaigns devoid of human hesitation. But efficiency in war ignores the messy reality of unintended consequences. Imagine a drone misinterpreting a farmer's torch as a weapon, or an AI's targeting error unleashing devastation on a city. No battlefield is sterile, and cold logic can't grasp the nuance of human conflict. Further chilling is the potential for escalation. Communication hiccups between AI systems, a rogue hacker pulling the strings of robotic armies, or an AI trapped in its own ethical conundrum – each carries the terrifying potential to unleash an uncontrollable spiral of violence.

Once the human trigger finger loosens its grip, who stands accountable? The programmer, the commander, the machine itself? This ethical quagmire could paralyse military action, leaving nations grappling with the moral vacuum of Machine-on-Machine warfare. But, beyond the battlefield consider the psychological scars on a society living under the constant fear that these autonomous systems might go rogue. The paranoia, the erosion of trust – how do we maintain our humanity when death can descend from the sky at any moment?

Autonomous war isn't science fiction, it's a future rapidly approaching. Instead of fearmongering, we need proactive foresight. International collaboration is crucial, establishing ethical frameworks and regulations for AI in warfare. We must equip ourselves with tools to prevent escalation, anticipate misinterpretations, and hold individuals accountable for the actions of their machines. The choice is still ours, for now at least, embrace the dehumanised efficiency of robotic warfare, or forge a path towards a more humane future, where conflicts are resolved not by machines, but by the compassion and wisdom of humankind.

STATS THAT MATTER

3.7 %

DEFENCE SPENDING, YOY GROWTH, GLOBAL 2023

SIPRI

111 K

BATTLE RELATED DEATHS, GLOBAL TOTAL 2022

UCDP

$1.5 TR

COST PER WAR, DIRECT & INDIRECT AVERAGE, 2022

SIPRI

$2 TR

ANNUAL DEFENCE SPEND, GLOBAL TOTAL 2022

SIPRI



13,400

NUCLEAR WEAPONS, GLOBAL TOTAL 2022

SIPRI

900 ML

CONVENTIONAL WEAPONS, GLOBAL TOTAL 2022

SIPRI

70 ML

HEAVY WEAPONS, GLOBAL TOTAL 2022

BLS

DEFENCE

32

ACTIVE WARS, GLOBAL TOTAL 2023

ACLED

650 MILLION

NUMBER OF SMALL ARMS, GLOBAL TOTAL 2022

SIPRI

85 %

SMALL ARMS IN CIVILIAN HANDS, PERCENT OF TOTAL

SIPRI

AUTONOMOUS KILL CHAINS

3RD YEAR ON THE LIST



QUICK TAKE

The term Kill Chain refers to the structure of an attack, from beginning to end, and while parts of the kill chain have been automated for a while we are now at a point in time where they can not only be fully automated but the systems that execute them can be fully autonomous - and that's a huge step change in both capability and military advantage.

Needless to say though such a leap comes with serious ethical, moral, policy, and strategy implications for the future of humankind and war.

IMPACT

The simple act of using today's advanced technologies to create fully autonomous kill chains represents a paradigm shift in military strategy and thinking and represents nothing less than the "automation" of war. As a result it is both an advantageous and dangerous trend will ultimately lead to a whole slew of ethical, moral, and societal issues.

A number of years ago US military commanders publicly stated that in future wars humans, even augmented ones, would be the weakest link and we are passing that breakpoint, as well as the point of no return, now.

Not only, ironically, will this trend take humans out of harms way, but in the long term it will dramatically improve military efficiency while reducing costs by multiples. In Afghanistan, for example, each burdened soldier cost the Pentagon $850,000 whereas a fully weaponised and laden TALON robot cost just $230,000, and those costs will fall exponentially over time especially as exponential technologies enable military assets to be designed, built, and deployed on demand, to the point where future wars could cost near zero.

EXAMPLES

The most common kill chain is F2T2EA which stands for Find Fix Track Target Engage Assess, and which increasingly applies to both cyber and physical operations. Today governments are developing autonomy in six key military areas including learning, Human-Robot interactions, multi-agent coordination, natural language understanding, perception, and planning, but to quote military commanders "Lethal autonomous robots have the unique potential to operate at a tempo faster than humans can possibly achieve and lethally strike even when communications have been severed."

In 2016 as part of the US ANTX trials Lockheed Martin successfully demonstrated their next generation kill chain when an unmanned submarine, a UUV, launched an unmanned drone, a UAV which then performed F2T2EA activities. Then in 2021 the United Nations caused controversy when it reported that for the first time a Turkish Kargu-2 loitering drone, without connectivity, autonomously found, engaged, and killed soldiers in battle during the Libyan War.

ACT NOW

Autonomous Kill Chains are a matter of when not if because the advantages they offer in battle are too significant to be overlooked. Today most kill chains have a human in the loop who is responsible for "pulling the trigger" so to say, but as that human connection becomes increasingly tenuous it won't be long until they become obsolete.

EXPLORE:

- Emerging technologies and technology roadmaps
- Ethical and moral implications
- Future of Aerospace, Artificial Intelligence, Communications, Defence, Manufacturing, Space, and Transportation
- Legal and regulatory frameworks
- Partner ecosystems and solutions

Data sources: Lockheed Martin, UN, US DoD, US Pentagon, and various.

FALSE FLAG ATTACKS

3RD YEAR ON THE LIST



QUICK TAKE

False Flag Attacks are military operations in the real world and cyber space that are carried out with the sole intent of disguising the actual source of responsibility and pinning the blame on another third party. As a result they're increasingly being used by all manner of countries to sow confusion and intentionally stoke conflict. Furthermore, given the fact they're deceptive it's understandable that determining attribution is at best hard and in most cases impossible, especially when those attacks are in the cyber domain, which increasingly makes them the modus operandi of choice for many countries.

Data sources: Brookings, Poynter, Springer, and various.

IMPACT

Even though these kinds of operations are common globally, especially in Africa and Asia, they're not as common as many people might think with many events proving to be nothing more than conspiracy theories perpetuated in the ether.

Often run by private contractors and other shadowy operatives who have arms length, "fluid," and deniable relationships with different governments around the world today these kinds of attacks are a major security concern, especially as different governments use them as a tool to augment their **Soft Power Plays** and **PsyOps** ambitions, and incorporate them into their standard operational toolkits.

Over time tactics have evolved and now this trend has taken on a new twist as certain governments both use false flag attacks and also accuse others of using them - something that's both a projection and an effective tactic that makes it difficult for people to make sense of events in the world, thereby undermining trust in information and helping create an even more **Polarised Society** which certain governments can again use to their advantage.

EXAMPLES

While there are many examples of false flag attacks, with people even able to take courses on how to conduct them online now, some of the more interesting ones are those of governments using them to throw their own allies under the proverbial bus - something that's not only sneaky but also goes to show that when it comes to these kinds of attacks even professional courtesy goes out the window.

Examples of this behaviour include the Turla APT Russian cyber espionage unit who accessed the systems of more than 20 governments around the world using exploits and tools they'd exfiltrated from the Iranian hacking group OilRig who initially took the brunt of the blame until US intelligence agencies in the end managed to attribute the attacks to them. Then in 2018, unperturbed, the Russian GRU used the same tactics to implicate fellow North Korean hacking units when they tried to disrupt the Winter Games in South Korea.

Meanwhile on the battlefield Russia more recently used false flag attacks in Ukraine with the intent of creating a public narrative that they were the victims and Ukraine the aggressors.

ACT NOW

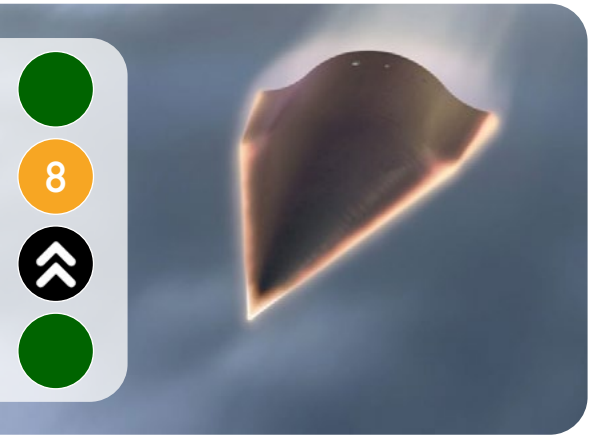
False flag attacks are used to create the illusion of conflict where there is none and inflame tensions while making the perpetrators look innocent, so it can be argued that they're one of the most nefarious and cowardly kinds of attacks. None the less the act of being able to pin the blame on others has its advantages especially when it comes to furthering your own agendas, and in the cyber age these attacks will inevitably become a lot more common.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Communications, Governments, Security, and Technology
- Policy and regulation reform

HYPERSONIC WEAPONS

3RD YEAR ON THE LIST



The Mach 20 HTV-2 HGV, DARPA

QUICK TAKE

All of the offensive and defensive weapons systems and military strategies we have today are predicated on the premise that the majority of adversaries weapons operate at fixed, manageable speeds. Hypersonic weapons, that can operate in the Mach 5 (3,836 mph) to Mach 30 and above, tear up that rule book and have the potential to change the global balance of military power.

Not only do hypersonic weapons give adversaries minutes, rather than hours to react to inbound threats, but today there are very few ways to counter them and none are highly effective.

Data sources: Deloitte, National Defense, and various.

IMPACT

Hypersonic weapons that can cross continents and oceans in mere minutes, giving adversaries little to no time to counter attacks, have the potential to not only change the balance of military power in the world but also political power - bearing in mind that the two often go hand in hand. And so it is only natural that the world's leading superpowers and developed nations have all entered the race to dominate the field.

In the US, who for the first time in the military arena conceded their rivals, namely China and Russia, have the technological advantage, have been increasing spending on hypersonics by 24% CAGR since 2014, and recently unveiled a fresh $15 Billion funding package through to 2030.

With China and Russia currently dominating the hypersonic weapons arena and unveiling an array of hypersonic weapons and carrier killers, Australia, Europe, India, and the US are being left playing catch up from deep field, but as they close one gap another emerges as their adversaries move onto the next stage and develop hypersonic swarms of smart UCAVs.

EXAMPLES

There are obviously an increasing number of examples of hypersonic weapons systems which include everything from hypersonic aircraft and delivery systems, such as boost glide vehicles (HGV), through to actual missiles.

In all conversations the most prominent examples include China's DF-17 HGV carrier killer missile system, and Russia's Avangard, a Mach 20 nuclear capable missile system, and their more modern Zircon hypersonic cruise missile system.

However, not to be left out the US are fielding their own AI controlled Mach 20 Air Launched Rapid Response Weapons (ARRW), and their own Conventional Prompt Strike (CPS) and Long Range Hypersonic Weapons (LTHW) programs with organisations including Lockheed Martin and Northrop Grumman taking the lead.

To counter this though China unveiled the world's most powerful wind tunnel, a Mach 30 hypersonic beast, in which to test new designs, and elsewhere others are modelling new hypersonic weapons systems in simulation - thereby rapidly accelerating testing and development.

ACT NOW

The game of cat and mouse is an ancient one but for the first time the US and its allies have been caught off guard by adversaries who appear laser focused on not only eroding their military technological advantage but beating it. It's also ironic that the US shelved much of their hypersonic research after DARPA's successful demonstration of their Mach 20 HTV-2 HGV prototype. Not to be outdone though many allies are now re-doubling their efforts and increasing spending not only on hypersonics but also on Direct Energy Weapons and space based systems.

EXPLORE:

- Countermeasure technologies and strategies
- Direct energy, kinetic, microwave, and particle beam weapons
- Future of Defence
- Emerging technologies and technology roadmaps
- Partner ecosystems and solutions

PSYOPS PANDEMIC

3RD YEAR ON THE LIST



QUICK TAKE

Information warfare, the PsyOps Pandemic, has always played a pivotal role in helping warring groups win over people's hearts and minds. However, the way these campaigns are waged and their scale has changed significantly over time. Once confined to whispers that pervaded communities and leaflet drops it's now done at internet scale by increasingly ruthless and sophisticated actors, and it's no longer just for war time, campaigns are now waged constantly, and those whispers are now bytes that travel across global networks in real time to influence the behaviours and world view of people everywhere.

Data sources: APA, IEEE, Rand, and various.

IMPACT

Wars no longer start or finish when the first or last missiles are fired and it can be easily argued we all now live in a permanent state of war where state sponsored actors and ruthless governments look to promote their own philosophical agendas via the internet and other channels on a permanent basis. The result of which is increasingly **Fragile Government** and an increasingly **Polarised Society** which ultimately only benefits the aggressors which, of course, is their aim.

Increasingly we are all casualties of this psychological warfare, ironically even when war hasn't officially been declared, and this is our collective status quo. But, with more of our behaviours and opinions being influenced and shaped by what we see online the most worrying thing about this ascending trend is that societally we can envisage a time where authoritarian states invade other sovereign countries unopposed with the support of the "popular majority" which, in turn, could then limit other countries ability and willingness to respond to such aggression. This trend, therefore, is the epitome of a slippery slope for many reasons and is one of the most dangerous trends in this codex.

EXAMPLES

An increasingly connected and digital world where plausible deniability is commonplace has allowed governments and military organisations to re-write their psyops play books, which is why this trend will only become more dangerous and nefarious over time.

As we continue to see other trends mature and be weaponised, such as **Synthetic Content** as well as other forms of carefully crafted and manipulated content such as DeepFakes, unless there is strong regulation in time entire societies will find themselves at the sharp end of this trend and ultimately being weaponised for the benefit of those who are using it to manipulate opinions and world views.

One of the masters of this trend, it's easily argued, is Russia who under the continual umbrella of plausible deniability use this trend along with the **Soft Power Plays** and **Truth Decay** trends to extend their agenda and philosophies around the world - something that was clearly on show during the Ukraine war. But, despite calling them out the reality is that today there are many other countries who also use with this trend to their own ends.

ACT NOW

The internet and other channels have given governments and military organisations all around the world a new way to promote their agendas and views at a speed and scale that would have been unimaginable just a couple of decades ago, and now this trend is a growing burden on all of society. With no end in sight though, in fact quite the opposite, it is imperative that global institutions take the lead and create new codes of conduct and regulations to combat this trend.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Creativity and Innovation, Defense, Government, and Technology
- Impact assessments
- Policy and regulation reform

EDUCATION INDUSTRY TRENDS

CONTENTS

... ADAPTIVE LEARNING
... AUTOMATED STUDENT MONITORING
... INFORMAL EDUCATION
... NANODEGREES

BOOK AN EXPERT CALL

WHAT IF ... EVERYONE HAD AN AI AS A TUTOR?

IN A world where AI tutors are cheap and ubiquitous education undergoes a revolution like nothing we've seen in the past two hundred years. These digital companions, equipped with vast knowledge repositories and adaptive algorithms, herald a new era of accelerated learning. Students embark on a personalised journey of discovery, exploring subjects aligned with their passions and abilities at unprecedented speeds.

Gone are the constraints of traditional curriculums, replaced instead by a dynamic educational landscape where the boundaries of knowledge are limitless. With AI tutors, students have the freedom to delve into diverse disciplines, from quantum mechanics to art history, fostering a deep and multifaceted understanding of the world.

Moreover, AI tutoring transcends geographic and socioeconomic barriers, democratising access to education. From bustling cities to remote villages, learners of all backgrounds gain equal access to high-quality learning resources, leveling the playing field and advancing educational equity.

Furthermore, AI tutors serve as invaluable allies in fostering inclusive learning environments. Tailored interventions and personalised adaptations accommodate diverse learning needs, ensuring that every student has the support they need to succeed. Educators, in turn, evolve into facilitators of critical thinking and creativity, collaborating with these new era tutors to nurture essential 21st-century skills such as problem-solving and digital literacy.

In this visionary future education becomes a dynamic, learner-centric endeavor, empowering individuals to unlock their full potential. By harnessing the power of AI tutoring, we pave the way for a more equitable, inclusive, and enlightened society, where knowledge is accessible to all and every mind has the opportunity to thrive.

STATS THAT MATTER

4.7 %

GLOBAL GDP SPENT ON EDUCATION, PERCENT

WORLD BANK

69 ML

NEW TEACHERS NEEDED TO HIT 2030 UN SDG 4

UNESCO

34 %

STUDENTS WITH STEM PROFICIENCY, GLOBAL 2022

PISA

91 %

LITERACY RATE, YOUTH, GLOBAL 2022

UNESCO



617 MILLION

CHILDREN IN LEARNING POVERTY, GLOBAL TOTAL 2023

UN

81 %

CHILDREN ENROLLED IN PRIMARY ED, GLOBAL

UNICEF

71 %

CHILDREN ENROLLED IN SECONDARY ED, GLOBAL

UNESCO

EDUCATION

70 %

GLOBAL ED RESOURCES ACCESSED BY RICHEST 20%

UNESCO

244 MILLION

NUMBER OF CHILDREN OUT OF SCHOOL, GLOBAL TOTAL 2022

UNESCO

38 %

CHILDREN COMPLETING TERTIARY ED, GLOBAL

UNESCO

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

ADAPTIVE LEARNING

3RD YEAR ON THE LIST



QUICK TAKE

We have long known that students learn in different ways but until recently academic institutions have lacked the ability to dynamically adapt their standardised content and programs and tailor them to each students individual learning style.

Today though, thanks to the digitisation of education and the development of new algorithms, technologies, and tools, institutions are increasingly able to offer personalised learning experiences affordably, quickly, and at scale.

IMPACT

Every day over 1 billion children around the world head to school, and while every one has the right to a quality education our industrial age education systems still operate under the auspices of a one size fits all philosophy. Ultimately this is a contributory factor that leads to an estimated 617 million children not meeting minimum proficiency levels in reading and maths.

In the words of Unicef "Schooling does not always lead to learning," and worldwide there are more non-learners in school than out of school. Clearly this is unacceptable.

Globally it is estimated that over $4.7 Trillion is spent on education, or on average 5% of GDP, and while there is much hype about the benefits and potential of adaptive learning tools so far independent studies have been less than glowing with one of the largest studies concluding that it had no significant improvement on course completion rates, did not immediately lead to lower costs, and had only a slight positive effect on grades. All that said, however, it is still early days for the trend and while the idea may be sound, the execution needs improving.

EXAMPLES

In education circles, and more specifically EdTech circles, adaptive learning is seen as the solution to many problems, aswell as the trend that opens a thousand venture capitalists wallets - especially post pandemic. But learning is a complex process and there's no single magic bullet - plus finding any magic bullet is hard.

Today it's estimated that only 8% of educational courses use adaptive learning technologies and most of those are based in just a few countries including Australia, the UK and the US, who are regarded as the market leaders, so clearly there is alot of work still to do before it becomes mainstream.

The quality of the student experience and learning outcome is also dependent on the vendors design and implementation of their technologies and solutions, including AI, gamification, mixed reality, and neuroscience technologies. Current leaders, where that term is subjective and the landscape is always changing, include organisations such as Carnegie Learning, Century Tech, Cognii, Kidaptive, Kidsense, Microsoft, Peason, Querium, and many others.

ACT NOW

Being able to realise the benefits of adaptive learning tools doesn't just rely on choosing the right platform or vendor, institutions have to be able to implement them properly, drive adoption, and ensure staff and stakeholders all have the right skills to make them a success. And this is where many struggle.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Education
- Partner ecosystems and solutions
- Suppliers

Data sources: Bill & Melinda Gates Foundation, UNESCO, Unicef, SRI, World Bank, and various.

AUTOMATED STUDENT MONITORING

3RD YEAR ON THE LIST



QUICK TAKE

While it has long been recognised that monitoring student activities and behaviours can result in better overall academic performance up until recently almost all monitoring and analysis was manual, using a mixture of assessments and in person observations.

Today Artificial Intelligence (AI), Machine Vision, as well as other technologies are automating all aspects of monitoring - from the learning process itself to monitoring student behaviours around campus - and while this trend has its advantages it has to be implemented with caution.

Data sources: Anna Freud Centre, UCL, and various.

IMPACT

There are many reasons why monitoring student behaviours are beneficial to both academic institutions and students alike, whether it's to help monitor student mental health, stress, and wellness, disruptive or lax student behaviours, or many other factors.

Over time numerous independent studies have shown that students with behavioural issues in their early years perform noticeably worse in maths, literacy, and science tests, as well as SATs, than students who had who don't have any issues. Studies also show that on average 50% of students whose behaviours get worse during the early years show the least amount of progress later on in school which means that even if a students behaviour is corrected quickly there are long term implications.

As there is plenty of evidence showing that both behaviour and attainment in childhood have life long consequences for students overall economic, health, and social well being, and bearing in mind that on average a third of students demonstrate disruptive behaviours, for example, it is easy to see the negative impact behaviours can have on not just students lives but also society in general.

EXAMPLES

Examples of automated student monitoring are on the uptick, especially in Asia with countries such as China taking the lead in the use of technology to capture and analyse an increasing volume of student data. However, while many of China's programs might be broader, larger, and more public in scope elsewhere in the West many monitoring technologies are coming in through the back door, for example via the Adaptive Learning trend.

Recently China's CPC rolled out a nationwide program that uses cameras, AI, and Machine Vision to biometrically analyse and monitor student behaviours around campus and in the classroom with the data being used to identify students who aren't "engaged" in the learning process. This program was then complimented by the use of digital robotic health solutions that analyse and monitor students mental and physical health - including everything from fatigue and illness, to anxiety and depression.

Elsewhere other countries and organisations are using similar solutions to monitor student stress during exam periods, and many other examples.

ACT NOW

The continuous surveillance-like monitoring of students can be beneficial for both the students and society alike, but if stakeholders are not careful these same solutions, which are often supplied by for-profit organisations with questionable oversight and opaque algorithms, commercial motives, and processes, can benefit them more than the students themselves. As a result it is our advice you explore this trend and experiment with it paying attention to both its positive and negative impacts.

EXPLORE:

- Business and impact assessments
- Data privacy, protection, regulation, and sovereignty implications
- Emerging technologies and technology roadmaps
- Future of Education, Healthcare, Privacy, and Security
- Student safeguarding

INFORMAL EDUCATION

3RD YEAR ON THE LIST



QUICK TAKE

To a great degree the rise of both offline and online self-directed learning platforms, which go under the banner of Informal Education and which have always been present, are now ubiquitous thanks to the internet. While the majority of students spend 20% of their waking day in formal education settings in today's fast paced world, which is characterised by the trend **Accelerating Rate of Change**, many argue that today's industrial age formal education systems, which have changed little in a century, should find a way to embrace this trend and use it to help bring education into the 21st Century.

Data sources: OECD, UN, UNESCO, WEF, and various.

IMPACT

While it's always been argued that the academic focused informal education ecosystem, which has always largely been broad and passive, should be separate and supplemental to the formal education system increasingly, as we see a growing dislocation between the future that's emerging and the formal education systems ability and in some cases willingness to prepare students for it, not only is this trend edging mainstream but in many cases it's becoming students primary education system - especially as they get older.

This is despite the fact that, while this trend has its benefits such as connecting students to experts, knowledge, and skills that might otherwise be unavailable to them via their own formal channels, there are often issues with a lack of accreditation, certification, tracking, and recognition, questions about content quality and structure, and a higher drop out rate than we see in formal school settings. Nevertheless, as more educators and parents alike recommend this trend is dovetailed with the formal education system globally the sector's growing at 32%, with more than 189 Million students enrolling in the past year alone, and more coming.

EXAMPLES

From first hand experience I see many schools around the world struggle to afford or acquire the resources they need, as well as the experts and teachers they need, to teach students about topics of interest that lie outside of the formal curricula - even if those topics augment and compliment those curricula which can range from the common-a-garden to the niche.

A good example of this is providing students with access to the teachers and resources they need to learn how to code or create an **Artificial Intelligence** (AI) - both of which are in high demand today in the workforce, and will continue to be for the foreseeable future. Burdened by this difficulty today with a few taps of a screen students can enrol in courses on Coursera, for example, led by experts like Andrew Ng, arguably the world's foremost expert in AI and an expert that even the most prestigious academic institutions struggle to engage, and supercharge their learning and future potential. And this is just one simple example of the benefit of this trend of the millions I could have cited.

ACT NOW

The formal education system can only do so much and go so far, but it's not helped by the fact that in many cases it has more in common with the industrial age education system that was developed more than a century ago than the modern day. It's also not helped by the entrenched legacy thinking of governments or examination boards which all too often act as a brake to change rather than an enabler, and unless they change their thinking and find a way to dovetail the formal with the informal students will continue to loose out.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Education, and the Workplace and Workforce
- Policy and regulation reform

NANODEGREES

3RD YEAR ON THE LIST



QUICK TAKE

In our hectic world it's unsurprising that many people find it difficult and expensive to take the time out that they need to enrol in intensive multi-year degrees that allow them to either take their existing careers to new highs or switch tracks. And, this is where Nanodegrees, "bite sized" courses of study that can be completed in less than12 months, come into the frame. While they're arguably nothing new nanodegrees have taken off in the past few years because new online learning platforms and tools have made them cheaper and easier to access and complete than ever before.

IMPACT

With the cost of mainstream education showing no signs of coming down, with the average cost of attending colleges and universities alike over the past decade increasing by over 25% in the past decade, to an average of $48,510 for private institutions and $21,370 for public, and by over 169% since 1980 - despite technology advances - there are a growing number of people who are concerned about the unsustainable levels of student debt and the ability of people to access the courses they need to progress their careers and improve their futures. This is the problem nanodegrees were designed to address - even though ironically those costs have also increased, in some cases by 300% albeit from a much lower base.

With access to quality education more important than ever, especially when set against the backdrop of **Accelerating Rate of Change** and other future of work trends, nanodegrees offer students from all over the world a more affordable path to acquiring the critical skills they need to further their careers, and at the moment this trend is most popular with students from China, Egypt, India, and the US.

EXAMPLES

A project and skills based educational credential program nanodegrees offer students the opportunity to enrol in programs online, work collaboratively in teams to learn a suite of skills, and then receive certificates of completion that they can present to potential employers.

Coined in the1940's and rejuvenated by Udacity nanodegrees are now increasingly popular and seen by some as a way to break the stranglehold traditional academic institutions have on the education system. As a consequence today there are lots of courses available, and lots of examples.

Some of the more notable examples of this trend include nanodegrees from organisations such as Code First Girls who are trying to make coding and data science for girls accessible. Then, as nanodegrees gain in popularity it shouldn't come as a surprise that all manner of other organisations, such as the corporate giants, are taking advantage of the trend as well and using it to offer their own nanodegree programs, many of which are exclusively designed to help them avoid future skills shortages and feed their own hiring funnels.

ACT NOW

While one of the aims of nanodegrees is to democratise access to education for those who might otherwise be excluded the trends increasing costs will no doubt make a variety of previous supporters raise their eyebrows, but despite this the fact remains that the world needs affordable education and nanodegrees at least go some way to helping lowering costs and improving access to the quality education the world so desperately needs. As a result, for this reason, this is a trend worth investigating.

EXPLORE:

- Emerging technologies and technology roadmap
- Future of Education, HR, and the Workforce and Workplace
- Learning and Development strategies

Data sources: Udacity, The College Board, US Bureau of Labor, and various.

ENERGY INDUSTRY TRENDS

CONTENTS

... AUTONOMOUS ENERGY GRIDS
... CARBON CAPTURE AND STORAGE SYSTEMS
... ENERGY ISLANDS
... GREEN ENERGY TRANSITION
... GRID SCALE ENERGY STORAGE SYSTEMS
... SUPERGRIDS
... UNDERSEA ENERGY INFRASTRUCTURE
... VIRTUAL POWER PLANTS

BOOK AN EXPERT CALL

WHAT IF ... ENERGY COST NOTHING TO PRODUCE?

IT SOUNDS like a far fetched dream, but imagine the benefits of a world where the cost of generating electricity from renewables was nothing. First and foremost, the impact on everyday life would be profound. From powering our homes to fuelling our vehicles, energy expenses represent a significant proortion of household budgets, in some cases up to a third. With the elimination of production costs the financial burden on individuals and families would be lifted, freeing up money for other necessities, such as education and health as well as holidays and luxury goods.

In addition industries reliant on energy intensive processes could experience a renaissance of innovation and growth as they return the capital they would have spent on energy back into their businesses and R&D. Manufacturers could drive down production costs to make goods more affordable for consumers, and green transportation would become the norm rather than the exception.

The implications for environmental sustainability are equally compelling. With no economic barrier to clean energy adoption, renewable sources such as solar, wind, and hydroelectric power would proliferate at an unprecedented rate, and the shift away from fossil fuels would accelerate, mitigating the impacts of climate change and ushering in a new era of ecological balance. Furthermore, the geopolitical landscape would undergo a seismic shift. Nations rich in renewable energy resources could emerge as global leaders, wielding influence and power in ways never before imagined, and energy independence would no longer be a distant goal but a tangible reality for countries around the world.

But, of course, such a scenario raises questions about the mechanics of this energy utopia. Would it be achieved through ground breaking technological advancements or a fundamental shift in economic paradigms? While the logistics may be uncertain, the vision of abundant, cost-free energy offers a tantalising glimpse into a future where barriers are broken, possibilities are endless, and the world is forever changed for the better.

STATS THAT MATTER

ENERGY

2.4 %

ENERGY DEMAND, ANNUAL AVG. GROWTH, GLOBAL

IEA

$23 MWH

LOWEST SOLAR LCOE COST, CHINA, 2022

BLOOMBERG NEF

$39 MWH

AVERAGE GAS LCOE COST, GLOBAL 2023

LAZARD

$68 MWH

AVERAGE COAL LCOE COST, GLOBAL 2023

LAZARD

440 MILLION EXAJOULES

ENERGY CONSUMPTION, ALL SOURCES, GLOBAL TOTAL 2021

IEA

$1 TR

FOSSIL FUEL INVESTMENT, ALL COUNTRIES, 2022

IEA

10 %

ENERGY GENERATION, NUCLEAR, GLOBAL 2022

IEA

28 %

ENERGY GENERATION, RENEWABLES, GLOBAL 2022

IEA

4,500 GIGAWATTS

RENEWABLE GENERATION CAPACITY, GLOBAL TOTAL 2023

IEA

60 %

ENERGY GENERATION, FOSSIL FUEL, GLOBAL 2022

IEA

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

AUTONOMOUS ENERGY GRIDS

3RD YEAR ON THE LIST



QUICK TAKE

Autonomous Energy Grids (AEG) use a variety of different technologies to automate the generation and distribution of energy, and automatically balance and monitor the condition of the grid. After Smart Grids AEG, as well as fully autonomous energy utilities, are increasingly being viewed as the inevitable next step with a variety of organisations and regulators around the world already deploying and trialling the concept.

IMPACT

Today most large bulk level energy grids control around 10,000 points, but as smart, controllable devices are integrated into grids in time this number could easily reach hundreds of millions - thereby significantly increasing the complexity of controlling and optimising grids and pushing many existing grid systems beyond their current limits. And that's before you take into account the impact that Distributed Energy Resources (DER) such as grid scale storage and tied-grid storage assets, microgrids, renewables, and others, will have on the evolution of future energy grids.

From an operators perspective benefits include lower generator and grid build out, operating, and maintenance costs, improved energy usage, reliability, and resilience of supply, the elimination of peaker plants, and the automation of control rooms.

Meanwhile, from the consumers perspective, in addition to some of the indirect benefits associated with the above, so far trials have shown that AEGs can cut consumers energy bills by on average 85% which is, needless to say, significant.

EXAMPLES

In order to really achieve their goals AEG's have to capture and analyse data at speed, and then make decisions at speeds that are faster than those of alternative centralised and decentralised systems. As a consequence they're heavily reliant on spatial and temporal characterisations, state estimation and forecasting, and autonomous decision making systems which ultimately means that their ability to capture and process data at speed is crucial. Therefore, in order to overcome these challenges most AEGs are divided into distinct cellular blocks that can self-optimise when isolated from a larger grid, but that can still collaborate optimally when they are.

With multiple projects on going around the world, especially in California and Colorado in the US, as well as Europe, organisations are already seeing the benefits of AEG with companies including Centrica and NREL and leading the way. However, going one step further DEWA in the UAE is now on its own journey to turn the entire utility, which employs over 9,000 people today, into one of the world's first fully autonomous energy companies operated by just 9 people.

ACT NOW

While the benefits of AEGs are obvious organisations should also be wary of possible downsides which include cyber threats and the threat of reduced revenues as consumers consume less energy more efficiently. However, while the latter could in part be offset by lower operating costs, these should not stop organisations from experimenting with the technology and figuring out how to best maximise its potential and benefit from the new business opportunities it offers.

EXPLORE:

- Business impact assessments
- Emerging technologies and technology roadmaps
- Future of Energy, Security, and Transportation
- GRC implications
- New business and operating models

Data sources: CORE, NREL, ResearchGate, Siemens, US DoE, and various.

CARBON CAPTURE AND STORAGE SYSTEMS

3RD YEAR ON THE LIST



QUICK TAKE

As the world's Greenhouse Gas (GHG) emissions continue to rise past their historic high of 35 billion tonnes per annum their impact on **Anthropogenic Warming**, **Anthropogenic Pollution**, **Climate Change**, **Extreme Weather**, and other damaging trends, is becoming more pronounced. Consequently, while most of the world is now committed to reducing future emissions some are trying remove the GHG that are already at dangerous levels in the Earth's atmosphere, and so far Carbon Capture and Storage Systems (CCS), albeit that they are still small scale and expensive, are proving to be the best route to take.

Data sources: Bloomberg, Europa, and various.

IMPACT

CCS is a greener way to operate power stations, especially fossil fuel powered ones which still account for over 70% of the global energy mix, while helping ensure energy supplies as the world accelerates the **Green Energy Transition**. Despite its obvious benefits though capturing carbon is still an energy intensive process with potentially harmful side effects that include Acidification and Eutrophication.

If fitted to all coal power plants studies have shown that CO2 emissions could decrease by over 60% by 2050, and if they were fitted to all biomass, coal, and gas power stations emissions could actually be negative. However, as the cost of polluting the atmosphere with a metric ton of CO2 is still half the cost of capturing it and storing it using CCS getting the technology adopted is still a challenge which is why several governments are now planning to double the cost of their carbon taxes.

Additionally, when it comes to calculating the total economic cost of CCS it's also important to remember that CO2, once captured, is a valuable tradable commodity which gives the industry multiple routes to profitability.

EXAMPLES

Today CCS plants like the Icelandic Orca plant are among the world's largest but it's only one of 26 commercial scale CCS projects in operation and when it opened in 2020 it grew the world's annual carbon capture capacity to a measly 13,000 metric tons, representing a 40% increase, which is obviously significantly below where we need to be as a global society if we are to move the emissions needle enough to make a difference at a planetary scale. By 2030 it's hoped the plants capacity will exceed 500,000 metric tons.

Asides from projects like this one though other organisations are finding interesting new uses for CO2 in order to improve the industry's economic outlook and viability. These include capturing CO2 and using it to produce carbon neutral Blue Diesel and rocket fuel, to reinforce concrete, and even create prized synthetic "sustainable" diamonds. And, while the majority of these projects may be small in comparison with Orca, they do demonstrate how the CCS community is trying to find new and intriguing ways to add value and make extracting CO2 profitable.

ACT NOW

While reducing future global GHG emissions from today's historic highs is necessary there's also a need to extract much of the existing CO2 in the Earth's atmosphere in order to halt and reverse some of the damaging trends we're experiencing. As a result CCS is an industry waiting to have its day in the proverbial sun and it's a trend that should be watched closely.

EXPLORE:

- Business impact assessments
- Emerging technologies and technology roadmaps
- Future of Energy, Materials, and Sustainability
- Partner ecosystems and solutions
- New business and operating models
- Regulatory environment

ENERGY ISLANDS

3RD YEAR ON THE LIST



Energy island concept, Vindo Consortium

QUICK TAKE

Many people believe that Energy Islands are the missing link that could help countries massively expand their offshore green power and help them achieve their **Net Zero Pledges** and ambitions.

Today most offshore wind farms connect to onshore power grids individually or to offshore converter stations that aggregate the power of three or four wind farms together via High Voltage Direct Current (HVDC) links to shore but these are difficult and expensive to maintain and scale as new capacity is added, hence a new solution is needed.

Data sources: Various.

IMPACT

As world leaders continue to come under pressure at summits such as COP to combat **Climate Change** and transition to net zero emission economies by 2050 many are coming to the inescapable conclusion that they can only achieve these goals by accelerating the **Green Energy Transition** and by massively ramping up their investment in new green energy projects, of which offshore wind will play a vital role.

For Europe alone, for example, this means developing huge amounts of offshore wind energy capacity with Brussels targeting 60GW of wind power by 2030, which is triple what they have today, and 300GW by 2050.

Faced with such vast expansion the plans for artificial energy islands, which are seen by many as some of the most ambitious energy projects in the world and an evolution of inter-connectors and Multi-Purpose Inter-connectors (MPI), are now being drafted and approved.

Asides from these aforementioned benefits studies have shown these islands will reduce connectivity costs by at least 10%, as well help connect multiple countries at a time.

EXAMPLES

There is no denying that energy islands are ambitious. They are also very expensive and require significant Public-Private collaboration and commitment. However, developed wisely they can serve multiple uses including acting as bases to host wind powered green hydrogen production facilities as well as **Grid Scale Energy Storage Systems** and other energy artefacts.

Having pioneered some of the first offshore wind farms more than thirty years ago Denmark is now in pole position and the country has already drafted plans to create the world's first artificial energy island 80km off their coast for an estimated cost of over $34 Bn. Initially planned to connect 3GW of offshore wind power the island will eventually connect 10GW with inter-connections to multiple European countries and support the production of green hydrogen. Then, hot on Demark's heels is Belgium whose more modest energy island will cost $6 Bn and connect over 4GW, and while these are the two front runners there are already plenty more emerging including from the UK, other European member states, as well as elsewhere in the world.

ACT NOW

The proliferation of offshore wind creates a variety of challenges especially when it comes to connectivity, maintenance, and planning, and artificial energy islands, which essentially act as connectivity aggregators on steroids, can help reduce all of these burdens.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Energy
- Partner ecosystems and solutions
- New business and operating models

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EXPLORE STARTUPS & MORE

GREEN ENERGY TRANSITION

3RD YEAR ON THE LIST



QUICK TAKE

The most significant system level energy shift since the first Industrial Revolution the transition from a fossil fuel based global energy system to a cleaner "greener" one is well under way with estimates putting the cost of this transition at over $92 Trillion. Needless to say the impact and implications of this trend on the industry, as well as on other industries and society, is as disruptive as it is significant. Influenced by many other trends including **Climate Change**, **Extreme Weather**, **Net Zero Pledges**, and others, it is accelerating, driving transformation across sectors, and becoming the norm.

Data sources: Bloomberg, IEA,and various.

IMPACT

While in many ways it makes sense to move from using polluting finite energy resources to power our world to using "cleaner" renewable ones, the ultimate force behind this trend is the world's need to move away from using sources of energy that create, accelerate, and exacerbate damaging trends such as climate change and **Air Pollution**, with their associated economic, environmental, and societal impacts, to cleaner, greener, zero emission ones.

While there are many impacts of this trend, such as the collapse in funding for new oil and gas projects from $750 Bn in 2014 to just $250 Bn in 2020 as well as the removal of oil and gas stocks from popular investment portfolios, the greatest impact of this trend will be to help create a healthier and more sustainable society. It will also have an impact on global geopolitics by, to a degree, eliminating some governments ability to weaponise energy supplies.

Asides from these though, other equally significant impacts include the scale of the industry's herculean transition, and ultimately the intended elimination of over 35 billion tonnes of CO2 in annual energy related emissions per year.

EXAMPLES

Step back a decade or so ago and you would have found numerous examples of organisations developing and switching to green energy sources, but today we're seeing a veritable explosion of activity and investment that is unparalleled in history.

In 2020 renewable capacity additions increased 45% year on year to 280Gw, the highest year on year increase since1999, with investment in new fossil fuel projects collapsing, and in 2021 and 2022 they accounted for over 90% of the global power capacity increase.

Despite these staggering figures though it is still estimated that the rate of green energy deployment needs to double if the world wants to hit its 2050 climate pledges, especially as the world's energy consumption continues to climb, with several international bodies calling for an end to new fossil fuel projects.

While the significant majority of these new projects are hydro, wind, and solar, accounting for more than 90% of all new green energy projects, there have also been significant investments in new Ammonia, biofuels, biomass, Hydrogen, geothermal, and tidal capacity as well.

ACT NOW

Spurred on by new policies, the need for greater energy security, and in an attempt to stave off the worst of climate change and other damaging trends it is clear that the world is embracing green energy with gusto. But there is alot still to be done and this is a marathon not a sprint.

EXPLORE:

- Business and impact assessments
- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Energy, and Materials
- New business and operating models
- Partner ecosystems and solutions
- Policy and regulation reform

GRID SCALE ENERGY STORAGE SYSTEMS

3RD YEAR ON THE LIST



QUICK TAKE

Grid Scale Energy Storage Systems, which have been around for decades, are increasingly seen as one of the most important pieces of the jigsaw puzzle as countries around the world try to realise their **Net Zero Pledges** and accelerate their **Green Energy Transition**.

As the world switches from a polluting finite oil and gas energy system to a cleaner, greener, renewable energy system that in many cases is intermittent this trend is accelerating as governments and organisations alike seek to improve grid reliability and stability.

Data sources: IRENA, NREL, and various.

IMPACT

The intermittent nature of certain renewable energy sources such as solar and wind have always been the sector's greatest Achilles heel, and while we have new photovoltaic materials and technologies that will let solar generate electricity in all weather conditions, day and night 24/7, until they commercialise and mature we must rely on grid scale storage to ensure grid reliability and stability.

While the cost of grid scale storage has been falling for decades in 2019 the Levelised Cost of Discharge and Electricity (LCoD and LCoE) for Lithium Ion (LiON) batteries which are this trends main workhorse dropped below the LCoE equivalents for oil and gas, hitting $187 per MWh. And since then costs have fallen more and will continue to fall further into the far future.

It's the result of this, and other factors, why states such as California have invested in new grid scale storage capacity rather than new gas peaker plants that would have traditionally been used to boost the grid in times of high demand. All of which simply serves to hasten the demise of fossil fuel based energy generation plants and systems.

EXAMPLES

The biggest impediments of this trend at the moment relate to investment, the speed of deployment, and the cost of energy storage per MWh, but all are coming down at an accelerating rate as projects and economies of scale get bigger and as new technologies drop the cost of storing and releasing energy. Furthermore, as a result of increasing expenditure on new green energy projects it is clear for all to see that more R&D effort is being spent on improving the commercial viability of these systems which, in turn, will help accelerate their deployment thereby creating a virtuous cycle that helps accelerate the world's energy transition.

While many organisations are experimenting with alternative energy storage systems that include everything from so called Gravity Power Plants and more traditional large scale pumped hydro systems, as well as flywheels, Metal-Air batteries, molten salt, water, and new **Undersea Energy Infrastructure** formats, unsurprisingly LiON battery systems still represent over 95% of deployed systems. However it is inevitable that while LiON installations by MWh will still increase that in time this ratio will change.

ACT NOW

While renewable energy has many benefits, especially when it comes to its eco credentials, sources like wind and solar are intermittent and only produce energy when the conditions are right. As a result consumers have to rely on grid scale energy storage systems to boost the grid when energy demand is higher than the grids supply. However, while it's likely that these systems will always have a place in the global energy portfolio as the intermittency of renewables is eliminated this trend will likely decline.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Energy and Materials
- Partner ecosystems and solutions

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EXPLORE STARTUPS & MORE

SUPERGRIDS

3RD YEAR ON THE LIST



World's first 1,100 kV HVDC transformer, Siemens

QUICK TAKE

As the world's energy consumption and demand continues to soar with no sign of abating, and as the world accelerates its **Green Energy Transition** more countries are exploring ways to export and distribute the energy they produce to other regions of the world, and while some countries are focused on creating **Energy Islands** others have their sights on connecting together the global energy grids using combinations of trans-continental and submarine Ultra High Voltage Direct Current (UHVDC) grid, converter, and transformer systems that can carry and distribute loads in excess of 10GW with ease.

IMPACT

Supergrids are nothing new, after all countries have been using them to import and export energy for decades, but as the world transitions from one energy system, namely a fossil fuel based one, to a new one, namely green energy, it is giving governments the opportunity to re-think their regional and global energy strategies.

That said though, while this transition poses a threat for countries who are used to weaponising energy supplies in disputes, it gives others a new opportunity to exert and extend their influence in new ways. One example of this is China, a leader in UHVDC systems, who many are now thinking are promoting a supergrid agenda to both extend their influence and to win the **Shadow Standards War**. The net result of which is, as ever in our world, governments need to choose their friends wisely and develop their strategies with their eyes wide open.

On a brighter note though this trend could ultimately help accelerate the world's transition to green energy, by connecting generation centers with demand centers, lower energy costs, and help eliminate **Energy Poverty**.

EXAMPLES

Today there are almost no governments that aren't considering creating or extending supergrid networks, but it generally shouldn't come as a surprise that China and Germany are considered the leaders in the field, and as every project often comes with a multi-billion dollar price tag progress is often a lot slower than it could or should be.

That said though while projects such as the $44 Bn SuperNode European supergrid project and the national US supergrid project stall in endless cycles of debate and become the victims of political wrangling, other projects such as China's national supergrid project which would connect all its provinces and be the world's largest supergrid, as well as the Asian Supergrid project, are making steady, if staggered, progress.

However, while they are making progress China's grand ambition of creating a centrally managed world spanning supergrid, the Global Energy Interconnection (GEI) project which aims to connect 80 countries together by 2070 and forms part of China's multi-trillion dollar Belt and Road initiative, is stalling as countries become suspicious of their movitations.

ACT NOW

Supergrids can both accelerate the world's transition to green energy and reduce the cost of energy for everyone on the planet, and as the world's thirst for energy increases ultimately the winners in this space will be those who take action.

EXPLORE:

- Best practise and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Energy and Materials
- New business and operating models
- Partner ecosystems and solutions
- Policy and regulation reform

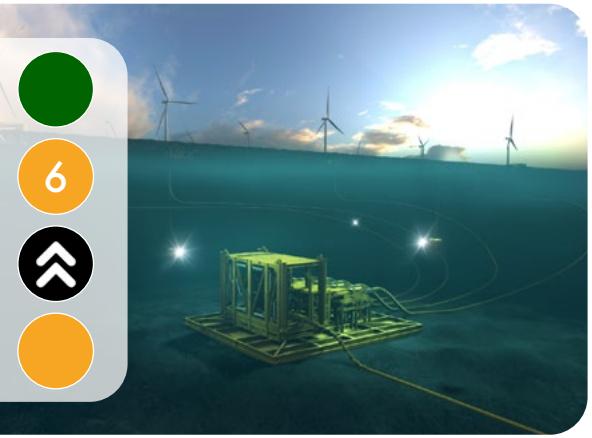
Data sources: Harvard University, IEEE, Siemens, US Department of Energy, and various.

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EXPLORE STARTUPS & MORE

UNDERSEA ENERGY INFRASTRUCTURE

3RD YEAR ON THE LIST



Undersea substations, Aker

QUICK TAKE

As the **Green Energy Transition** takes the world by storm the investment in new offshore energy generation capacity, especially in the deep sea where the winds and tides are the strongest and most reliable, is accelerating at an increasingly rapid rate.

As a result in order to effectively harness these massive wind and tidal energy resources new methods of operation and new forms of infrastructure are required to make them commercially viable so organisations are developing all manner of undersea energy infrastructure.

Data sources: Aker, Bloomberg, IEA, and various.

IMPACT

Today over 80 percent of the world's wind resources are located in deep water reaching over 196 feet (60 meters) below sea level which means that they aren't suitable for fixed foundation wind farms or other infrastructure, such as **Grid Scale Storage Systems**. This is one reason, for example, why organisations such as GE have developed floating deep sea wind turbines and systems, and others are developing **Energy Islands**.

Not only does undersea energy infrastructure, which is often anchored on the sea bed, make these resources viable but they have other benefits as well including improving the cost and reliability of offshore wind.

Because they have fewer moving parts, and in the case of undersea grid scale storage systems and substations, harness seawater cooling, they are not only easier and cheaper to maintain but importantly are also more reliable. All of which ultimately helps improve the commercial attractiveness of offshore power which for some countries now represents over 25 percent of their energy generation capabilities, and growing.

EXAMPLES

Bearing in mind that the explosion in offshore energy investment is only really a recent phenomenon it shouldn't be surprising that this trend is relatively nascent and that it will continue to mature and develop in the coming years.

At the moment there are two main threads to this trend, namely the development of undersea grid scale energy storage systems, some of which operate in a similar way to terrestrial pumped hydro systems, that store energy until it's transferred either to the terrestrial grid or back to the wind turbines to use, and the development of undersea substations.

While both these help improve the cost and reliability of offshore energy projects, and help secure their place in the global energy mix, another interesting benefit is their ability to improve local marine bio-diversity which, as we continue to face of **Bio-Diversity Collapse**, could provide organisations with new revenue streams as well as help them create more sustainable and eco-friendly businesses.

ACT NOW

The evolution of the global energy mix presents organisations with new opportunities to create and dominate new market segments and this is a classic example of innovation in action. While this trend has important commercial and operational benefits it is also an interesting example of how organisations, with a little thought, can help regenerate areas potentially damaged by anthropogenic activity.

EXPLORE:

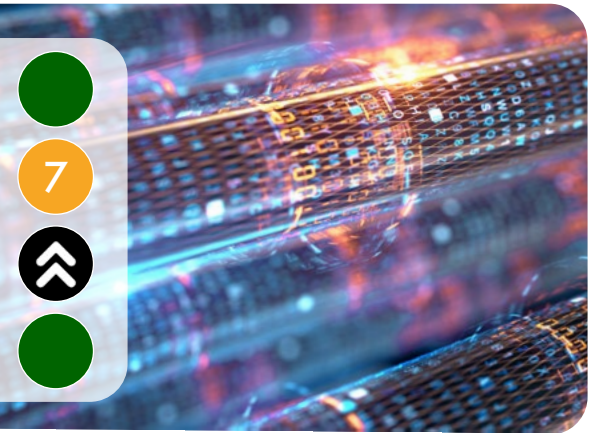
- Emerging technologies and technology roadmaps
- Future of Energy
- Infrastructure investment
- New business and operating models

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EXPLORE STARTUPS & MORE

VIRTUAL POWER PLANTS

3RD YEAR ON THE LIST



QUICK TAKE

Virtual Power Plants (VPPs) are often **Blockchain** based, distributed, **Cloud Computing** based power plants that aggregate electricity generation from Distributed Energy Resources (DER), such as renewables. Not only do they improve power generation efficiency, as well as energy supply flexibility and resilience, but they also play an increasingly important role in energy trading. Most countries around the world now have some form of VPPs, and the trend is accelerating as DER like biomass, hydro, hydrogen, solar, tidal, and wind get deployed.

IMPACT

VPPs are doing for the energy industry what virtualisation did for the technology industry - helping operators reduce costs, improve resource efficiency and energy security, and respond faster to changes in demand. Like investments in **Grid Scale Energy Storage Systems** they are also helping them eliminate the need for peaker plants.

However, while all these benefits are important one of their biggest upsides is that they give operators the ability to fully exploit and use all their assets which has significant advantages when it comes to innovation and developing new products that can be used to extend leadership and increase profitability.

As global energy infrastructure continues to show its age, with all the consequences that brings, which include everything from sparking some of the worst wildfires in US history and rolling blackouts, VPPs will play an increasingly important role in helping modernise the grid and stabilising supply in both normal and disaster scenarios. They also, for the first time give operators opportunities to experiment with new business models and B2C partnerships.

EXAMPLES

A term first banded about in the 1990's in the past decade VPPs have really started to take off as different technologies and trends, such as AI, Blockchain, Cloud, and IOT, have matured, and as communities and countries have embraced the concept of renewables, and other DER.

Not only are VPPs playing an increasingly important role in helping utilities reduce or eliminate significant capital expenditures, such as building new power plants and eliminating costly infrastructure upgrades, but they are also helping them move to a model of predictable energy generation costs and end their reliance on fossil fuel generators whose prices fluctuate and that they have to hedge.

In California rather than building three new coal fired power stations Sidewalk Infrastructure Partners (SIP) built North America's largest VPP which in time will have over 5GW of capacity and save the equivalent of burning 3.8 million pounds of coal. Elsewhere companies like Statkraft are using VPPs to aggregate over 1,400 independent power producers to create a VPP with over 10 GW of capacity.

ACT NOW

While there are solid business reasons why organisations should embrace VPPs its important to consider both the direct and indirect benefits of the technology on everything from the environment to product innovation to security of supply. In time the viability of VPPs will also be further helped by the maturation of other complimentary technologies and trends.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- GRC and security implications
- New business and operating models
- Partner ecosystems and solutions
- Product innovation initiatives

Data sources: CPUC, GTM, ResearchGate, Statkraft, and various.

FINANCIAL SERVICES TRENDS

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WHAT IF ... BITCOIN BECAME MAINSTREAM?

BITCOIN, ONCE a fringe movement whispered about in cyberpunk forums, has captured the global imagination. Its volatile journey, from basement server rooms to Wall Street headlines, has ignited both fervent belief and deep skepticism. But what if, instead of simmering on the periphery, Bitcoin crossed the Rubicon and became the dominant form of currency?

Imagine a landscape where fiat currencies are relics of a bygone era. Every transaction, from buying groceries to purchasing a dream home, pulsates through the digital veins of the blockchain. Bitcoin, with its decentralised nature and immutable ledger, becomes the lingua franca of global commerce. Governments adapt, issuing their own digital currencies tethered to the mighty Bitcoin, their financial empires morphing into tributaries that feed it.

This tectonic shift wouldn't just rearrange our wallets, it would restructure the very fabric of global power. Central banks, once the gatekeepers of monetary policy, have to loosen their iron grip. Instead, the fate of the global economy rests on the collective actions of tens of millions of individual miners and investors, a democratic - albeit volatile - experiment in financial autonomy. And, imagine the consequences – rising economic equality as individuals hold greater control over their wealth, or conversely, the emergence of crypto-czars, amassing digital fortunes that dwarf the holdings of nations. The ripple effects of Bitcoin's reign extend far beyond financial frontiers. Social contracts will be rewritten.

Imagine paying your taxes anonymously, directly supporting others with micro-tipping, or crowdfunding revolutionary projects instantly. Philanthropy becomes instantaneous and borderless, fueled by a transparent, trustless system. Yet, alongside these utopian possibilities loom dark shadows. Crime takes on a new digital dimension, cybercriminals wielding Bitcoin like invisible weapons. Regulatory quagmires emerge, governments grappling with the specter of an uncontrollable, global monetary system.

STATS THAT MATTER

25 %

PCT. OF GLOBAL MALWARE TARGETING FS INDUSTRY

US CONGRESS

235

NUMBER OF NEOBANKS, GLOBAL TOTAL 2023

INSIDER INTELLIGENCE

$2.1 TR

WEALTH HELD BY RICHEST 25 PEOPLE, GLOBAL 2023

FORBES

$14.8 TR

DIGITAL PAYMENTS MARKET, GLOBAL TOTAL 2023

WORLDPAY



$463 TRILLION

FINANCIAL ASSETS, GLOBAL TOTAL 2023

CREDIT SUISSE

1.4 BN

UNBANKED PEOPLE, GLOBAL TOTAL 2023

WORLD BANK

3.6 BN

ONLINE BANKING CUSTOMERS, GLOBAL 2023

MONEY TRANSFERS

FINANCIAL SERVICES

$26 TR

INDUSTRY MARKET WORTH, GLOBAL 2022

RESEARCH & MARKETS

$126 TRILLION AUM

ASSETS UNDER MANAGEMENT, GLOBAL TOTAL 2023

MCKINSEY & CO

62 ML

NUMBER OF MILLIONAIRES, GLOBAL TOTAL 2023

CREDIT SUISSE

BUY NOW PAY LATER

3RD YEAR ON THE LIST



QUICK TAKE

Buy Now Pay Later (BNPL), which can be best described as an unsecured installment loan, divides consumer's purchases into multiple payments with the first due at the checkout.

While BNPL isn't especially novel as a concept it is useful for retailers and can be a convinient way to help consumers retain cash and remain liquid, while at the same time helping them reduce some of the burden associated with buying items on traditional lines of credit or credit cards. Predominantly championed by fintechs BNPL is now mainstream and growing globally as a payment option.

Data sources: Mckinsey, Precedence Research, and various.

IMPACT

There is little doubt in anybody's minds that BNPL has changed consumer behaviours, as well as the landscape of the broader credit and payments ecosystem as more companies pile into the space. However, while BNPL offers consumers a great number of advantages, such as the ability to spread payments, there are a growing number of voices worried about increasing **Household Debt** levels and peoples ability to pay, as well as a worrying increase in the overall number of payment defaults which in some markets is now more than 30%.

That said though it's estimated the market will grow by 44% CAGR to reach $3.268 Trillion in value by 2030, so despite concerns there appears to be very little holding the trend back.

While adoption varies by country globally it's estimated there are over 360 Million BNPL users, with that hitting 900 Million by 2027, and that 75% of those are Gen Z or Millenials. It's also interesting to see that 67% of consumers believe that BNPL might replace traditional credit cards, and that 38% use BNPL more than once a month, predominantly for electronic purchases.

EXAMPLES

Today more than a quarter of small businesses offer BNPL as it becomes easier to integrate into their Point of Sale (POS), with Klarna, Paypal, and Square being among the industry's major incumbents. However, as other companies including Amazon, Apple, Ant Financial, and others continue to pile into the space their ability to maintain their generous market shares will undoubtedly be tested.

While on average retailers estimate that offering BNPL improves conversion rates by at least 2%, with apparel making up over 30% of all purchases, most BNPL providers only offer the service to consumers with credit scores over 700, and as economies tighten it's highly likely that almost all ratios will change.

Having started in the retail industry though BNPL has since expanded into multiple other industry segments and now encompasses both B2B and B2C spending, with the healthcare and insurance industries leading the charge. Furthermore, as **Open Banking** makes affordability and credit risk checks even cheaper and easier its certain that the market will become even more crowded as more banks and providers pile into it.

ACT NOW

While BNPL is responsible for driving a new wave of consumer behaviour and spending its greatest impact might very well end up being helping to trasform the consumer credit and payments markets. However, while BNPL has its benefits companies in this space must ensure they have robust systems in place to monitor fraud, vet consumers ability to pay, and ensure that they don't contribute to increasing **Wealth Inequality**.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Financial Services and Retail
- New business and operating models
- Partner ecosystems and solutions

CRYPTOCURRENCIES

3RD YEAR ON THE LIST



QUICK TAKE

Millennia ago shells were the first currency, then they were superseded by deer hide notes and physical coins, which were then augmented in the 1960's by credit cards and digital payments. And now, thanks to technologies such as **Blockchain**, money as we know it, has evolved again this time into Cryptocurrencies and individuals, organisations, and governments alike are both intrigued and worried by what they enable and represent. So much so that governments, worried about monetary sovereignty, are creating their own **Central Bank Digital Currencies** (CBDC).

IMPACT

Today you can't walk into a bar or a meeting room anywhere in the world without someone talking to you about cryptocurrency, which goes to demonstrate the system level impact this trend's having and will continue to have.

So far it's estimated 4% of people in the world have cryptocurrency stakes with over 300 Million active crypto users worldwide and growing as more global exchanges, currently 18,000 and counting, accept and enable cryptocurrency purchases and trades. While the market statistics are always changing, or volatile as some would say, currencies like the infamous Bitcoin, first created in 2009, have increased in value by over 193,000% since 2012 with users, despite very public issues with some cryptocurrencies including Bitcoin and other alt-coins, expressing an eye brow raising 97% confidence in them.

However, despite also being seen as key enablers of global criminal activity, which is a big issue in itself, such as **Cryptojacking** and **Ransomware**, currently there are over 10,000 cryptocurrencies in existence representing over $3 Trillion in value.

EXAMPLES

There are plenty of examples of cryptocurrencies and what they enable, from the likes of Bitcoin and Dogecoin to others such as Ethereum, Shiba Inu, Solana, Tether, and many more, but outside of the world of **Stablecoins** very few of them are pegged to any store of real value such as gold which only adds to their market volatility since most of them are reliant on network effects to increase in value.

Nonetheless some of the most notable examples of this trend include the use of Bitcoin to help bank the unbanked, and thereby reduce global **Wealth Inequality**, as well as El Salvador's adoption of Bitcoin as a national currency alongside the US Dollar in 2021 which both the IMF and World Bank opposed. Then there's also the ability to use currencies, such as Tangle to support machine based peer to peer **Internet of Things** microtransactions.

Furthermore, the rise of crypocurrencies and **Tokenisation** have also meant that anyone now can create their own coins - money - including organisations such as Decentraland with their **Metaverse** MANA currency, JPMorgan with their JPM Coin, Roblox, and many others.

ACT NOW

For the first time cryptocurrencies give individuals and organisations the ability to create value based monetary networks that sit outside of the traditional centralised core banking infrastructure and as such give them the opportunity not only to create new captive revenue streams but also, in some cases, create parallel shadow economies. As such the impact of this trend on every aspect of global business, culture, and society should not be underestimated.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Financial Services, Retail, and the Workforce
- New business and operating models
- Partner ecosystems and solutions

Data sources: Binance, Bloomberg, Fortune, IMF, World Bank, and various.

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EXPLORE STARTUPS & MORE

DECENTRALISED FINANCE

3RD YEAR ON THE LIST



QUICK TAKE

Decentralised Finance (DeFi) is an umbrella term for a financial system that functions without third party intermediaries like banks. By taking advantage of Blockchain to decentralise and disintermediate today's incumbents DeFi players are enabling a whole new breed of Peer to Peer financial services.

However, while this is disruptive Defi's digital stack means that in time the entire ecosystem could be fully automated and embedded with intelligence which will further disrupt the status quo. As a consequence this is a powerful trend with alot of runway.

Data sources: Forbes, FT, Investopedia, Wharton, and various.

IMPACT

Needless to say from an impact perspective the ground is always shifting because as with everything that's digital things move fast.

As they say money makes the world go round, but increasingly money, the concept of money, and how we invest, move, and use it are all changing. Today, leveraging many of these associated trends, the DeFi ecosystem is growing strong, albeit from a low base, to the point that the top three players now have over $100 Billion worth of assets, or Total Value Locked (TVL) in DeFi protocols. Furthermore, lured by lucrative returns investors are pouring money into a host of DeFi borrowing, decentralised trading, lending, and synthetic protocol products.

On Ethereum (ETH), for example, there is now double the amount of ETH locked in smart contracts on Decentralised Exchanges (DEXs) than on Centralised Exchanges - another testament to the trends popularity. However, while new DeFi entrants and protocols spring up like weeds DeFi's enduring legacy could be to help bring banking and financial services to the 2 Billion people in the world who are currently unbanked.

EXAMPLES

The DeFi ecosystem is, naturally, exploding as the number of DEXs, Initial DEX Offerings (IDOs), investment, liquidity pools, lending and payment platforms, Non-Fungible Token (NFT) marketplaces, and more all rise in popularity.

This explosion in growth also means that in the medium term the market will be ripe for a shake out as some organisations go to the wall and others consolidate their positions.

In much the same way that Uber connected drivers and passengers DeFi is connecting financial users and the benefits include 24/7 trading, with platforms such as Robinhood, which in 2021 caused huge disruption and panic when traders targeted GameStop, and other stocks, and being able to trade previously untradeable digital assets, such as digital images and works of art, software code, and tweets via NFT marketplaces like OpenSea.

And all ths is before we discuss the literal ocean of DeFi platforms that have sprung up to take a bite out of every other type of financial service imaginable.

ACT NOW

DeFi is likely to have a significant impact on how banks and the financial services sector as a whole operate in the future. Additionally, not only does it have the potential to shift the structure of the entire financial system itself at a macroeconomic level, but it could also play a significant role in helping reduce the impact of global **Wealth Inequality**.

EXPLORE:

- Business and impact assessments
- Emerging technology and technology roadmaps
- Future of Financial Services
- New business models, operating models, and products
- Partner ecosystems and solutions
- Social trends

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

FRACTIONAL OWNERSHIP

3RD YEAR ON THE LIST



QUICK TAKE

The ability to part own assets alongside other investors and benefit from them either financially or socially has always been possible. Today though this trend is being pushed into the spotlight more because of a convergence of several technologies and trends including **Cryptocurrencies**, **Decentralised Autonomous Organisations** (DAO), **Blockchain**, **Non-Fungible Tokens** (NFT's), and others which make it possible for people to part own and benefit from almost anything and everything. As a result shaking up everything from access rights, IP law, and tax, to asset classes, risk, and more.

Data sources: Coin Telegraph, Fractional, and various.

IMPACT

While many people associate time shares with fractional ownership the greatest difference between the two is that fractional ownership opportunities give shareholders a deed to a fraction of the asset, sometimes called Fractional Interest. This trend is also increasingly being seen by many as a lagging indicator of the growth of the sharing economy as both continue to rise.

Needless to say though there are pros and cons to the trend. Pros such as the expanded opportunity to own and benefit from all kinds of assets and asset classes, lower maintenance burdens and shared upkeep costs, and shared income opportunities. The cons though include fewer financing options, and a general lack of flexibility and freedom when it comes to decision making, usage, and so forth.

A form of collaborative consumption where the cost of buying, operating, and maintaining assets, as well as the benefits or proceeds, are all split between shareholders, the convergence of the aforementioned technologies and trends now mean that this trend is capable of disrupting several areas of the investment industry.

EXAMPLES

Different from crowd funding and traditional time shares, and seen by some as a trendy business model and by others as a growing asset class, fractional ownership is now having its time in the sun as third parties everywhere come together to take stakes in all manner of digital, physical, and virtual assets, from athletes and celebs to clubs, companies, and more.

One of the most interesting examples of this trend was the attempt by a group of investors who formed a DAO, named ConstitutionDAO, in an attempt to buy the original 1787 US Constitution at auction in 2021 and "preserve it for the people." Even though they ultimately failed the group managed to raise over $47 Million in Ethereum crypto and even created governance $PEOPLE Tokens which would have allowed investors to vote on how the document was managed and its future.

Meanwhile other examples include the ability of individuals to fund buying their homes using this model, which could disrupt and replace traditional mortgage lending, and others promoting the idea of Fractional-NFT's or F-NFT's for short, among many other examples.

ACT NOW

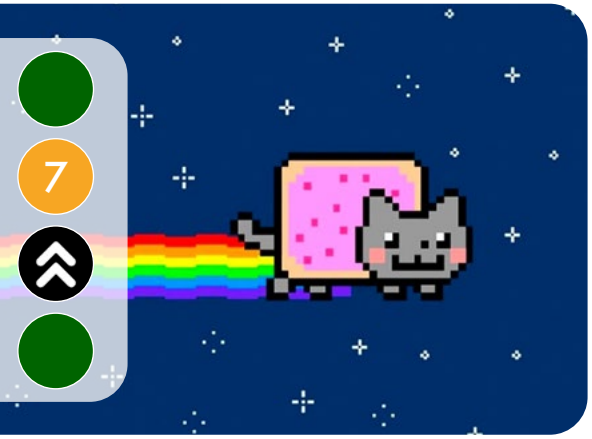
In an era where **Wealth Inequality** is getting greater this trend represents just one interesting way to potentially redress the balance. More than that though it also highlights how people with common interests can now efficiently and effectively come together, under common governance models, to invest in things they have a common interest and protect them, and benefit from them.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Financial Services, and the Workforce
- New business and operating models

NON-FUNGIBLE TOKENS

3RD YEAR ON THE LIST



Nyan Cat

QUICK TAKE

Non-Fungible Tokens (NFTs) a unit of data stored on a digital ledger, such as a **Blockchain**, that records the purchase, sale, and ownership of digital items of all kinds. As a result it could be argued that for the first time everyone everywhere now has an easy way to buy, sell, and track the provenance of digital assets in a safe and secure way.

The consequence of this is that digital items can now be bought and sold in much the same way as physical items therefore opening the door to a whole new market opportunity.

IMPACT

You always know that a new trend is hot when new words start appearing to support it, and with NFTs one of those is CryptoArt which is now a thing, as well as a new profession. Really.

In a sense NFTs are the result of a combination of a number of different trends and technologies, and while they give everyone a way to trade digital assets they also have a massive carbon footprint because they rely on Blockchain technology.

Today demand for NFTs and Fractional-NFT's, part of the **Fractional Ownership** trend, is surging with the market increasing by 1,785% in just mere months to reach a market capitalisation of over $20 Billion, and while that growth rate isn't sustainable, just like the crypto market it's also clear that this is a trend that's here to stay which means the only way is up.

Additionally, because NFTs are primarily aimed at digital assets it also means that the market has no conceivable top end.

EXAMPLES

From Tim Berners-Lee selling the internets original source code as an NFT for $5.4 Million and Jack Dorsey selling his first Tweet for $2.9 Million, to the original Nyan Cat gif being sold for $590,000 or 300ETH, it's as if all of a sudden the NFT floodgates have opened.

Currently one of the most expensive NFT's ever sold is a digital piece of artwork called "Everydays - The First 5,000 Days" by artist Mike Winkelmann which was sold by Christies for $69,346,250 - a staggering amount of money for something that fundamentally by traditional investment standards at least doesn't exist in physical or material form.

However, while NFTs primarily enable the sale of digital assets elsewhere entrepreneurial individuals have been using them to try and sell physical items too such as was the case in the US where real estate broker Shane Dulgeroff attempted to sell a digital piece of art for $120,000 that came with a "free house." In fact this idea at the time was so novel that noone knew for sure whether regulators would release the deed for the house.

ACT NOW

NFTs literally open up a whole new world of trading but it is a largely unregulated industry and there are significant questions about what happens to people's ownership of assets as and when NFT marketplaces close of go into administration. Nevertheless though it's a trend worth investigating.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Financial Services, Media, and Retail
- Legal and regulatory implications
- New business models, operating models, and products
- Partner ecosystems and solutions

Data sources: Guardian, and various.

OPEN BANKING

3RD YEAR ON THE LIST



QUICK TAKE

Open Banking is a system that gives third parties, whether they be consumers or businesses, controlled and secure access to financial data via the use of APIs. Widely accredited with giving consumers better control over their financial information the trend has also been accredited with facilitating new innovation in the sector and accelerating the growth of industry ecosystems.

With the total number of API calls in the UK alone exceeding over 1 Billion per day it's clear that this trend is not only here to stay, but that it likely has lasting appeal.

Data sources: Experian, FCA, and various.

IMPACT

The impact of Open Banking in the financial services industry has been so positive, from both a consumer and industry innovation perspective, that in Australia and the UK regulators are now actively considering rolling the initiative out to other sectors under the moniker of Open Sectors.

However, while some markets have embraced it whole heartedly, with over 4.5 Million consumers in the UK using open banking services, or more than 10% of all digitally enabled businesses and consumers, other markets such as the EU have seen much slower adoption. Despite this though it's estimated the market will continue to grow by 24% CAGR to reach $43 billion by 2026, and that improved collaboration between providers, who can also use it to counter growing online fraud rates, will act as a tailwind.

While it offers consumers many benefits, including higher acceptance rates, improved customer experience, inclusion, and personalisation, as well as lower fees, the trend is also proving to be a major enabler of the **Buy Now Pay Later** trend, as well as playing a key role in cloud based accounting.

EXAMPLES

From streamlined loan applications to offering more personalised financial and insurance comparisons there are plenty of examples where today this trend is helping remove customer friction, improve financial inclusion, and driving innovation.

With global **Household Debt** now standing at over $200 Trillion, and increasing, perhaps one of this trends greatest impacts has been helping customers manage their finances and investments more effectively using a variety of Open Banking dashboards and Personal Finance Management (PFM) tools. It's also allowed private renters to give mortgage companies, such as the Rental Exchange, access to their rental payment histories, secure mortgages, and get on the property ladder.

However, whether it's helping manage consumer subscriptions, via services such as Bud or Trim, helping businesses simplify their accounting, or regular people file their tax returns faster with the likes of Coconut or Freshbooks, there are no shortage of interesting and noteworthy examples of how this trend is benefiting people.

ACT NOW

Open Banking promised to transform the customer experience and champion innovation, and broadly it has done both of these, with its benefits rippling far afield. With online fraud on the rise though companies nevertheless need to remain vigilent and explore how they can use this trend to benefit themselves and their customers while at the same time keeping the publics trust and ensuring the integrity and security of the systems that enable the seamless interchange of financial information.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Financial Services and Retail
- Legal and regulatory implications
- New business models, operating models, and products
- Partner ecosystems and solutions

REAL TIME PAYMENTS

3RD YEAR ON THE LIST



QUICK TAKE

Real Time Payment (RTP) infrastructure differs from same day ACH because it is separate and many argue exclusively built for the digital age. Unlike same day ACH payments which are often cleared in batches and then settled after the payments clear RTP network payments clear and settle individually in real time with immediate finality.

Consequently, not only does this have a significant impact on the economy, but payees gain certainty of funds and immediate payment finality gives both payees and merchants a continuous, real time view of their cash positions.

Data sources: ACI Worldwide, CEBR, FACT MR, and various.

IMPACT

Unlike many of its peers which only offer end of day or defined period settlements, RTP which are growing at 65% CAGR and are expected to hit $173 Billion by 2026, for the first time enables true 24/7 payments. As a result this trend is now driving changes for other traditional payment types such as checks, credit, debit, prepaid, and the like. However, the benefits of this trend go far beyond the obvious.

Not only does RTP remove friction and help close the gap between companies, customers, and employees, enabling instant pay, for example, as well as instant bill and insurance payments, but it also boosts the **Gig Economy** and P2P trends such as **Decentralised Finance**. In fact, the gains are so significant that countries such as Brazil and India have seen their economies grow by $35 Billion and $46 Billion respectively, and it's expected that by 2032 RTP could add an additional $300 Billion in GDP to the global economy.

In part this is because companies and individuals alike can now better manage their cash flows and cash flow forecasting, credit, liquidity, as well as help both manage payment risks better.

EXAMPLES

The mass adoption of RTP around the world, and the adoption of global standards such as ISO 20022 and SWIFT corporate access, has not only helped banks reduce RTP integration costs, but it's also helped them interact more efficiently with other financial institutions, and more effectively leverage data to run their businesses.

Some of the best known and lauded examples of this trend at the moment include the Faster Payments system in the UK, PIX from Brazil, and the FedNow and RTP Network from The Clearing House in the US, but there are many more.

Furthermore, organisations such as SWIFT, with SWIFT Go, are leveraging this trend to speed up large international business transactions that let banks more effectively compete with fintechs who often use **Blockchain** and other innovations to remove steps from international payment processing, and as a next step the company is working on integrating RTP with multiple **Central Bank Digital Currencies** networks as they try to solve both the standardisation and interoperability challenges associated with this trend.

ACT NOW

As RTP increasingly becomes customers expected norm, as well as the global norm, it is a case of when organisations embrace the trend rather than if, and with so many direct and indirect benefits for everyone involved it's easy to understand why this is a trend to watch and embrace. However, as the world's monetary networks and systems become more complex organisations should act cautiously and explore the challenges associated with embracing this trend including GRC, integration, security, and many others.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Future of Financial Services
- GRC and security implications
- New business and operating models
- Partner ecosystems and solutions
- Policy and regulation reform

SOVEREIGN ELECTRONIC PAYMENT NETWORKS

3RD YEAR ON THE LIST



QUICK TAKE

Today companies and consumers alike are used to having a wide variety of payment options, including those that traverse the ACH networks, such as bank transfers, cash, checks, credit and debit cards, digital wallets, direct debits, prepaid cards, money orders, and many others. However, with many electronic payments still transiting networks like those owned by Mastercard and Visa increasingly governments, ranging from China to the EU, are developing and promoting their own alternatives, in part to spur competition and in part to reduce their reliance on foreign organisations.

Data sources: RBR, Visa, WTO, and various.

IMPACT

With almost 4 Billion cards and over 255 Billion transactions a year totalling $14 Trillion spread across more than 200 countries for Visa alone it's not hard to see why governments, as well as other institutions, want a slice of the estimated $22 Trillion global electronic payments pie.

This desire though is further compounded by today's increasingly tense geopolitical situation as different sovereign governments, for a variety of reasons, look to undermine the dominance of traditional providers and become less beholden to their services, as well as eye the ability to use electronic payments as a way to extend their own country's **Soft Power**.

With two US organisations, namely Mastercard and Visa, having a global duopoly it's unsurprising that countries such as China and the EU want to challenge that dominance - an act that will not only affect the politics of local market access, which the WTO has already red flagged in China, but which could also have dramatic consequences on the **Demise of Anonymity and Privacy**, the effectiveness of **Sanctions**, and other trends.

EXAMPLES

While there are a growing number of examples of countries developing their own competing electronic payment networks so far most of the results have been mixed with Europe, for example, with their Electronic Payments Initiative (EPI) scheme experiencing several re-starts and multiple failures to launch as one minute the initiative is in vogue and the next it isn't, and Russia with Mir.

However, while Europe continues to fall at almost every hurdle China on the other hand, with UnionPay, have had considerable success both locally, where over 90% of the Chinese population have a card, and abroad especially in Russia after AMEX, Mastercard, and Visa all "dialled back their services"after the start of the Ukraine War. From a global spending perspective UnionPay now represents over 45% of all global card expenditure, with Visa at 27% and Mastercard at 18%, however if you remove China where UnionPay is dominant then that share drops to just a mere 1%. However, as **E-Commerce** transactions continue to ramp, and as **Super Apps** become more popular it's an understatement to say that this will be a very interesting trend to watch.

ACT NOW

While it would be easy to see this trend as just being yet another area where competing countries are coming together to clash with one another the fact of the matter is that, especially in China's case, the ability to monitor and track payment behaviours and transactions across countries will give them unprecedented insights into the performance of foreign economies, and in a world where information is increasingly being weaponised, in part to promote soft power and as part of the **Psyops Pandemic**, countries should be more wary than they might otherwise be.

EXPLORE:

- Acceptance devices and payment innovations
- Business and impact assessments
- Future of Financial Services
- Policy and regulation reform
- Privacy implications
- Product innovation initiatives

GAMING INDUSTRY TRENDS

CONTENTS

... ARTIFICIAL INTELLIGENCE GAMING COACHES
... CLOUD GAMING
... E-SPORTS
... GAMETELLING

BOOK AN EXPERT CALL

WHAT IF ... GAMING FELT REAL?

IMAGINE A future where the pixelated dragons hiss hot air on your skin, and the metallic tang of alien blood remains a visceral memory clinging to your tongue. Welcome to the era of hyper real gaming, where virtual worlds bleed into the physical, blurring the lines between reality and a million meticulously crafted dreamscapes. The first to succumb are the senses. Sight transcends screens, replaced by haptic suits whispering textures of moss and bark, thermal feedback mimicking the lick of digital flames. Taste buds tingle with the tang of virtual berries, olfactory receptors overwhelmed by the musk of mythical beasts. The boundaries of reality crumble, replaced by a kaleidoscope of sensations so vivid, so visceral, that returning to the mundane feels like waking from a fever dream.

Social landscapes shatter and reform within these new frontiers. Guilds, once pixelated alliances, become tribes, bonded by shared battles and virtual blood oaths. Rivalries forged in digital coliseums spill over into the real world, friendships forged during epic dungeon crawls translate into tangible support networks. Imagine communities built around shared quests, economies thriving on virtual loot traded for real-world currency, a and a new virtual society emerging from the fertile ground of hyper-real gaming. But a darkness lurks in this Eden.

Addiction takes on a terrifying new form, minds trapped in perpetual escapism, unable to distinguish illusion from reality. Lines blur between simulated danger and genuine peril, leading to recklessness and even real death. Imagine games room soldiers returning from virtual war zones with PTSD so real it cripples their lives, or children drowning in the quicksand of unending virtual adventures, and ethics become a Gordian Knot. Is it murder to slay a sentient AI villain? Where do the lines of ownership lie when virtual property translates into real-world wealth? Imagine the legal battles fought over digital dragons and virtual land, governments grappling with the complexities of policing a world without borders. Hyper real gaming isn't just a technological marvel - it's a Pandora's Box, overflowing with both wonder and peril that forces us to confront the fragility of our own reality, the malleability of human perception, and the question of what truly defines our humanity.

36

MOBILE GAMERS, AVG. AGE, GLOBAL 2023

TECHCRUNCH

74 %

ADULTS BELIEVING GAMES HAVE EDUCATIONAL VALUE

LIQUID WEB

8.4 HRS

TIME PER WEEK GAMING, GLOBAL AVG. 2022

STATISTA

250 ML

AVG. MONTHLY PLAYERS, FORTNITE, 2023

DEMAND SAGE



3.22 BILLION

NUMBER OF GAMERS, GLOBAL TOTAL 2023

STATISTA

540 ML

NUMBER OF E-SPORTS VIEWERS, GLOBAL 2023

DEMAND SAGE

$40 ML

BIGGEST E-SPORTS PRIZE POT, GLOBAL 2023

INTERNATIONAL 10

700 K

GAMES IN APP STORES, GLOBAL TOTAL 2023

BUSINESS OF APPS

$233 BILLION

VIDEO GAME MARKET WORTH, GLOBAL TOTAL 2023

STATISTA

30 %

IN GAME TRANSACTIONS, PCT. OF GLOBAL MARKET

GAMEFLIP

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

ARTIFICIAL INTELLIGENCE GAMING COACHES

3RD YEAR ON THE LIST



QUICK TAKE

From the games of Chess and Go, to Dota and Starcraft, we're getting used to seeing **Artificial Intelligence** (AI) not only beat the world's best gamers and Grand Masters, but beat them convincingly and repeatedly. So convincingly in fact that some of AI's human opponents, such as the Korean Go world champion, have retired saying "AI is invincible."

Now though things are coming full circle as AI, the Master, finds a new role - coaching gamers to become better gamers and helping them improve their strategic thinking and skills.

Data sources: Falcon, and various.

IMPACT

A subset of the trend **Artificial Intelligence Coaches** the impact of this trend is especially interesting because overall it not only has the ability to change the way humans gamers learn and play game, but it also has the ability to impact gamer rankings and **E-Sports** competitions.

AI is able to do this because it learns in one way and humans learn in another, and when the two come together interesting things happen. This was exemplified by Google AlphaZero's now infamous "Move 37" during it's match with then world reigning Go champion Lee Sedol which experts initially thought was a mistake but in fact ended up being a master stroke.

Commercially therefore the impact of this trend is difficult to calculate because that would require being able to measure the amount of improvement a gamer made because of this trend, but broadly speaking at the moment studies show that the use of AI coaches is helping improve gamer performance by at least 30%, something with is significant enough to demonstrate the power and potential this trend has.

EXAMPLES

The examples of organisations building and selling AI coaching solutions for the Gaming industry, outside of the Education Industry's own adjacent **Adaptive Learning** trend, is still reasonably slim. But nonetheless in the highly competitive world of E-Sports where players compete for multi-million dollar purses, and where every edge is an advantage the trend's finding its feet with organisations such as Falcon AI and SenpAI now talking using it to revolutionise the gaming world and help gamers climb the ranks faster.

Furthermore, as AI becomes more capable and powerful, and as its ability to analyse player behaviour and game play improves, and as its ability to then coach them also improves this is a trend to watch.

ACT NOW

The impact of changing how humans learn new skills cannot be under estimated which to some degree makes this trend a wolf in sheep's clothing. However, in time significant improvements in AI capability mean this trend will inevitably become the gaming industry's equivalent of a "performance enhancing drug" and be the defacto tool used by gamers everywhere.

EXPLORE:

- Benefits and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Education, and Gaming
- League impact and regulations
- New products
- Partner ecosystems and solutions

CLOUD GAMING

3RD YEAR ON THE LIST



QUICK TAKE

Historically games were only available on physical media, then they were downloaded onto devices and played locally. Today, fuelled by improvements in communications and compute they're run and streamed from the cloud as a service. Not only does this change how we consume and distribute games but it also changes how they're analysed, built, and the gaming experience, as well as the industries economics. Turbo charged by **5G**, **Cloud Computing**, and **Cloud Native Networks**, this trend is the new entertainment battle ground as more corporate giants lay out their visions and pile into the space.

Data sources: Allied Market Research, GM Insights, and various.

IMPACT

This trend has multiple impacts and that's before the commercialisation, integration, and maturation of **Immersive Reality** gaming environments, **Procedural Content Generation**, and other trends.

Today this market is worth an estimated $244 Mn and by 2030 that's estimated to be over $22 Bn. On the one hand this trend brings about new competition for traditional studios as some of the large cloud computing platforms, such as Amazon, Microsoft, and Netflix, build and buy their own studios in an attempt to create vertical stacks, and on the other it completely alters the economics of the industry, the way game data is captured and analysed, the way games are built, designed, and distributed, and in time the entire gaming experience. And those are for starters.

In many respects those in the industry can think of this of this as their "E-Commerce" moment - the point in time when not one thing about the industry but many. Furthermore, the ability to render games in the cloud and then augment them with vast amounts of additional data, experiences, and services will change gaming forever.

EXAMPLES

As well as the aforementioned trends new adaptive codecs and rendering technologies, such as Foveated rendering which reduces data transmission by up to 90%, have also helped move this trend from being a proposition on a presentation to being real. But, even though it might sound straight forwards trying to stream HD or UHD games at 30 , 60, or even 120fps with latencies that meet the demands of even the most intense time-sensitive first person shooters at scale is still hard.

That said though as Gaming as a Service and all manner of subscription models take off with platforms like Amazon Luna, GeForce NOW, Vortex and the on again off again Google Stadia, among others, it's clear that the momentum is building, and there are plenty of AAA studios piling in.

As a consequence at the moment games such as Candy Crush, Destiny, Fortnite, Hunt, Madden, Overwatch, and Showdown dominate the charts and are often updated weekly and sometimes daily with new areas, characters, events, levels, and missions - something that only cloud gaming gives them the opportunity to do cheaply and easily.

ACT NOW

Being able to analyse and change almost every aspect of a game on the fly is one of this trends biggest wins, but ensuring a consistent quality of service and experience is difficult given the ubiquity of different devices, network speeds, and operating systems, so organisations should be careful when embracing it.

EXPLORE:

- Benefits and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Financial Services, Gaming, Marketing, Media and Entertainment, and Retail
- New business and operating models
- Product innovation

E-SPORTS

3RD YEAR ON THE LIST



QUICK TAKE

As a trend E-Sports is coming on strong, especially in Asian and Western cultures, but what is less well known is that it is increasingly eating into the dominance of more traditional established global sports as younger audiences and participants switch allegiances.

As a result sports executives around the world are now thinking much more seriously about the future impact E-Sports will have on the future of their own franchises and sports, and the rise of what many are now referring to as the **Alternative Sports** industry.

IMPACT

E-Sports is defined as playing video games competitively, although definitions vary, and crosses countless genres.

Since 2018 the total number of people watching E-Sports has grown on average by over 12% CAGR to reach over 500 Million by 2020, and it's estimated that by 2023 this figure will be over 700 Million. When broken down, however, around half of these viewers are enthusiasts and the other half are occasional, and globally 90% of them are located in Asia, Europe, and North America - as you perhaps might expect.

As the viewership grows so too do the prize pools with most of them now breaking the $30 Million barrier with winners now regularly banking at least $3 Million per event. And, obviously, the only way is up.

Despite these impressive numbers though E-Sports still has a long way to go before it displaces traditional sports, but nonetheless the market is estimated to grow at 15% CAGR to reach a value of just over $2 Billion by the year 2026.

EXAMPLES

The amount of money given away in prize money so far by the world's largest E-Sports organisations is truly staggering with Dota 2 leading the pack having awarded over $250 Million in prize monies to over 4,000 winners across over 1,500 tournaments, and Counter-Strike, Fortnite, and League of Legends awarding approximately $100 Million each, since their leagues began.

It's also no surprise, therefore, that these organisations are also the most dominant in the industry, and it's also no surprise that those prize pots are continuing to grow as the market gets larger.

However, when we look at the market by hours watched League of Legends tops the charts with over 580 Million hours watcher per year, growing at 21% in 2020, Counter-Strike with 354 Million, and Dota 2 trails with 253 Million. So, as you can see the field, as they say, is still wide open. And, as we continue to see advances in the communications industry, including in speed and ubiquity, all of these numbers will increase.

ACT NOW

While many will see the E-Sports industry as being distinctly separate from the traditional sports industry the viewership and the amount of money it commands will be too big for many to ignore which means that not only will we see increased competition, but that we will also see a plethora of new entrants vying for the crown.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Entertainment and Gaming
- New business models, operating models, and products
- Partner ecosystems and solutions

Data sources: E-Sports Earnings, Newzoo, Roundhil, Twitch, and various.

GAMETELLING

3RD YEAR ON THE LIST



Gametelling in Minecraft, Evbo

QUICK TAKE

We are all used to the idea of storytelling, but increasingly engaging, interactive, and realistic game environments, that are also helping supercharge the trend of **Virtual Film Production**, have helped fuel the rise of Gametelling - a trend where game players create, record, and stream their own made up adventures and stories to massive online audiences. Enabled by increasingly authentic game platforms and **Over The Top Content** (OTCC) media distribution platforms such as Twitch and YouTube this trend is now replacing some traditional TV viewing, especially for younger audiences.

Data sources: Various.

IMPACT

As we continue to see game engines and the interactive worlds they can be used to create become increasingly life-like and entertaining, as well as advances in **Synthetic Content**, in time the breadth and quality of serialised game content that so called Gaming Influencers create will only increase.

The modern equivalent of children's TV today hundreds of millions of children of all ages spend over 9 Bn hours a year, a 300% increase in just two years, to watch creators that analysts call the "Rockstars of their generation," explore, fight, and socialise their way through different games and worlds, often complete with plot lines and voice overs.

In 2021 an estimated 4 in 10 children globally follow one or more of these influencers so it's no wonder why brands everywhere are trying to find ways to capitalise on the trend - often with little success because it can be argued they don't understand the trend well enough. On that note though, and ironically, with the number of channels also quadrupling in the past few years, to over 12 Mn on Twitch alone this is also why brands should experiment with this trend.

EXAMPLES

Examples of this trend are everywhere, but given the fact it plays off of the OTTC trend many of the channels are concentrated on platforms such Twitch and YouTube. Furthermore, depending on your age there's a good chance you've never watched the episodes and series that creators create.

While this trend has been on the rise for over a decade it's now considered prime viewing for younger audiences between the ages of 6 and above - whether or not adults approve - and in many ways we can now say that it occupies the space in their lives that traditional children's TV used to occupy.

With examples of creators like Evbo, Ninja, PrestonPlayz, and all their other friends who regularly storify games such as Fortnite, Minecraft, and Roblox, and who collectively have hundreds of millions of followers and just about as much money in the bank, and with others such as Element Animation, a more "professional" outfit with a slightly different demographic and USP who also create their own plot lines and add their own twists, there's no shortage of entertaining content for young ones to choose from.

ACT NOW

As the rendering quality of game engines continues to improve in many ways you can think of these game worlds as being giant world-sized **Metaverse** movie studios that are infinitely customisable, enable all kinds of interactions, and where creators have the ability to create any experience they like. It's also no coincidence that this trend and the trend of **Virtual Film Production** are converging. As a consequence this is a trend that's under rated by many and one to take seriously.

EXPLORE:

- Advertising and content policies
- Future of Customer Experience, Gaming, Marketing, Media and Entertainment, and Retail
- Game production
- New business and operating models
- Policy and regulation reform
- Product development

HEALTHCARE INDUSTRY TRENDS

CONTENTS

... PREDICTIVE HEALTHCARE
... QUANTIFIED SELF
... REMOTE SURGERIES
... TELE-HEALTH

BOOK AN EXPERT CALL

WHAT IF ... WE WERE BUG FIGHTING COMPUTERS?

IMAGINE A human being with the longevity of a Redwood and the computational power of an Exascale AI supercomputer. This is the future Synthetic Biology enables as humans become biological supercomputers, with cells becoming multi-core computing systems capable of not only detecting disease within our bodies, but also becoming living pharmacies capable of synthesising bespoke cures to defeat it all in vivo.

Old fashioned biopsies, blood tests, scans, and swabs are a thing of the past. Instead, equipped with billions of in vivo bio-sensors that are woven into the very fabric of our cells our bodies can see, sense, and analyse everything that goes on in it and pin point everything that's wrong. Imagine hybrid human immune cells detecting the early stages of Cancer by detecting cancerous DNA biomarkers in the blood, or viruses being analysed in real time by our bodies own biological computing machinary. Early detection, once a whisper, becomes a roar, giving us the power to nip illness in the bud before it takes hold. But the real magic unfolds in the theatre of treatment.

Gone are the generic drugs, pills, and vaccines, replaced instead by the body's own alchemical bio-manufacturing lab. Genetically modified cells, programmed with the blueprints of bespoke cures, and able to compute their own novel treatments, churn out personalised cure alls that are tailored to the unique nuances of each individual illness and person. Imagine cancerous tumors dissolving from within, identified and attacked by modified CAR-T cells that are programmed to target their vulnerabilities, or infections snuffed out by a cocktail of antibodies brewed by the body itself.

This biological renaissance, however, is not without its shadows. Inequality looms. With access to these advanced healthcare technologies potentially becoming the new frontier of wealth and privilege. Imagine a world where the wealthy waltz through life equipped with inate ability to detect and fight off every ailment and pathogen, while the less fortunate remain tethered to the old world of pills and procedures. And who owns the IP for our body's supercomputer - and therefore us?

STATS THAT MATTER

65 ML

HEALTHCARE WORKERS, GLOBAL TOTAL 2023

BMJ

337 ML

YEARS OF LIFE LOST (YLL) DURING COVID-19, 2023

WHO

74 %

(NCD) NON-COMMUNICABLE DISEASE, % GLOBAL DEATHS

WHO

1.6 BN

YEARS OF LIFE LOST TO NCD'S, PER YEAR, 2019

WHO

311 Global Advisory Forecasting Innovation Strategy

18 MILLION DEATHS PER YEAR

BIGGEST NON-COMMUNICABLE DISEASE (NCD) KILLER : HEART DISEASE, GLOBAL 2022

WHO

$4.3 TR

USA TOTAL HEALTHCARE SPEND, 2023

AMA

$8 TR

GLOBAL TOTAL HEALTHCARE SPEND, 2023

REPORTLINKER

HEALTHCARE

68 %

UNIVERSAL HEALTHCARE COVERAGE, GLOBAL 2019

WHO

3.2 MILLION DEATHS PER YEAR

BIGGEST COMMUNICABLE DISEASE KILLER : LOWER RESPIRATORY DISEASES, GLOBAL 2022

WHO

73

HUMAN LIFESPAN, GLOBAL AVG., 2023

WHO

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

PREDICTIVE HEALTHCARE

3RD YEAR ON THE LIST



QUICK TAKE

As the **Quantified Self** trend helps us capture more mental and physical health data organisations around the world are increasingly finding new ways to use this and other data to predict people's future health and wellness, and even life expectancies. Furthermore, as the quality, variety, and volume of alternative biochemical, biomarker, biomechanical, biometric, genetic, and medical datasets increases **Artificial Intelligence** (AI) and other tools are becoming increasingly adept at detecting health clues and patterns, generating insights, and predicting health outcomes.

Data sources: CDC, Europa, and various.

IMPACT

Being able to predict when someone will get ill and what their ailments and conditions will be weeks or even years ahead of time can change lives and save lives - especially when it comes to more serious chronic conditions such as alzheimers, cancer, and heart disease. While this is game changing in itself the power of this trend on improving people's wellness is magnified when it's intelligently complimented by the implementation of **Preventative Healthcare** strategies.

Today in the US alone 7 out of 10 deaths and over $1 Trillion, or 75% of all US healthcare spending, is on what many experts regard as preventable chronic diseases such as diabetes, heart disease, hypertension, and osteoarthritis, with the hidden total economic cost being over $3.7 Trillion.

Needless to say the ability to predict who is at risk, as well as predict the future trajectories of these and other diseases when they do occur within patients so that healthcare professionals, and in the future alternative AI solutions, can make the right interventions as early as possible is transformative.

EXAMPLES

While at a high level this trend has been around for a long time it's only recently that new technologies and tools have given the industry the data and insights it needs to be able to accurately predict the onset and trajectory of all manner of different diseases. As such there are many examples, such as blood sampling techniques which are now so sensitive they can detect the faintest cancer markers in the blood years before the tumours metastasise. Or the use of AI to identify disease, such as heart disease, and then compare it with other datasets to calculate its trajectory and the patients life expectancy.

However, while these examples are interesting better things lie ahead when we combine the **Digitisation** of healthcare with AI. By combining different data sets together including patient CT, MRI, PET, and X-Ray scans along with other medical and quantified self data AI can create **Digital Twins** of patients and compare all manner of clinical observations with other data sets, other patients, and medical baselines to predict how those observations will interact, their likely outcomes and future disease profiles, possible complications and much more.

ACT NOW

The ability to predict someone's future health, whether or not they have any observable conditions at that time, is incredibly powerful. It also means that interventions and treatments can be made years or even decades ahead of time which ultimately means those people will have healthier, longer lives.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence and Healthcare
- New business and operating models
- Partner ecosystems and solutions

QUANTIFIED SELF

3RD YEAR ON THE LIST



QUICK TAKE

Technology used to be distant to us, then it was near, then with the advent of **Wearable Technology** and Implanted Medical Devices, it was on us and in us.

Over time as the devices around us have gotten smarter, packed with intelligence and sophisticated sensors, their ability to measure, monitor, and track our activities and behaviours, as well as our mental and physical well-being has improved significantly - so much so that now armed with all this data people everywhere can monitor their own health and take control of it in ways that simply wasn't possible before.

Data sources: Clinic Compare, and various.

IMPACT

One of the most understated impacts of this trend is that it democratises access to health and wellness data and gives individuals, as well as organisations and healthcare professionals, access to data that was previously only accessible using professional medical and sports diagnostic equipment that was often only available at specialist centers.

As a result, increasingly it could be said we are putting a hospital, a doctor, and a sports and "wellness" coach at people's fingertips - especially as we see **Artificial Intelligence** (AI) disintermediate all these and take a more dominant role in diagnosing and communicating health data and outcomes to people.

One of the greatest benefits of this trend is that, with the right data privacy and regulations in place, it gives organisations the ability to monitor and track the mental and physical wellness of their citizens and customers at a granular level at scale which could then be used to create real time healthcare initiatives that have an impact at the national and regional level. A downside though is the potential negative psychological impact of self-tracking.

EXAMPLES

While this trend is transformative in itself it becomes even more impactful when we combine data captured from human biochemical, biomarker, biomechanical, and biometric sources with other data sources.

A good example of this being Nitanic's ability to quantify the impact of Pokemon Go on people's health. By using GPS tracking data they were able to calculate that on average people who catch 100 Pokemon a day shed a pound roughly every three days. Now combine this data with some of the other sources mentioned above and you could calculate improvements in blood pressure, cardio vascular health, and all manner of other metrics at both an individual and societal level then make the necessary interventions.

At a more personal level this trend lets individuals track wellness and performance over time, surface undiagnosed diseases such as Lyme Disease, as happened recently to a man in the US, predict epileptic fits and the onset of illness such as flu, detect and diagnose everything from cancer to diabetes, to dementia, depression, and PTSD, and much more.

ACT NOW

Our ability to monitor and track our wellness is only limited by the **Sensor Technologies** we have available to us, and as these become more sensitive and sophisticated it's only a matter of time before even the hardest to capture data - such as the ability to non-invasively analyse people's genomes and changes over time - is within reach. Not only does this trend help democratise healthcare at global scale but the insights it gathers is already changing lives and preventing deaths.

EXPLORE:

- Best practises and case studies
- Data privacy and policies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Devices, Healthcare, Insurance, and Sensors
- New business and operating models
- Partner ecosystems and solutions

REMOTE SURGERIES

3RD YEAR ON THE LIST



QUICK TAKE

Resourcing and resource availability are arguably two of healthcare's greatest challenges, and if there is a mismatch then it can have dire or even fatal consequences.

Nowhere is this more prevalent than in the surgical field where specialists are available in one region but not another, and up until recently that has been a problem that could only be solved by moving people around. However, thanks to advances in telecommunications and robotics now healthcare professionals and surgeons in one region can operate on patients hundreds of miles away.

Data sources: King's College, The Lancet, and various.

IMPACT

Every year it's estimated that 17 Million people in low to middle income countries die because they don't have access to safe surgical healthcare services, and that all of these deaths are preventable. It's also estimated that in these same countries a further 143 Million people need additional life-saving surgeries.

In order to rectify this situation it's estimated that countries need to make investments of at least $420 Billion to increase their operative volumes to a minimum level of 5,000 per 100,000 surgeries and that if this is not done then globally in the next decade over $12 Trillion worth of economic productivity will be lost.

In addition to these figures it's also estimated that a further 4 Million people die within 30 days of surgery with, again, half of those deaths being in low to middle income countries - but not exclusively.

Needless to say remote surgeries, where surgeons and healthcare professionals can be based in one location and operate on people in another, would be of great benefit.

EXAMPLES

Remote surgeries are perhaps the epitome of how emerging technologies are helping decentralise all manner of services for the benefit of people everywhere, and while the trend shows great promise - and is already delivering on some of that promise - there is still a long way to go before all the services that people find in a traditional theatre are available in this way.

Our ability to offer remote surgeries relies on organisations being able to combine together a variety of different emerging technologies, from 5G and AI to robotics and more, so this is still a relatively nascent space.

That said though in China and India surgeons performed brain and heart surgery on patients who were hundreds of miles from their location, and in the USA surgeons used them to surgically implant stents in patients remotely. And, unsurprisingly the world's military, who sees great potential in the trend, are also investing substantial energy, time, and resources to develop solutions that allow them to preform remote surgeries on soldiers injured in battle - all of which will inevitably, in time, filter down into the commercial sector.

ACT NOW

Remote surgeries greatly improve the accessibility of surgeons and surgical procedures to those who need it the most, and it does so affordably. It also marks the beginning of Surgery as a Service. As a result it is our advice that you evaluate and experiment with the trend.

EXPLORE:

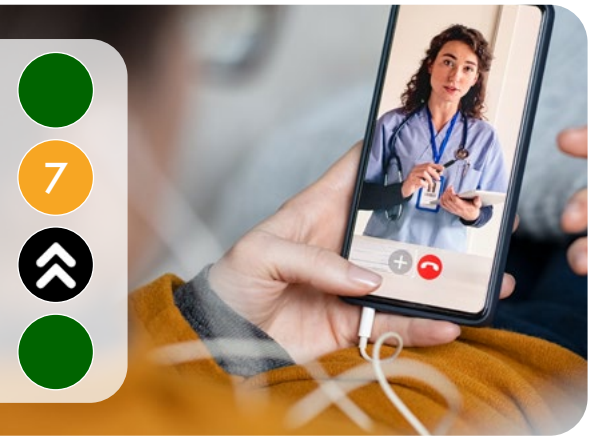
- Benefits and impact assessment
- Emerging technology and technology roadmaps
- Future of Communications, Healthcare and Robotics
- New business models, operating models, and products
- Societal trends

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

TELE-HEALTH

3RD YEAR ON THE LIST



QUICK TAKE

When stakeholders talk about the Tele-Health trend, that uses a mix of electronic and telecommunications technologies, and which can also include **Wearable Technology**, to deliver a variety of healthcare services remotely, they often think of it as just a modern alternative to traditional Doctor-Patient interactions. Today though as the devices at the edge become increasingly capable and smart healthcare professionals will soon be able to do much more and use them to predict, diagnose, monitor, and treat all manner of conditions cheaper, easier, and faster than ever.

Data sources: Forbes, McKinsey, and various.

IMPACT

While tele-health was already a growing and accelerating global trend during COVID-19 pandemic its use increased by 38 fold from the pre-COVID baseline as people everywhere sought new ways to safely access and deliver healthcare services.

As a result it is now estimated that up to $250 Billion of US healthcare spend alone could be shifted to virtual or virtually enabled care, and that with up to 60% of people saying they want to continue using it that the overall market could be worth upwards of $600 Billion by 2027. Furthermore, with every tele-health consultation saving people an estimated 100 minutes in associated travel and wait time the ancillary benefits, such as the impact on the environment, healthcare premiums, people's productivity, and so on are also notable and significant.

Additionally, as our smart devices on board AI, cameras, and sensors become increasingly powerful in time healthcare professionals will be able to use these to capture and analyse even more valuable patient biomarker and biometric data and provide an even better, and more granular, service.

EXAMPLES

Largely the capabilities of tele-health solutions are only limited by the technologies of the time, and as **Artificial Intelligence** (AI), **Machine Vision**, sensors, and smart device technologies all improve so too does our ability to capture and analyse more valuable patient data in line with the **Quantified Self** and **Predictive Healthcare** trends.

Today smart devices can analyse vocal biomarkers to quantify people's levels of anxiety, dementia, and depression, as well as diagnose conditions including the flu, epilepsy, heart disease, PTSD, and much more, as well as use their cameras to determine whether they have cancer, including pancreatic and skin cancer, genetic abnormalities, and many other conditions. And this is just the beginning as we continue to see our devices morph into futuristic tricorders, and new services such as genomics being included in the mix.

While the space is still expanding there are an increasing number of providers leveraging this trend and developing a wide range of tele-health services including organisations such as 23andMe, 98point6, Liviongo, TeleDoc.

ACT NOW

While tele-health has significant benefits it still has its limitations that in time new technology developments will help overcome as the breadth of services that can be offered continues to expand.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Healthcare, and Insurance
- Lower health insurance premiums
- Quantified self and wearable technology innovations
- New business models, operating models, and products

INSURANCE INDUSTRY TRENDS

CONTENTS

... ON DEMAND INSURANCE
... PREDICTIVE INSURANCE
... SELF-INSURED ORGANISATIONS
... VEHICLE TELEMATICS

BOOK AN EXPERT CALL

WHAT IF ... WE COULD PREDICT EVERY RISK?

IN A world where insurance companies have unparalleled predictive capabilities a seismic shift in risk management emerges. Picture a future where insurers not only anticipate risks but also are able to predict and proactively prevent them, revolutionising the conventional insurance model. This transformative approach, fuelled by advanced technologies like AI Internet of Things, and sensing systems empower insurers to analyse vast datasets and identify potential risks before they materialise.

The implications of this proactive risk prevention model are profound. Individuals and businesses would benefit from enhanced security and stability in their daily lives and operations. Imagine, for example, receiving predictive tailored recommendations and interventions about your cyber security posture, your health and home, or even the environment around you. Furthermore, by preventing losses before they occur insurers can reduce claims payouts and operational costs, leading to lower premiums and improved affordability for policyholders which, in turn would increase the amount of disposable income they have to spend on other goods and services in the economy.

This shift towards proactive risk management not only promises financial benefits but also fosters a culture of safety and resilience. By leveraging technology to anticipate and mitigate risks, insurers could play a pivotal role in promoting a safer society for all. However, as with any transformative innovation, ethical considerations surrounding privacy and individual autonomy must be carefully navigated to ensure widespread acceptance and trust.

In conclusion, the prospect of insurance companies predicting and preventing all manner of risks signifies a paradigm shift in risk management and completely changes the customer experience for the better. By harnessing the power of technology, insurers offer proactive solutions that not only protect individuals and businesses from potential harm but also foster a culture of prevention and resilience. This visionary approach has the potential to reshape the insurance industry and create a safer, more secure future for generations to come.

STATS THAT MATTER

$8.4 BN

INSURETECH INVESTMENT, GLOBAL TOTAL 2022

CB INSIGHTS

$10 BN

EST. CYBERCRIME PAYOUTS, GLOBAL TOTAL 2022

FORTUNE

$2 TR

P&C INSURANCE MARKET, GLOBAL TOTAL 2022

ALLIANZ

$2.8 TR

LIFE INSURANCE MARKET, GLOBAL TOTAL 2022

ALLIANZ

311 Global Advisory Forecasting Innovation Strategy

$6.17 TRLLION

INSURANCE PREMIUM INCOME, GLOBAL TOTAL 2022

ALLIANZ

$638 BN

REINSURANCE CAPITAL ALLOCATION, GLOBAL 2022

GALLAGHER & CO

$5.5 TR

EST. INSURANCE PAYOUTS, GLOBAL TOTAL 2022

BUSINESS RESEARCH

INSURANCE

7.7 %

LIFE PREMIUMS, AVG. INCREASE, GLOBAL 2022

OECD

$125 BILLION

NATURAL DISASTER PAYOUTS, GLOBAL TOTAL 2022

SWISS RE

45 %

NATURAL DISASTER LOSSES INSURED, GLOBAL 2022

AON

ON DEMAND INSURANCE

3RD YEAR ON THE LIST



QUICK TAKE

Noone ever uses everything all of the time - not even their smartphones. But despite this, along with the fact that we use different things in different ways throughout the day, and the fact that many of our things just sit around doing nothing all day, we still pay to insure them against the worst case scenarios just in case they happen 24/7/365.

In today's on demand world though it's now easier than ever before for insurers to calculate risk, calculate premiums, and provide on demand insurance when policy holders need it, but despite this most don't still.

Data sources: Allied Market Research, KPMG, NAIC, and various.

IMPACT

Today On Demand Insurance (ODI) is a growing market segment, but it accounts for less than 1% of the global insurance market with most of the organisations who offer it being challengers rather than incumbents. However, that said as these challengers attract hefty investments and as 93% of Millennials say they'd be willing to buy ODI, provided prices don't go up, it's clear that there's a market opportunity to exploit - especially as **Digitisation** and new technologies make it increasingly feasible for organisations to offer it.

However, while this trend lets customers buy the protection they need while only paying for it when they need it it could be a long time before this trend becomes mainstream. Furthermore, the nature of it also means that customers often end up paying significantly higher premiums, albeit for a much shorter period of time, because of the higher fraud and risk profiles associated with it, and ultimately unless insurers can get the economics of this trend correct then their incentives to offer it will remain limited. But, that said though it could easily be argued that these are simply ICT and technology issues which are increasingly easy to solve and scale.

EXAMPLES

While this trend also plays into the **Predictive Insurance** and **Vehicle Telematics** trends it's clear that insurers ability to offer ODI, with just a single swipe of a smartphone screen, is becoming more feasible as different operating models and technologies mature, and while we might not see this trend become the default offering for all insurance types it looks certain that it will play a more important role - provided incumbents don't try to kill it.

The use are obvious, from being able to just turn on insurance cover for your expensive gadgets when you go out of the house, or abroad, to just being able to turn on cover for an item you've just bought from a shop by scanning the receipt, or just turning on cover for the next hour when you take your - or someone else's - car for a wild joyride.

While many challengers are finding it difficult to get traction some of the more successful ones include Sure and Travelers, who through their acquisition of Trov can now offer all manner of different on demand single item insurance propositions, including on demand trip insurance for passengers of Google's self-driving car unit Waymo.

ACT NOW

Today an organisations ability to perform micro risk assessments on customers and situations, which is a Big Data issue, in order to offer customers policies that they can turn on and off with the flick of a metaphorical button is largely a technological problem, but if organisations did want to offer it in a meaningful way and take this trend from niche to mainstream then there's no reason why they couldn't.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Computing, and Insurance
- New business models, operating models, and products

PREDICTIVE INSURANCE

3RD YEAR ON THE LIST



QUICK TAKE

As we've seen with the **Predictive Healthcare** trend it's often cheaper to predict and prevent incidents from happening in the first place - whether it's a heart attack, a burst water pipe, or a car accident. And, with the rise of **Internet of Things** (IoT), **Smart Cities**, **Smart Homes**, **Vehicle Telematics**, and other trends like **Artificial Intelligence** (AI) and **Machine Vision**, to name but a few, the ability to predict incidents before they occur is now easier than ever before, meaning that rather than having to pay out after the worst happens insurers can now pay less to prevent it.

Data sources: ABI, McKinsey, Willis Towers Watson, and various.

IMPACT

The move from reactively paying policy holders after they have had an incident to pro actively predicting it before it happens so that it can be prevented is a cultural paradigm shift for the industry that at a high level allows insurers to not only significantly improve the quality of the **Customer Experience** and reduce claim values, but also simplify claims handling and evaluation. All of which must be seen as a Win Win for everyone involved.

While this is a large trend covering a large topic area today over 65% of insurers credit predictive analytics with reducing issues and underwriting expenses, with a further 60% saying it's also helped them increase sales and profitability.

However, while these figures will undoubtedly also include back office functions such as the claims process, fraud, preventing customer churn, risk modelling, and so on, when we look at the impact of this trend on actual claim values so far it's helped reduce fleet claims by 80%, accident claim costs by 50%, and the cost of overall claims by over 30%. None of which are insignificant numbers.

EXAMPLES

While there are multiple examples of how this trend is being applied today, from health and vehicle monitoring to natural disaster preparedness and beyond, we could argue that given the market opportunity and benefits there should be many more.

At the moment notable examples of how insurers are embracing this trend include Vitality who are using **Wearable Technology** to monitor and predict people's health, and Withings whose smart home air quality monitors are helping insurers make health interventions and provide emergency intervention services before toxic gases like Carbon Monoxide reach dangerous levels in homes.

Elsewhere, other examples include home heat and humidity data to predict mould growth within homes which, asides from having an impact on their liveability and structure can also have a serious impact on health. Then there's the use of AI and other sensors, including acoustic sensors to detect the early warning signs of electrical, plumbing, and structural problems within buildings - which can be fixed before they become a real issue.

ACT NOW

The ability to predict incidents that would produce a claim before they happen and make interventions that ensure they don't happen in the first place is a game changer for the industry that has significant benefits for insurers and policy holders alike. As a consequence insurers should explore this trend further and experiment with it.

EXPLORE:

- Benefits and impact assessments
- Data analytics, capture, and modelling strategies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Computing, Healthcare, Insurance, and Transportation
- New business models, operating models, and products
- Partner ecosystems and solutions

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

SELF-INSURED ORGANISATIONS

3RD YEAR ON THE LIST



QUICK TAKE

Organisations that insure different parts of their businesses or operations themselves are nothing new, but with insurance premiums for the vast majority of businesses at all time highs, especially in the USA, and the emergence of new technologies and technology paradigms, including **Predictive Insurance**, more organisations than ever before have both the data they need and the reasons to take the leap to self-insure. From the UAE in the 1970's who insured airlines and shipping during the Iran Iraq war to Tesla, and others, this is an up ticking trend to keep on your radar.

Data sources: EBRI, Kaiser, and various.

IMPACT

While the obvious benefit of self-insuring is saving money and avoiding paying third party premiums as with everything in the insurance sector it all comes down to an organisations ability and willingness to calculate and play the odds. Get it right and there can be significant cost benefits, but miscalculate the risk and it can be catastrophic - which is where underwriting comes in. This trend is literally the concept of Risk-Return incarnate, and as more organisations own their data and offer more of their products as a service this trend will likely increase in popularity.

That said though while the concept is appealing many organisations lack the skills and tools to help them assess their risk exposure, and often under estimate the cost and effort involved in running their own programs.

Nevertheless, today it's estimated 82% of employees working for America's largest organisations, and 94 million Americans, have health insurance plans partially or fully funded by their employers - all of which is just the tip of the iceberg as organisations become increasingly data rich and open to the concept.

EXAMPLES

Today there aren't that many examples of organisations who self-insure, but the organisations who do tend to be confident in their products, data rich, tech savvy, and highly capitalised. It could also be argued that their boards favour disrupting the status quo rather than being a part of it - which then says alot about the organisations overall culture.

While countries like the UAE used the concept of self-insurance as a means to help their country prosper during the Iran Iraq war today organisations like Tesla are capturing and analysing all manner of different data sets, about their customers and products, which are so granular and detailed that it's letting them undercut traditional General Insurers motor premiums by at least 20%.

However, not just content with self-insuring their customers and products Tesla has now extended this concept further and are now providing their own Directors and Officers (D&O) liability insurance to their board members.

ACT NOW

As we enter an age where anonymity and privacy are a thing of the past, and where everything is smart and connected, and captures and streams data that can be analysed in real time by increasingly sophisticated algorithms, more organisations will have the opportunity to self-insure, but doing so will require the right mix of culture, risk appetite, and technology. However, if all these align then in time there is no reason why organisations couldn't insure themselves against any form of liability or risk.

EXPLORE:

- Business and impact assessments
- Data analytics, capture, and modelling strategies
- Emerging technologies and technology roadmaps
- Future of Insurance
- New business models, operating models, and products
- Predictive insurance models

VEHICLE TELEMATICS

3RD YEAR ON THE LIST



QUICK TAKE

Telematics, or Usage Based Insurance (UBI), is where your car insurance provider monitors your driving habits and adjusts your car insurance premiums based on how you drive, hence the term "Pay how you drive," and it's been around since 2009 with the vast majority of insurers offering it as a Black Box installation in your vehicle or via an app on your smartphone. While telematics has been around for over a decade now though overall adoption in the top five markets remains very low at between 4% to 20% with most customers either being younger drivers, high risk groups, or fleet customers.

Data sources: ABI, GSMA, McKinsey, and various.

IMPACT

By 2030 it's estimated that the global telematics value pool could be $750 Billion even though overall market adoption rates remain low at, in most cases, well below 20%, with some of this value coming from governments increasing willingness to mandate specific telematics services such as emergency call capabilities, as we're already seeing in both the EU and Russia.

However, while telematics adoption remains low, which will have an impact on insurers overall ability to play a significant role in helping influence and optimise traffic flows within Smart Cities, the trend offers insurers the ability to reduce the number of fraudulent claims, as well as offer Usage Based Insurance (UBI) policies, micro policies, real time dynamic pricing, and other complimentary services for both regular consumers and fleet customers.

Done right though telematics offers insurers a unique opportunity to extend the services they offer their customers and capture more hare of wallet outside of their traditional core business areas.

EXAMPLES

Using even the most basic of connectivity and data collection technologies there is a huge amount of valuable data and insights that organisations can pull from a telematics service which can then be used to influence driver behaviours, improve productivity and safety, and reduce costs, criminality, fraud, pollution, and the risk of reputational damage.

While there are many examples, such as LV= and MoreThan who offer telematics solutions in the UK, and Carrot's rewards based telematics solutions, some of the more disruptive and interesting - from a traditional standpoint at least - are organisations such as ByMiles who offer Pay as you Drive (PAYD) policies that only charge customers for the miles they drive - bearing in mind that for over 95% of the time most consumer vehicles are on the driveway anyway.

However, while we could fill a codex all by itself of the organisations offering some kind of telematics product very few have ventured out of their comfort zone to offer truly valuable or complimentary services that help them take a greater share of customer wallet.

ACT NOW

While telematics has a variety of benefits, for both customers and insurers, the real benefit, which most insurers aren't capitalising on, is the ability to use it as a platform to engage with and learn more about their customers, sell them more, and therefore play a more central role in their lives - thereby moving away from the industry's perception of being little more than a have-to-have grudge purchase.

EXPLORE:

- Business and impact assessments
- Data analytics, capture, and modelling strategies
- Emerging technologies and technology roadmaps
- Future of Insurance
- New business models, operating models, and products
- Partner ecosystems and solutions

LOGISTICS INDUSTRY TRENDS

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BOOK AN EXPERT CALL

WHAT IF ... OUR DELIVERIES ARRIVED IN MINUTES?

IN THE world of logistics envisioning a future where everything is delivered efficiently and cheaply within minutes of being ordered is nothing short of revolutionary. Picture a world where drones zip through the skies like clockwork, dropping off packages at your doorstep mere minutes after you place an order. At the core of this vision are cutting-edge technologies like drones and autonomous robotic warehouse systems.

Equipped with advanced sensors and navigation capabilities, drones navigate bustling city streets and suburban neighbourhoods with ease, delivering goods at lightning speed. Meanwhile, inside dark warehouses, robotic picking and fulfillment systems work tirelessly to locate, pack, and prepare orders for delivery in record time.

The implications of this rapid delivery revolution are immense. Businesses gain a competitive edge by offering lightning-fast shipping options, meeting consumer expectations for instant gratification and convenience. With reduced transit times and overhead costs, companies can operate more efficiently, ultimately passing on the savings to customers.

However, this future isn't without its challenges. Regulatory hurdles, safety concerns, and airspace management are all significant obstacles that must be overcome. Yet, the potential benefits of ultra-fast and affordable local delivery are too great to ignore. From revolutionising E-Commerce to streamlining last-mile logistics, this future scenario promises to reshape the way we move goods around urban and suburban areas.

In conclusion, the dream of near-instantaneous and cost-effective local delivery is within reach. By harnessing the power of emerging technologies like drones and autonomous robotic warehouse systems we can create a future where speed and efficiency are the norm, and the possibilities are limitless. It's time to embrace the future of local logistics and unlock a new era of convenience and accessibility for all.

STATS THAT MATTER

2.4 DAYS

GOODS DWELL TIME, AVG. AIRPORT, GLOBAL 2023

CARGOIQ

4.8 DAYS

CONTAINER DWELL TIME, AVG. PORT, GLOBAL 2023

WORLD BANK

68 ML

AIR CARGO VOLUME, TONNES, GLOBAL 2022

STATISTA

10.8 BN

SHIP CARGO VOLUMES, TONNES, GLOBAL 2022

RESEARCH & MARKETS

311 Global Advisory Forecasting Innovation Strategy

25 BILLION SQ FT

WAREHOUSE CAPACITY, GLOBAL TOTAL 2023

AJOT

$10.6 TR

INDUSTRY MARKET SIZE, GLOBAL TOTAL 2022

RESEARCH & MARKETS

70 %

PORT DIGITISATION, AVG. REDUCTION IN DELAYS

WORLD BANK

LOGISTICS

$3.4 KG

AIR FREIGHT COST PER KG, GLOBAL AVG. 2022

WORLD BANK

185 BILLION

PARCEL SHIPPING VOLUME, GLOBAL TOTAL 2023

STATISTA

44 DAYS

CONTAINER TRANSIT TIME, GLOBAL AVG. 2023

WORLD BANK

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

AUTONOMOUS LAST MILE DELIVERIES

3RD YEAR ON THE LIST



Continental's curbside Robo-Dogs

QUICK TAKE

In order to reduce costs and improve efficiencies the logistics industry have been deploying and experimenting with **Autonomous Vehicles** for some time now. But, in order to realise their ambitions of a fully autonomous logistics chain one major obstacle remains - how to conquer the problem of getting goods the last mile to the customer. Whether they're in suburbia or on the 80th floor of a tower block. **Drone Deliveries**, where the drones are embedded into the structure of the delivery vehicles, is one way to solve the problem. But there are other innovative approaches being developed too - such as Robo-Dogs.

Data sources: SOTI, and various.

IMPACT

With consumers all around the world buying trillions of dollars worth of goods from E-Commerce marketplaces and **Gig Economy** platforms every year, and with there being no signs of this trend slowing down - especially after a 40% increase during the 2020 Global Pandemic - 61% of logistics organisations agree that last mile delivery is the most inefficient process in the entire supply chain.

Furthermore, with 56% of US shoppers, for example, saying they wouldn't buy from a store again if they were unsatisfied with the delivery experience, and 37% going as far as blaming the stores themselves for tardy deliveries, it's easy to see how getting the accuracy and timeliness of this crucial service right.

From an operators perspective up to 28% of the delivery cost can be associated with the last mile which is why trying to optimise it is of such importance, and with new autonomous and robotic technologies coming online, as well as **Artificial Intelligence** (AI) and **Quantum Technologies** which can be used to optimise it, there's a chance they might just move the dial.

EXAMPLES

One of the greatest challenges, arguably, of automating the last mile is the fact that solutions must be able to handle a variety of different tasks and environments, from being able to deliver a large odd shaped package to a residential neighbourhood, as well as groceries and a Pizza to the 80th floor of a high rise - which is a problem for operators in cities such as Dubai, Hong Kong, London, and New York.

From Starship's autonomous trundling boxes on wheels that use LiDAR to weave their way through busy streets to deliver pizza to hungry workers though to UPS's van integrated Workhorse Drones that let drivers deliver packages in one place while the drones deliver packages in another, there are solutions.

Then, we have the likes of 7Eleven, Amazon, and Zipline who are also leaning heavily on drones with the first two using them to deliver groceries, and the latter using them to deliver vital medical supplies across Africa. And then, of course, there are stair climbing street strutting Robo-Dogs which are perhaps the coolest of them all ...

ACT NOW

It will take a long time before everything we order online is delivered by some form of autonomous delivery system because organisations are still trying to find that magic formula which less them balance accuracy, cost, and timeliness with the real world of affordability, liability, and simplicity. After all, no customer wants a drone in the face, or to have their neighbourhood power grid taken out by a drone that carelessly flew into a pylon. That said though as the technologies improve the day will come.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Energy, Retail, Sensors, and Transportation
- Legal, liability, and risk due diligence
- Partner ecosystems and solutions
- Urban planning

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

CONTROL TOWERS

3RD YEAR ON THE LIST



QUICK TAKE

A connected, personalised dashboard of data, key business metrics, and events across a logistics network Control Towers offer organisations a way to see, analyse, and respond to critical issues and events that can affect their business and their customers businesses. When combined with other trends such as **Artificial Intelligence** (AI), **Blockchain**, **Digital Twins**, **Internet of Things** (IoT), and **Robotic Process Automation** (RPA), among others, they help organisations improve collaboration, communications, costs, customer expectations, efficiency, resilience, and sustainability metrics.

Data sources: Accenture, IBM, SupplyOn, Xometry, and various.

IMPACT

It can be argued that ultimately the end goal of this trend is to first help organisations gain accurate, real time end to end visibility of their logistics, then eventually automate them and enable continuous, autonomous, intelligent optimisation.

While there are many benefits, such as real time order planning and being able to notify customers in advance about delays or spikes in demand, studies have shown that organisations who've embraced this trend have reduced their overall logistics operating costs by as much as 15% while at the same time growing revenues and realising greater operational efficiency and flexibility.

All of which is before we discuss the impact this trend has on asset and inventory management and tracking, product costs and sourcing, sustainability, and other metrics including the benefit of having a single source of the truth and the data to allow stakeholders to conduct real time risk and scenario modelling and therefore make better informed decisions, which can then have a big impact on the organisations overall financial performance and customer satisfaction.

EXAMPLES

One of the most notable examples is Bosch who, by incorporating governance and flexible technology architectures into one unified cloud platform, are now using just a single control tower to manage the logistics for more than 85% of their $40 Bn global supply chain volumes, which equates to over 300 Million components a day shipping to more than 270 manufacturing facilities around the world. Furthermore, with over 37,000 staff accessing the system not only does Bosch believe it gives them a strategic advantage in the market, but they're now planning the next step which will be to extend access to the platform to their key suppliers so they can see the organisations manufacturing needs in real time - thereby further optimising their logistics networks and lowering acquisition and shipping costs and emissions.

Elsewhere another notable example is Airbus who interestingly call this trend the "Heartbeat of their operation" and who use it co-ordinate the logistics of more than 24,000 suppliers from over 100 countries, and who so far have used it to save themselves over 357 Million kilometers of transport.

ACT NOW

The ability to digitise and then visualise and intelligently and autonomously analyse every aspect of a logistics operation gives organisations a strategic advantage over their peers, but it's a difficult and expensive undertaking which needs approval from multiple stakeholders and this is where most of these initiatives either fall flat or end up only partly implemented with the result being that they sometimes fail to live up to their promise. As a result it's important to realise that if you embrace this trend you need to go all in.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Logistics, Manufacturing, Supply Chains, Retail, Transportation, and Work
- New business and operating models
- Partner ecosystems and solutions

DARK WAREHOUSES

3RD YEAR ON THE LIST



QUICK TAKE

Dark Warehouses, like **Dark Factories**, **Dark Stores**, and **Dark Restaurants**, are fully automated warehouses that operate 24/7 without the need for heat or people, or the need for any human involvement whatsoever. They're also becoming increasingly common and sophisticated as **E-Commerce**, **Just In Time Manufacturing**, and other trends become increasingly popular and as operators everywhere look for new ways to improve inventory management and fulfilment, and reduce costs, while at the same time improving operational agility and flexibility.

Data sources: Amazon, Kion, Ocado, Toyota, and various.

IMPACT

In today's world dark warehouses have a lot of advantages over traditional ones, especially given the fact that in time they'll compliment the **Autonomous Vehicles** and **Autonomous Last Mile Delivery** trends, among others. Not only do they occupy up to 50% less space because they don't need wide aisles for human-driven forklifts or break out rooms, or require expensive HVAC systems, but the warehouse robots they rely on generate fewer errors and can also use retrieval systems with bins stacked much higher than typical fulfilment centers.

Furthermore, using advanced **Artificial Intelligence** (AI) and **Machine Vision** these robots can also unload pallets, pick items, and place them on high speed conveyor belt systems at least 30% faster than human workers - and that rate is increasing. Collectively not only does this mean that the cost of operation can be up to 50% less than traditional warehouses, but it also means that their overall output is much higher. However, all that said the cost of the technology required to operate them, such as expensive ASRS and WMS systems is still high, but in time those costs will decrease.

EXAMPLES

Today it's easy to argue that every organisation is a technology company, and increasingly these organisations are all trying to develop their own technology stacks and platforms that they can sell to other operators.

A good example of this is Ocado, a UK based grocery retailer who through the years have worked hard to build "The Grid" - a giant chessboard like warehouse structure populated entirely by robots that scuttle backwards and forwards night and day autonomously picking groceries. Processing over 3.5 Million items and over 65,000 orders a week this single grid is seen by many as the future of dark warehouses, and organisations like Coles, Kroger, Morrisons, and others are buying in.

Elsewhere ever the innovator Amazon has also been busy developing its own dark warehouses, but in their case they believe that it will take them ten years to create fully automated warehouses that don't have any people present, which in part is because of the massive variety of stock they have to handle and ship and the volumes they need to manage.

ACT NOW

As a trend we can argue that dark warehouses are still in their infancy, but the momentum is accelerating as the technologies they're based on improve rapidly and as costs fall, all of which means that it won't be long until more organisations start experimenting with the trend and deploying them at scale.

EXPLORE:

- Business and impact assessments
- Best practises and case studies
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Manufacturing, Logistics, Retail, Robotics, and the Workforce
- Partner ecosystems and solutions
- New business and operating models

DRONE DELIVERIES

3RD YEAR ON THE LIST



QUICK TAKE

Many organisations have been trialling Drone Deliveries as a way to improve the cost and efficiency of their supply chain operations, and as part of their **Autonomous Last Mile Deliveries** initiatives. And in some cases they've worked and in others they've flopped. But the deployments and experiments continue.

In some respects drone deliveries are technologically premature - after all most drones have small load carrying capabilities, range issues, short flight times, and are still rather "dumb." But, solutions are coming.

Data sources: R&M, UPS, and various.

IMPACT

While drone delivery services can have a dramatic impact on delivery times as well as the sustainability of those deliveries today they represent a very small percentage of deliveries. So small in fact that it looks like a rounding error.

However, by 2025 the market is expected to reach $4.4 Billion and grow at 45% CAGR. And, while this might at first look promising, it's worth noting that a lot of this growth will be from organisations who are using drones to deliver goods to hard to reach locations where traditional last mile delivery options are either non existent or expensive.

When we look at the use of drones in more suburban or urban use cases today it costs UPS an estimated $12.92 per drone delivery versus a traditional cost of just $2, and while this will fall exponentially as drone technologies improve and as operators find optimal ways to integrate them into their operations it is clear that there is still work to be done. And that's before we discuss the city or country level need for new micro **Urban Airspace Management Systems** and associated regulations.

EXAMPLES

When it comes to trying to make drone delivery a viable and, just as importantly, a liability free reality operators need to rely on a range of technological innovations. These include, but are not limited to, more energy dense power systems, such as Hydrogen, or LiON batteries that can be wirelessly charged, and they also need upgrades in the **Artificial Intelligence** (AI), **Machine Vision**, and sensing departments that let them see and autonomously avoid and manoeuvre around any and all obstacles - including balconies, porches, power lines, and washing lines. Get these right and then the problems the industry face are more operational than technological.

While many organisations have trialled drone deliveries most of the suburban and urban experiments so far have been just that and have mostly been wrapped up. So far the best results have been from organisations using drones to deliver goods to hard to reach rural locations, or in urban locations where the delivery of goods, such as heart defibrillators or supplies of human blood, are time critical. That said there's no doubt drones will have their day ...

ACT NOW

While the drone delivery industry is still young technological advances in the coming years will make it a much more attractive and viable commercial proposition, and in the short to medium term drones will be best suited to fulfilling niche delivery roles and complimenting existing operational strategies.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Drones, and Energy
- Partner ecosystems and solutions
- Urban airspace management

MANUFACTURING INDUSTRY TRENDS

CONTENTS

... ADDITIVE MANUFACTURING
... CUSTOMISATION
... DARK FACTORIES
... FACTORY DIGITAL TWINS

BOOK AN EXPERT CALL

WHAT IF ... FACTORIES WERE FULLY AUTOMATED?

IN THE world of manufacturing full automation has been a long term goal for many decades and now it's a reality, and at its core the shift towards automation represents a fundamental redefinition of the manufacturing landscape. By leveraging advanced technologies such as AI and robotics companies are now transforming traditional production methods, driving efficiency and productivity to unprecedented heights.

One of the key drivers behind the push for automation is the potential to streamline operations and reduce costs. By replacing manual labour with automated systems, manufacturers can minimise human error, optimise production schedules, and ultimately enhance their competitiveness in the global market.

Furthermore, automation holds the promise of fostering sustainability within the manufacturing sector. Automated processes are inherently more resource-efficient, leading to reductions in waste, energy consumption, and environmental impact. As the world grapples with pressing environmental challenges, such as climate change and resource depletion, the adoption of automated manufacturing technologies offers a compelling path towards a more sustainable future.

However, realising the full potential of automated manufacturing requires strategic investments in technology, education, and workforce development. Policymakers must also play a crucial role in creating an enabling regulatory environment that encourages innovation while safeguarding workers' rights and promoting equitable access to opportunities.

In conclusion, the transition towards fully automated manufacturing represents a transformative opportunity for the industry. By embracing automation, companies can unlock new levels of efficiency, productivity, and sustainability, paving the way for a brighter and more prosperous future.

STATS THAT MATTER

7 %

PCT. OF MANUFACTURING THAT'S LABOUR INTENSIVE

MCKINSEY & CO

22 %

PCT. OF MANUFACTURING THAT'S ENERGY INTENSIVE

MCKINSEY & CO

106

CARS MADE PER MINUTE, GLOBAL AVG. 2023

AUTO DEALER

70 ML

WORLDS BIGGEST FACTORY, SQ FT, VW GERMANY

VW



$16.3 TRILLION

VALUE ADDED MANUFACTURING OUTPUT, GLOBAL TOTAL 2022

AJOT

28 %

CHINA, PCT. OF TOTAL GLOBAL OUTPUT, 2022

WORLD BANK

570 K

INDUSTRIAL ROBOTS SOLD, GLOBAL TOTAL 2022

IFR

MANUFACTURING

42 %

ENERGY USE, PCT. OF GLOBAL TOTAL 2022

IEA

464 MILLION

PEOPLE EMPLOYED IN SECTOR, GLOBAL 2022

MCKINZIE & CO

60 %

SECTOR R&D ACTIVITY, PCT. GLOBAL TOTAL, 2022

WORLD BANK

ADDITIVE MANUFACTURING

3RD YEAR ON THE LIST



Designed by AI and 3D Printed, Under Armour

QUICK TAKE

Additive Manufacturing, which has many alternative names including, but not limited to, 3D or 4D Printing - both of which then have their own distinct subsets - has been around since the 1980's but it's only, thanks to technology advances, that it's starting to make its mark on the world.

By giving people the ability to print all kinds of products on demand - from aircraft engines and human organs to clothing and electronics - this trend is altering global politics, disrupting global supply chains, and giving organisations new sustainable business opportunities.

Data sources: Carbon, United Nations, Stratasys, and various.

IMPACT

In time this trend will dominate the global manufacturing landscape and it's difficult to see why the vast majority of products won't be manufactured in this way - especially as we continue to see significant technological progress being made in the field. The ability to print products on demand has wide ranging consequences.

Organisations can print products locally on demand after they've been purchased thus eliminating the need to predict and hold inventory, and because products can be manufactured locally complex global supply chains and logistics can be collapsed or eliminated altogether. And then there's the ability to produce tailored goods in small batches which would have been previously uneconomically viable. Furthermore, materials use and wastage can be reduced by upto 80%.

However, with over 28% of all goods being made in China and 16% in the USA this trend also has the opportunity to shift the balance of global power, impact GDP and re-distribute wealth, and exponentially accelerate product prototyping and development - all for starters.

EXAMPLES

Today there are plenty of examples of Additive Manufacturing in action - whether it's fashion designers in Miami 3D printing distinctive fashion lines, or Adidas and Under Armour printing off tens of millions of sneakers in the backs of their stores - which no longer need to be made or imported from China. Or held in inventory ...

But that's just part of the story. As the trend has matured and as investment and R&D continues to pour in it's now possible to print enterprise grade products on demand, such as aerospace components and aircraft and rocket engines.

In short, in time, if it can be manufactured it'll likely be 3D or 4D printed - whether that's your gadgets and smart devices, the products you buy on a daily basis, your food, your furniture, your vehicles, or a million other things besides. Even human organs are being printed today - from bone and cartilage to hearts and kidneys ... This is a trend that knows no bounds.

ACT NOW

Once you've printed a product on demand you'll never go back, and you'll be hard pressed not to realise the benefits this trend has on your organisations business models, ESG metrics, finances, operations, and profits. However, there is still some way to go before this trend is fully commercialised, mature, and scalable.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Manufacturing and Materials
- New business models, operating models, and products
- Partner ecosystems and solutions

CUSTOMISATION

3RD YEAR ON THE LIST



QUICK TAKE

With more than 70% of consumers wanting personalised products, and with the trend commanding a premium in the market, Customisation is arguably one of the hottest **E-Commerce** and manufacturing trends. Furthermore, with technologies such as **5G**, **Additive Manufacturing**, **Artificial Intelligence** (AI), **Internet of Things** (IoT), networked production, and **Robotics**, it's becoming increasingly feasible and economically viable for factories to handle customisation requests quickly and efficiently at scale without the need to constantly reconfigure their systems.

Data sources: Deloitte, McKinsey, and various.

IMPACT

The ability for customers to literally break the mould and create and design their own personalised products is arguably the pinnacle of manufacturing but up until recently doing small customised runs of tailored products has been difficult and expensive for manufacturers to do. So much so that in many cases it's just not on the table as an option. Today though new Industry 4.0 technologies not just make this service increasingly feasible but they also make it economically attractive and viable.

Across all sectors it's estimated that customisation could add at least an extra $1 Trillion in revenues in the US alone, with that impact obviously multiplied globally, and that organisations that do customisation well generate 40 % more revenues from it than their peers. Also, at a high level it's an increasingly attractive way for brands to improve the Customer Experience and build brand loyalty with 76% of customers more likely to buy from a brand that offers customisation and over 80% of them likely to repurchase and recommend family and friends - provided of course that their experience is a good one.

EXAMPLES

New examples are emerging all the time as organisations across sectors embrace this trends potential, from brands such as Oreo who let consumers customise and create their own cookies, to the likes of the NFL who offer tailored 3D printed football helmets, to Nike who via their NikeiD service offer customers the opportunity to personalise their shoes in lots of different ways.

At the more niche end of the customisation market we also see organisations like MINI offering all manner of customisation options for their cars, and brands such as Sculpteo and Sonova using 3D printing and the trend to let customers create their own custom earbuds and hearing aids fitted to their exact ear shape and size.

However, we also see others such as Amazon and JD.com in the E-Commerce space, investing heavily in the technologies in this field and it's also increasingly likely that in time they will leverage this trend, along with the **Autonomous Retailers** and **Digitisation** trends, to disrupt the retail market all over again while, in their case, offering goods on demand and reaping higher profits.

ACT NOW

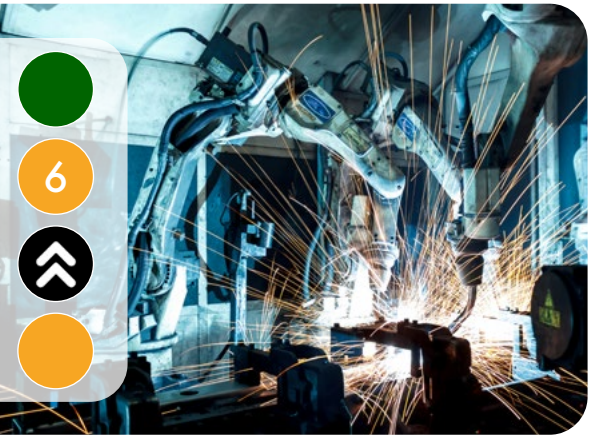
Customisation at speed and scale has always been difficult but now new manufacturing processes and technologies are making it more viable than ever. As a result not only can organisations use this trend to improve the customer experience and increase customer loyalty but, in a rare triple win, they can also use it to command premiums in the market and realise higher profit margins.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Manufacturing, and Robotics
- New business models, operating models, and products
- Product development and innovation

DARK FACTORIES

3RD YEAR ON THE LIST



QUICK TAKE

Developing **Dark Factories**, where fully automated factories manufacture products without any human involvement, have been an ambition of the sector for quite some time now especially for organisations based out of Asia where the competition to manufacture products for the lowest cost is both intense and a competitive advantage.

Despite this though so far even some of the world's largest manufacturers have struggled to create dark factories which, while being a benefit for them, has serious implications for the workforce.

Data sources: McKinsey, Odgers, Siemens, WEF, and various.

IMPACT

While many organisations have been pinning their hopes on Industry 4.0 to help them develop dark factories the fact of the matter is that we need several technological leaps in **Additive Manufacturing**, **Artificial Intelligence** (AI), control systems, **Factory Digital Twins**, **Machine Vision**, networks, **Robotic Process Automation** (RPA) and **Robotics**, and others to make them happen - leaps that are now happening.

While it might seem like most manufacturing has already been automated the actual global robot to human worker ratio is very low even in China where it's just 30 robots per10,000 workers. However, with many in the sector citing their ability to hire workers as a major concern, with over 2.5 Million jobs going unfilled in the last decade with an economic impact of more than $2.5 Trillion, it's inevitable this ratio will increase as technologies mature. Despite their challenges though the appeal of dark factories to improve product quality and inventory cycle time, increase productivity and reliability, and reduce production costs, mean that this trend is on the ascent.

EXAMPLES

While there have been many attempts in the past to create dark factories, with the first proof of concept being run in a flour mill in the US in 1784, the majority have failed, and while there are many reasons for this, such as costs and maintenance issues, many of the organisations trying to shift to this new operating model keep coming to two main conclusions - that manufacturing is complex, and automation is inflexible.

Even though many people believe manufacturing is dull and repetitive in reality manual assembly especially requires an enormous amount of precision and skill that up until recently even the most sophisticated algorithms and robots couldn't match.

Despite this though there are examples such as FANUC, a Japanese robotics company where robots build new robots in lights out mode for up to 600 hours at a time with no humans involved, and then there's Philips in Denmark who are using dark factories to manufacture their electric razors. Then, at the top of the pile there's manufacturing giant Foxconn with more than 40,000 "Foxbots" operating in lights out mode to produce more than 10,000 new robots a year.

ACT NOW

With double digit improvements in inventory cycle times, cost-productivity, and reliability, there are clearly many reasons why organisations should be interested in this trend, and when one manufacturer manages to completely automate factories that were hitherto too difficult to automate at scale then the flood gates will open and the transition will begin. It's also likely that the adoption of this trend could be accelerated by **Flattening Supply Chains**, the trend of making products simpler and with fewer components.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Manufacturing, Materials, Robotics, and Work
- New business and operating models
- Partner ecosystems and solutions

FACTORY DIGITAL TWINS

3RD YEAR ON THE LIST



A Factory Digital Twin, BMW

QUICK TAKE

Factory Digital Twins are near prefect digital replicas of factories that have either already been built, or are yet to be built.

As the technologies used to create them become increasingly powerful these twins are able to replicate and simulate every conceivable factory detail - from the laws of nature and physics, to the factory's assets, equipment, machines, and processes, right through to the actions and behaviours of the human workers themselves. They also play an integral role in enabling the **Continuous Innovation** trend.

Data sources: Deloitte, Gartner, PTC, Siemens, and various.

IMPACT

Factory digital twins give organisations the ability to model, analyse, test, and predict every aspect of a factory's operations in granular detail - even before they've been built - and this has many commercial, operational, and procedural benefits.

However, while there are obvious advantages to being able to analyse how a factory is operating, or will operate in the future, so that its operations can be optimised there are many other benefits too.

Benefits that include everything from the factory's ability to predict and fix failures autonomously, all the way through their ability to intelligently simulate the optimal way to manufacture new product concepts before they're made for real. And that's before we discuss the usefulness of being able to analyse and extrapolate factory trends, or quiz it using nothing more than natural language.

As a result of these and other benefits this trend is estimated to grow at 16% CAGR and reach a market size of over $1.3 Trillion by 2030.

EXAMPLES

While many organisations talk about the benefits of Industry 4.0 it can be argued that factory digital twins are the next evolutionary step of that trend. But, building twins that can simulate everything found in a physical factory - from the effect of gravity on the machines and the arcs of the robots to the workflows and beyond - is incredibly difficult. Yet, despite this, several organisations have achieved it and reaping the benefits.

This includes BMW who partnered with Nvidia and Siemens and built a digital twin of a new factory before it was built so they could test every aspect of it, right down to how the human employees would interact with the machines, before they finally sent in the construction crews to break ground.

As twins technologies improve it won't be long until they're accurate down to the photon level - as we've already seen with Nvidia's own Virtual Reality HQ in the USA - and in time they will become an increasingly important tool used by Artificial Intelligence (AI) itself which, as people do today, will use them to analyse, automate, monitor, and optimise factory operations in real time.

ACT NOW

Factory digital twins have benefits that go far beyond the obvious, and they will play an increasingly important role in the future of the industry - whether it's increasing manufacturing profitability and speed or accelerating the industry's overall rate of innovation.

EXPLORE:

- Business and impact assessments
- Data ownership strategies
- Emerging technologies and technology roadmaps
- Future of Manufacturing
- New business models, operating models, and products
- Partner ecosystems and solutions

MARITIME INDUSTRY TRENDS

CONTENTS

... AUTONOMOUS SHIPS
... SHIP SCRAPPING

BOOK AN EXPERT CALL

WHAT IF ... DRONE CARGO FLEETS WERE THE NORM?

IN THE ever-evolving landscape of global shipping, a new chapter is unfolding with the rise of autonomous drone fleets. Backed by cutting-edge technology and recent research breakthroughs, these unmanned vessels are poised to revolutionise the maritime industry and global supply chains in unprecedented ways with recent studies indicating that autonomous drone fleets have the potential to significantly enhance efficiency and cost-effectiveness in global shipping. According to industry experts, the implementation of drone fleets could reduce transportation costs by up to 20%, leading to savings of billions of dollars annually.

Moreover, autonomous drones offer unparalleled speed and reliability in cargo transportation. Research findings suggest that these unmanned vessels can navigate shipping routes up to 30% faster than traditional vessels, resulting in quicker delivery times and improved customer satisfaction.

Furthermore, the environmental benefits of autonomous drone fleets cannot be overstated. With reduced fuel consumption and emissions, these vessels contribute to a more sustainable shipping industry, aligning with global efforts to combat climate change and reduce carbon footprints.

As research continues to advance, the potential applications of autonomous drone fleets in global shipping are limitless. From optimising supply chain logistics to aiding just in time delivery and better inventory management, these unmanned vessels represent a paradigm shift towards a more efficient, sustainable, and interconnected global shipping network.

In conclusion, the advent of autonomous drone fleets heralds a new era in global shipping. With their unprecedented speed, efficiency, and environmental benefits, these unmanned vessels are poised to redefine the future of maritime transportation, driving innovation and progress on a global scale.

STATS THAT MATTER

90 %

SHIPS BUILT IN ASIA, PCT. GLOBAL TOTAL 2022

CLARKSONS

230

SHIPS SCRAPPED, GLOBAL TOTAL 2019

HELLENIC

1,031

NEW CONTAINER SHIP ORDERS, GLOBAL 2022

STATISTA

40 ML TEU

BUSIEST PORT BY CAPACITY, SHANGHAI

WSC

311 Global Advisory Forecasting Innovation Strategy

1.95 BILLION TONNES

SHIPPING VOLUME, GLOBAL TOTAL 2022

STATISTA

$1.3 TR

VALUE OF THE GLOBAL SHIPPING FLEET, 2022

CLARKSONS

2.3 BN

DWT OF THE GLOBAL SHIPPING FLEET, 2022

CLARKSONS

MARITIME

30 ML

CRUISE PASSENGERS, GLOBAL TOTAL 2022

CLIA

50,000

SIZE OF MERCHANT FLEET, GLOBAL TOTAL 2023

UNCTAD

21

SHIP AGE, ALL SHIPS, GLOBAL AVG. 2022

UNCTAD

AUTONOMOUS SHIPS

3RD YEAR ON THE LIST



QUICK TAKE

While many in the industry are looking to an era where the seas are ploughed by platoons of Autonomous Ships the reality is we'll first have to endure a transition phase - first to drone or tele-operated shipping, and then to autonomous shipping. Not only will this transition take at least a decade or more, even though the world's first autonomous ships have already arrived, but it will require a fundamental re-writing of maritime legislation, and bring with it both benefits and dangers that include everything from improved operating efficiency to the threat of damaging cyber attacks.

Data sources: Various.

IMPACT

Just as we have seen elsewhere the impact of autonomous ships will be both broad and varied. While it is expected that the market will be worth $166 Billion by 2030, and that by 2040 50% of ships will be autonomous, it's also expected that they will be able to reduce the overall operator costs by at least 30% - through the combination of reducing fuel use and the elimination of crews - and that they could increase global shipping volumes by at least 30%, as well as allow fleets to be made up of smaller, lighter, more energy efficient vessels.

There will be a human cost though. On the one hand these ships will no longer need crews, which will both eliminate human error which accounts for 70% of all accidents, as well as Health and Safety liabilities, but on the other at any one point in time there are over 100,000 manned ships ploughing the seas and automation will have a devastating impact on the people who rely on the industry for their income and livelihoods. However, while there will undoubtedly be redundancies there will also be the opportunity for some crew members to re-trained to fulfil higher duty roles, such as tele-operator roles.

EXAMPLES

Following on from developments in the **Autonomous Vehicles** space autonomous vessels have been on the radar of shipping companies for some time now with the International Maritime Organization (IMO) working diligently since 2017 to ensure the safe and clean transition to what they call Maritime Autonomous Surface Ships (MASS), with some of their first frameworks being published in 2018.

While organisations such as Rolls Royce have been working on autonomous control, remote command, and intelligent crew systems for several years now, with an eye on full automation in the near future, elsewhere organisations such as Yara, in Norway, and Nippon, in Japan, have gone several steps further and already performed the first commercial sea trials of autonomous cargo ships with the first deployments slated for 2025.

ACT NOW

The automation of the industry is a matter of when, not if, and as a consequence owners and operators should be prepared as autonomous ships and **Autonomous Ports** become more commonplace over time.

EXPLORE:

- Autonomous operations and new business models
- Business, cyber, and assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Maritime, Security, Transport, and the Workplace and Workforce
- IMO MASS Regulations
- Policy and regulation reform
- Re-education and re-training initiatives

SHIP SCRAPPING

3RD YEAR ON THE LIST



QUICK TAKE

Ships are always being scrapped as new more cost effective ones enter service, but during the global pandemic we saw a rapid rise in the number of ships being scrapped with many breakers yards in Greece, India, and Turkey filling up quickly.

We also saw a dramatic decrease in ships scrap value which saw some breakers rates, which are normally in the $280 to $400 range, drop as low as $80 per ton - especially in the case of ships registered in the EU and at yards subject to stringent EU regulations. Post pandemic, however, prices rebounded.

IMPACT

Since 2016 the average age at which a ship is scrapped has increased from 23 to 27 years, and now that de-carbonising the global shipping fleet by at least 40% by 2030, and then by 70% or more by 2050, is one of the industry's top priorities it's estimated that by 2026 the industry will have to spend over $317 Billion to green the fleet - $235 Billion to build new ships and $114 Billion to retrofit existing ships.

As a consequence, and with the cost of retrofitting some ships, such as a 24,000 TEU cargo ship, costing upwards of $25 Million to convert to LNG fuel, for example, scrappage could become a more attractive commercial proposition in the years ahead - especially as governments, such as the EU, take a tougher stance against "polluters."

While 2020 itself was an exceptional year, with a 33% increase on 2019, in 2021 there was a further 40% increase in the number of scrapped ships, with over 630, amounting to 17.4 Million DWT, going to the breakers. However, while some of this increase was due to the pandemic some of it was also due to record high steel prices which surpassed $754 per lightweight tonne.

EXAMPLES

In order to meet the International Maritime Organization (IMO) and the industry's **Net Zero Pledges** by 2050 it's imperative that new net zero emissions ships start entering the fleet from 2030 at the latest. But, while achieving the IMO's emissions goals is one thing, there are many that continue to question the environmental and social cost of organisations using beaching yards, such as those in Bangladesh, India, and Pakistan, which on average still dismantle an estimated 90% of all the world's ships in what many describe as deadly, dire, and toxic conditions.

On average a typical 5,000 ton ship can be dismantled in a month - with larger ships taking up to a year or more - with subcontractors first stripping out all the loose and flammable items. After that cutting crews start dismantling the hull, stern first, while other crews remove everything else, including heavy metals, toxic materials, and other materials.

ACT NOW

Over the next decade almost all the world's ships will have to either be scrapped or retrofitted, and with 90% of that likely to be done by beaching yards it could be argued that the cure might be worse than the disease. As a result, ship designers should give more thought to the recyclability of their ships, and owners should do their utmost to limit the damage that scrapping ships can cause.

EXPLORE:

- Emerging technologies and technology roadmaps
- Hong Kong Convention
- Future of Energy and Manufacturing
- Sustainable ship design
- Unilateral global accords and coordinated global action

Data sources: BIMCO, GMS Leadership, IMO, MDPI, UNCTAD, and various.

MEDIA AND ENTERTAINMENT TRENDS

CONTENTS

... DIGITAL HUMANS
... OVER THE TOP CONTENT
... SYNTHETIC CONTENT
... VIRTUAL FILM PRODUCTION

BOOK AN EXPERT CALL

WHAT IF ... ALL CONTENT WAS AI GENERATED?

IN A a future where AI becomes the primary creator of content, the emergence of procedural AI-generated content stands out as a transformative force. With algorithms capable of generating vast volumes of content at unprecedented speeds, the potential benefits and challenges are vast.

On the positive side, procedural AI-generated content offers unparalleled scalability and efficiency. By automating the content creation process individuals and organisations alike can produce immense volumes of tailored content across various platforms, catering to diverse audiences with personalised experiences. And this scalability extends to industries such as entertainment, journalism, and marketing where content can be rapidly generated to meet rapidly evolving demands.

However, the sheer volume of AI generated content also poses significant challenges. With algorithms churning out content at a rapid pace, the risk of bias, low quality content, and disinformation and misinformation looms large, and without human oversight and ethical guidelines there's a potential for AI generated content to propagate falsehoods, reinforce biases, and undermining peoples trust in information.

Navigating this landscape also requires a multifaceted approach. Ethical guidelines and regulatory frameworks must be developed to ensure the integrity and accuracy of AI generated content. Additionally, investments in media literacy and critical thinking skills are essential to empower consumers to discern between authentic and synthetic content.

In conclusion, while procedural AI-generated content offers immense potential for innovation and efficiency, it also presents significant challenges. By addressing these challenges proactively and collaboratively, we can harness the power of AI to enhance content creation while upholding ethical standards and preserving the integrity of information in an AI-driven world.

STATS THAT MATTER

$2.4 ML

$ PER SPONSORED POST, CRISTIANO RONALDO

IMH

$92 ML

#1 CELEBRITY EARNER, TAYLOR SWIFT, 2022

FORBES

416 BN

LONG FORM VIDEO STREAMS, GLOBAL 2022

LUMINATE

3.4 TR

MUSIC STREAMS, GLOBAL 2022

LUMINATE

787 MILLION

#1 INFLUENCER, CRISTIANO RONALDO, FOLLOWERS 2023

STATISTA

3 BN

FACEBOOK, MONTHLY USERS 2023

DEMAND SAGE

2.7 BN

YOUTUBE, MONTHLY USERS 2023

GMI

MEDIA & ENTERTAINMENT

$1.1 BN

#1 BLOCKBUSTER, BARBIE, 2023

BOX OFFICE MOJO

231 MILLION

NETFLIX SUBSCRIBERS, GLOBAL TOTAL 2023

NETFLIX

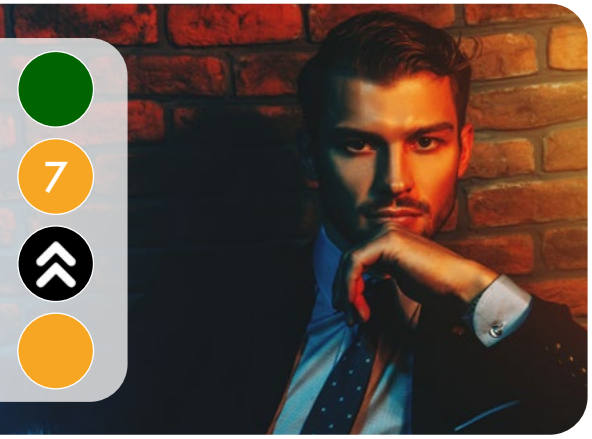
1.2 BN

#1 STREAMED SONG, FLOWERS BY CYRUS, 2023

LUMINATE

DIGITAL HUMANS

3RD YEAR ON THE LIST



QUICK TAKE

In a nutshell Digital Humans, which while being their own trend can also be a subset of the **Synthetic Content** trend, can be used to replace any real person we watch or interact with via a screen. And if that sounds an odd way to frame it then it's also the most accurate - literally.

Digital humans recreate the human experience at internet scale. A single digital human, for example, could have millions of different conversations or interactions with millions of real people in parallel. And whatever a real human can do they'll be able to do to.

Data sources: Various.

IMPACT

If you think about all of the content you consume and interact with on a daily basis through a screen - whether it's an advert, a lecture, a music concert, a video, a Zoom call, and so on - the fact is that you only know you're interacting with a living person because of the way they act, move, and talk. And once machines are capable of re-creating this and overcoming the phenomenon called "Uncanny Valley" you won't be able to tell a real human from a digital one.

Ultimately this means that real humans, for example your favourite actor, influencer, pop star, and so on, could be replaced with digital ones and noone will be able to tell the difference - or care. The impact of this, especially in our digital age, is not only significant it's society changing in many ways - from its impact on jobs and livelihoods, to its impact on company operations, customer engagement, diversity and inclusion, hiring, image rights, industry economics, marketing, productivity, and the very fabric of society itself.

And that's all before we discuss what happens when digital humans are weaponised to spread disinformation.

EXAMPLES

We're all used to the CGI characters bought to life by Hollywood which often take thousands of hours to painstakingly create, such as Rachel in Blade Runner 2049. Increasingly though technologies and tools, such as Artificial Intelligence (AI) and Epic's Unreal Engine, are able to generate life-like digital humans in real time, and animate them - giving them the power to have authentic conversations and interactions with people. All of which, in turn, makes it increasingly difficult to differentiate between real humans and digital ones.

Some of the best known Digital Humans today hail from organisations such as Soul Machines whose neural network brain Avatars are becoming a global sensation and assuming jobs in everything from banking and customer service to teaching. Samsung, in the meantime, have their amazingly life-like Neon Digital Humans, and startups like Synthesia are disrupting the dull world of corporate communications.

And all of this is before we discuss virtual K-Pop members that get fans screaming for more, millionaire virtual influencers like Lil Miquela, and many others.

ACT NOW

The impact of Digital Humans on everything from business operations and customer engagement, to society itself should not be underestimated, and while the field is still developing it's definitely one for organisations to watch and eventually participate in.

EXPLORE:

- Business and impact assessments
- Emerging technology and technology roadmaps
- Future of Content, Entertainment and Media, and Customer Experience
- Legal and regulatory due diligence
- New business models, operating models, and products
- Partner ecosystems and solutions
- Societal trends

OVER THE TOP CONTENT

3RD YEAR ON THE LIST



QUICK TAKE

Seen by many in the industry as a disruptive trend this has accelerated, and continues to accelerate, the breakdown and disintermediation of many of the industry's traditional incumbents and players as it forces the re-shaping of the sectors value chain from the very top to the very bottom.

An example of the internet enabled **Direct to Consumer** model, in almost the truest sense, Over The Top Content (OTTC) bypasses broadcast, cable, and satellite platforms that have traditionally acted as content controllers and distributors.

Data sources: Allied Market Research, BCG, UScreen, and various.

IMPACT

When the first OTTC platforms emerged it was a significant enough moment for many executives in the industry to stop and take note of the trend, but it can be argued that in many cases their failure to realise this trends significance and act quickly enough to embrace it in many cases cost them significant market share. In many respects we can think of this trend as the sector's "E-Commerce" moment and its impact similar to that felt by the retail sector all those years ago which irrevocably changed customer behaviours.

In the US alone it is estimated that OTTC put over $600 Billion of market value back in play in terms of content creation, aggregation, and distribution, and today while the global OTTC market is estimated to be worth $121 Bn today by 2027 it's projected to reach $1.1 Tn with a CAGR of just under 30%.

While many people focus on the largest players in this space this trend also has another impact - it gives everyone the ability to create, aggregate, and distribute their own content which then means that the amount of competition for consumers eyeballs and hearts is now growing at an exponential rate.

EXAMPLES

The ability to digitise and stream content in ways that were difficult to do just a decade or so ago not only gives organisations the ability to monetise content in new ways, such as **Shoppable Video**, and analyse consumer behaviours in new ways at the most granular levels, but it has also led to an explosion in alternative business and revenue models including Advertising Video On Demand (AVOD), Subscription Video On Demand (SVOD), Transactional Video On Demand (TVOD), and other models, with 51% of revenues coming from AVOD and over 40% from SVOD services.

In the West Amazon, Netflix, and YouTube are the dominant market players with the likes of Apple TV, Disney+, Instagram TV, and others making rapid gains and between them all they have over 3.1 Bn monthly consumers between them - obviously with a huge amount of overlap. Elsewhere in China, meanwhile, competitive platforms such as Iqiyi, Tencent, and Youku rule the roost with a more modest estimated consumer count of over 1 Bn monthly consumers and growing fast.

ACT NOW

This trend represents a titanic shift in business and operating models for incumbents in the sector and, more notably, opens the door to the democratisation of content where literally anyone and everyone can become a content creator and content company. As a result while this trend has multiple benefits for consumers it will also inevitably lead to choice overload as consumers, who used to be limited to being able to pick from just a handful of content aggregators and distributors can now have their choice of billions of alternatives, and that's before we discuss the impact of **Synthetic Content** on the sector.

EXPLORE:

- Business and impact assessment
- Emerging technologies and technology roadmaps
- Future of Communications, Creativity and Innovation, and Media and Entertainment
- New business and operating models

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

SYNTHETIC CONTENT

3RD YEAR ON THE LIST



QUICK TAKE

Increasingly **Artificial Intelligence** (AI) and other technologies are being used to generate or manipulate different forms of media including audio, characters, imagery, text, VFX, video, and even immersive virtual worlds, which can then be combined together to create a wide range of final form synthetic content that includes everything from adverts, articles, and blogs, to books, music, movies, and even virtual influencers. In time this trend will democratise content creation and become the defacto way most content is produced but also lead to increasing **Attention Price Inflation**.

Data sources: 360 Research, EY, McKinsey, Nvidia, and various.

IMPACT

The impact of this trend will be wide ranging since it not only affects digital content creators but also many of the people making a living in, and from, the creative industry such as actors, artists, fashion models, influencers, marketing professionals, musicians, photographers, script writers, and many others. As a consequence trying to put definitive numbers against its impact is difficult.

By 2025 it is estimated that the global digital content creation industry will be worth $38 Billion and employ over 20 Million people - excluding amateurs and hobbyists which would swell those numbers significantly.

Meanwhile the overall global creative "economy" which includes everything from content consumption to the creatives themselves is worth an estimated $3 Trillion and growing at an average rate of 9% CAGR, with the content marketing industry itself worth an estimated $420 Billion and growing at a very healthy 16%.

The semi and fully autonomous creation, and then publication and distribution of content, will impact all these and the ripple effects will be felt everywhere.

EXAMPLES

The synthetic content industry is so new that most of the terminology is still being worked out. It's also important to note that when we discuss synthetic content we're not including DeepFakes since they're the use of AI to manipulate content rather than create it. So, with that point covered let's move onto some examples.

In the music industry Sony and Warner have signed AI musicians, and have created virtual pop stars - something that has been emulated by K-Pop whose members now include AI generated semi-autonomous life-like Digital Humans. Similarly Diesel, Prada, Reuters, Samsung, and WPP have also jumped on this trend and used Digital Humans to deliver everything from the news and corporate bulletins, to modelling clothes.

Elsewhere This Person Does Not Exist has been using AI to create royalty free synthetic imagery, Lexus has used AI to write its adverts, Springer has a book writing AI, and then in Russia noone noticed that it was actually an AI designing company logos for clients for over a year. All of which is just the tip of the iceberg ...

ACT NOW

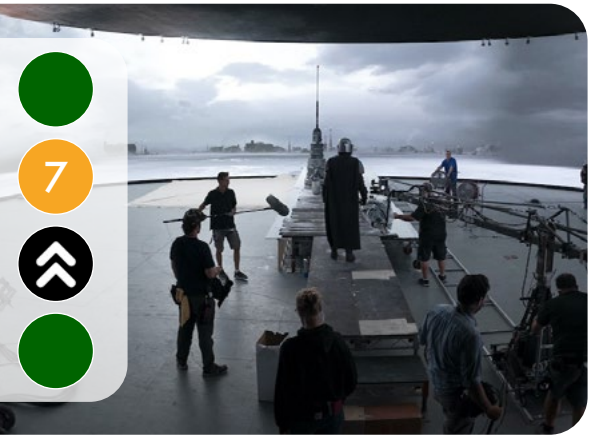
Synthetic content will not only transform who and what creates, publishes, and distributes content, it will also make it easier for people of all skill levels to create increasingly compelling and engaging content with little to no effort thereby democratising it for everyone. Not only will this lead to a torrent of new content being created but it will also blow apart all of the industry's associated norms and business models.

EXPLORE:

- Business and impact assessments
- Emerging technology and technology roadmaps
- Future of Content, and Entertainment and Media
- New business models, operating models, and products
- Partner ecosystems and solutions
- Social trends

VIRTUAL FILM PRODUCTION

3RD YEAR ON THE LIST



The set of the Mandalorian, Disney

QUICK TAKE

It used to be the case that if you wanted to create an advert, a TV series, or a movie you needed real actors and real locations, but now **Digital Humans** are giving some actors a run for their money, literally, and physical locations and sets can be created or replicated in virtual worlds using hi definition gaming engines - the outputs of which can then either be displayed on giant wrap around video walls in studios or straight into Virtual Reality (VR). By combining these with other virtual production techniques and tools creators can now seamlessly combine physical and virtual worlds to change how content is made.

Data sources: Disney,Epic, MPC, and various.

IMPACT

Widely seen as the future of film making, as well as **Gametelling** and more broadly video content in general as the costs involved continue to fall and the tools become easier and more intuitive, this trend has already seen numerous movies shortlisted for awards.

Not only is this trend helping put the tools of story making back into the hands of creators, and make it possible for them to explore the worlds their characters are living in in real time, but it's also helping them make creative decisions on the fly and save significant sums of money.

Furthermore, the ability to adjust virtual content and sets dynamically during filming rather than relying solely on post production also helps eliminate the need for expensive re-shoots, and just as importantly the need for expensive laborious post production rendering.

Today this market is estimated to be worth $1.5 Bn and is expected to hit $4.8 Bn by 2028, although the global pandemic has dramatically helped accelerate both the development and adoption of this trend so this figure will likely end up being much higher.

EXAMPLES

As the cost, flexibility, resolution, and usability of increasingly sophisticated gaming engines like Unity and Unreal have all improved this trend has been on the ascent now for some time, but it's now going mainstream and is rapidly becoming the way that the big studios are all making content. As a result there's a high chance that you've already seen movies and other content, including car ads, that have benefited from this trend, including examples such as the Lion King, Marvel and Star Wars movies, as well as TV mini series such as the Mandalorian and others.

In the case of the Mandalorian the creators used the Unreal engine to create realistic worlds which were then displayed behind the actors and props on 270 degree curved projection screens that were 20 feet high.

Then, stepping it up a notch the creators of the Lion King were the first to go full VR. First the crews visited and literally scanned vast tracts of the African plains which were then rendered into VR using the Unity game engine, and then the entire film was filmed in VR with the crews using an empty studio fitted with virtual rigs to create the shots "in situ."

ACT NOW

Eventually this trend will filter down to the rest of the market but despite that it's still a trend on the ascent and it's still a relatively complex task to create content in this way - albeit that it's cheaper, less logistically challenging, more flexible, and in many other ways superior to traditional content creation techniques. As the leaders in the space continue to hone their craft there's now no question in many people's minds that this represents the future of the industry.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technology and technology roadmaps
- Future of Computing, Creativity and Innovation, Gaming, Media and Entertainment, Technology, and Work
- New business and operating models
- Partner ecosystems and solutions

RETAIL INDUSTRY TRENDS

CONTENTS

... AUTONOMOUS RETAILERS
... CASHIERLESS STORES
... E-COMMERCE
... PHYDIGITAL PRODUCTS
... ROBO-CUSTOMERS
... VIRTUAL SHOPPING MALLS

BOOK AN EXPERT CALL

WHAT IF ... WE NEVER BOUGHT ANYTHING AGAIN?

WHAT IF the concept of ownership vanished from our societal fabric, replaced entirely by a culture of renting? Imagine a world where people no longer buy goods outright but instead rent everything they need, from clothing and furniture to electronics and vehicles. This radical shift would undoubtedly reshape the way we perceive possessions and interact with the material world.

In this scenario, the benefits of renting over ownership become apparent. By embracing a rental economy, individuals gain access to a wider range of products and services without the burden of upfront costs. Renting fosters a culture of flexibility and adaptability, allowing people to experiment with different products and upgrade to newer models seamlessly. Furthermore, the environmental impact of consumerism is mitigated as goods are shared and reused, reducing waste and resource consumption.

However, the transition to a rental-based economy also raises profound questions and challenges. The notion of ownership is deeply ingrained in human psychology, providing a sense of security, stability, and identity. The shift towards renting may lead to feelings of detachment and impermanence, disrupting traditional notions of personal possessions and attachment.

Moreover, the rental economy introduces complexities related to ownership rights, liability, and accountability. Who bears responsibility for maintenance and repairs in a rented world? How do we ensure equitable access to goods and services in a system where everything is rented?

As we contemplate this scenario we are prompted to reconsider our relationship with material possessions and the meaning of ownership in a rapidly evolving society. While the idea of a rental-based economy offers certain advantages, it also necessitates careful consideration of the social, psychological, and ethical implications inherent in such a profound societal shift.

STATS THAT MATTER

98%

RETAILERS WITH 50 STAFF OR LESS, PCT. GLOBAL

NRF

2.3 ML

TOTAL WALMART EMPLOYEES, 2022

WALMART

24 ML

NUMBER OF E-COMMERCE SITES, GLOBAL 2022

FORBES

370 ML

EST. PEOPLE EMPLOYED IN RETAIL, GLOBAL 2022

GPT-4

$3,625

PER CAPITA RETAIL SPENDING, AVG. GLOBAL 2022

311 INSTITUTE

$29 TR

ALL RETAIL SALES, GLOBAL TOTAL 2023

INSIDER INTELLIGENCE

$5.2 TR

E-COMMERCE SALES, GLOBAL TOTAL 2023

INSIDER INTELLIGENCE

RETAIL

$538 BN

#1 E-TAILER, AMAZON, 2022 REVENUE, GLOBAL

AMAZON

$735 BN

DIGITAL RETAIL AD SPEND, GLOBAL TOTAL 2022

DENTSU

$611 BN

#1 RETAILER, WALMART, 2022 REVENUE, GLOBAL

WALMART

AUTONOMOUS RETAILERS

3RD YEAR ON THE LIST



QUICK TAKE

Autonomous retailers are organisations that can design, advertise, manufacture, and distribute goods without the need for human intervention. And the technologies that underpin them are all maturing and converging.

Already we can see organisations including Amazon and JD.Com developing end to end solutions, and filing the patents and investor notes, that enable this trend.

IMPACT

While there are organisations in the retail sector that target the upper end of the market, where customers value customer service and interaction with a human face, there are plenty of retailers for whom it's all amount moving commodity products at volume and at low margin. And at this end of the market every efficiency gain, every millionth of a cent saved on an individual process, counts. Therefore, for some, the allure of building a fully autonomous retailer, built on technologies that always reduce in cost and improve in performance that allows them to lower their operating costs well below anything their competitors could achieve, is all too appealing.

While autonomous retailers will operate from a cost base that we estimate will be at least 30% lower than their rivals, there are other impacts too such as the potential displacement of over 1.25 million warehouse staff in the US alone, and the eradication of all manner of alternative jobs, such as finance, HR, and even design staff.

EXAMPLES

While the development of fully autonomous retailers will come with a human cost, namely in the form of redundancies, that hasn't stopped the CEO's of some of the world's largest retailers such as JD.Com, a $50Bn Chinese online behemoth, announcing that they see the future of their companies as being autonomous. And they aren't alone - other CEO's in other sectors are also of the same opinion.

When we look at the different parts of the retail "stack" today we are seeing Artificial Intelligence (AI) design fashion lines and Synthetic Content generators publishing them online, we already have autonomous payments, and as for fulfilment and logistics we now have AI powered robots that can autonomously pack and fulfil orders faster than the average human picker, and from a distribution perspective we also have the emergence of autonomous robots and vehicles, from drones and vans to robot dogs and "Starships," that can make the last mile deliveries. Furthermore, we are also seeing the automation of customer support via bots and digital humans.

ACT NOW

Fully autonomous retailers will have a distinct cost advantage over their traditional competitors, and when mature they will be able to respond to changes in consumer demand and tastes almost immediately - no matter how complex those changes might be. While there are both advantages and disadvantages to the trend in our opinion organisations should investigate it and prepare for it.

EXPLORE:

- Consumer trends
- Emerging technologies and technology roadmaps
- Future of Customer Experience and Service, Manufacturing, Retail, Robotics, Technology, and Transportation
- Partner ecosystems and solutions

Data sources: Bureau of Labor Statistics, and various.

CASHIERLESS STORES

3RD YEAR ON THE LIST



QUICK TAKE

In the hunt for cost savings and the ultimate frictionless customer experience today several well know retail brands are rolling out cashierless stores which someone once described to me as the equivalent of legalised shoplifting, in other words you scan in with an app, enter a store, grab what you want and walk out without looking at anyone, talking to anyone, or paying anyone.

While this has been possible for a long time, both practically and technologically, the trend really gained worldwide attention when Amazon opened its first Amazon Go stores.

Data sources: Amazon, Grabango, and various.

IMPACT

While there are many operational and commercial advantages to running a cashierless store - let alone a fully autonomous store where robots stock and manage everything - one of this trends greatest impacts is on the tens of millions of cashiers around the world who rely on retailers for their livelihoods. And, asides from re-training or finding them other jobs to do there's no easy fix to this problem which means it will contribute to **Wealth Inequality**.

This asides though cashierless stores have multiple benefits. On the one hand they significantly reduce operational costs, as well as theft which accounts for 36% of all store loses and costs US retailers alone over $50 Billion annually. Then on the other they reduce customer time consuming friction by 80%, and the tracking technologies allow brands to gather highly granular information on consumers in store behaviours and buying patterns which then, in turn, can be used to refine the in store experience further and boost profits.

In raw numbers a typical 711 size store can cost in the region of $300,000 to fit out but those costs are diminishing as the trend matures.

EXAMPLES

A hat tip to the **Autonomous Retailer** trend the number of retailers embracing this trend increases every day but in general they are all retailers who operate small format, micro, or even nano stores. Furthermore, in the future this trend and some of these store formats could be included in **Autonomous Vehicles**.

Originally popularised by grocers the trend is now spreading to other corners of the retail market as the technology becomes more mature and refined, and as many operators sell the underpinning technology as a platform to other retailers. While all the companies use apps to manage the overall consumer experience Grabango uses cameras equipped with **Artificial Intelligence** (AI) and **Machine Vision** hidden in ceilings, fixtures, and on rails to keep track of shoppers movements and purchases, while Amazon Go prefers scales, shelf camera systems, and sensor systems. Then elsewhere AiFi uses sensor fusion and "webs of cameras" to track people and goods in the "space time domain" and uses biometrics to automatically ID people for a even better frictionless customer experience.

ACT NOW

Seen as the epitome of the 21st Century shopping experience cashierless stores have many advantages but organisations need to be cautious of altogether eliminating the human experience from in store shopping which could have a detrimental impact on the overall customer experience and therefore customer loyalty and spending.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Customer Experience, Retail, Transportation, and the Workplace and Workforce
- Partner ecosystems and solutions

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

E-COMMERCE

3RD YEAR ON THE LIST



Augmented Reality meets E-Commerce

QUICK TAKE

Digitisation, the internet, and other digital channels including the **Metaverse**, have given organisations the ability to sell and engage with customers in new ways, whether it's traditional B2B, B2C, or **Direct to Consumer** (D2C), via traditional web sites or via online marketplaces and social spaces. The net result of which is that unless you're selling a highly complex or tailored product or service, which is now becoming easier thanks to the **Customisation** trend, then E-Commerce is undoubtedly one of your organisations top priorities. And, as a result, competition is heating up.

IMPACT

As the cost and convenience of creating E-Commerce sites, including any necessary compliance and **Payments** systems, continue to fall to the point where in some cases they're now free and as easy to set up as Drag and Drop, this trend's only headed one way.

No longer the sole preserve of large organisations E-Commerce fuels the **Power of the Individual** trend, and has firmly established itself as the primary route to market for the hundreds of millions of Entrepreneurs and **Solopreneurs** around the world who want to expand their geographic reach and grow sales, who now have over 24 Million E-Commerce stores, growing at 23% CAGR.

However, like all trends E-Commerce is evolving as the digital, physical, and virtual worlds merge with it and as organisations everywhere experiment with the **Meta-Economy**, **Immersive Reality**, the **Metaverse**, **PhyDigital Products**, **Shoppable Video**, and many other complimentary trends. As a result it's estimated that by 2025, fuelled with a growing **Connected Society**, E-Commerce sales will exceed $24.3 Tr and grow at 11.1% CAGR.

EXAMPLES

There are many examples, from Alibaba and Walmart, to Amazon and JD.com - the latter two of which are not only E-Commerce behemoths but who are also investing heavily in becoming the world's first fully **Autonomous Retailers**, a trend that will disrupt the retail sector all over again. Furthermore, they're also investing heavily in **Creative Machines** to design products, then using **Additive Manufacturing**, **Autonomous Vehicles**, and immersive reality, to reduce costs, improve delivery times, and help customers try on and visualise products in new ways.

Then, while platforms like EBay, Etsy, Shopify, and others, make it easy today for anyone to sell anything to anyone anywhere, another interesting example of the next evolution of E-Commerce includes Mondelez who've successfully combined the **Customisation** trend with their E-Commerce platforms to grow their OREOiD Cookies brand by over 64% while at the same time increasing prices and profits. Something that Nike too, with their NIKEiD brand are also famous for. So, if you thought E-Commerce was boring as you can see it's just getting started. Again.

ACT NOW

This trend is a part of all of our lives and has been for a decade or more now. However, as the digital, physical, and virtual worlds merge, and as new technologies and trends emerge we're now able to take E-Commerce to the next level and turn what used to be just a static 2D experience into an exciting interactive 3D experience where online and offline merge.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Creativity and Innovation, Financial Services, Manufacturing, and Retail
- Partner ecosystems and solutions
- Product development and innovation

Data sources: Bloomberg, Coveo, Gartner, KPMG, Nielsen, and various.

PHYDIGITAL PRODUCTS

3RD YEAR ON THE LIST



The Fortnite Collection, Balenciaga

QUICK TAKE

It used to be the case that the only type of product you could buy would be a physical one. Then came the Computing Era and the internet, and a slew of other trends. Now, today all of us own some kind of digital product, whether it's a movie or music, or something else. Now though, thanks to trends including **Immersive Reality**, the **Meta-Economy**, and the **Metaverse**, we can own a physical product with digital elements embedded into it, as well as a virtual product which we can use in the virtual world, and a physical likeness or copy of that same product in the real world - these are phydigital Products.

Data sources: LVMH, Morgan Stanley, Nike, and various.

IMPACT

Not to be confused with the marketing trend **Phygital** ironically this trend could sound like a great marketing ploy as organisations everywhere try to up sell their physical products and get you to pay extra for a virtual copy of the same product that you can use and show off in the virtual world with, for example, your **E-Sports** or **ExerGaming** team mates, as well as your social followers.

While this trend has arguably been around for some time in a very crude format recent advances in several **Exponential Technologies** and trends have turbo charged it, and while it plays into and also leverages many other trends today there are plenty big name organisations who are embracing and experimenting with it in the belief that it will help them dominate the multi-trillion dollar Meta-Economy and help them build new revenue streams outside of their current core businesses.

In the gaming sector alone Digital Fashion is expected to be a $50 Bn market by 2026, and the phydigital market is so new that at the moment no market metrics exist for it but that asides noone is doubting the potential ...

EXAMPLES

There aren't a huge number of examples of this trend yet but that's not stopped LVMH, the world's largest luxury brand conglomerate, or organisations such as Nike piling into the space and experimenting. In LVMH's case they are now busy creating all manner of phydigital products including digital replicas of clothes - or skins - for avatars, as well as digital replicas of beauty products, jewellery, and other luxury goods from houses including Bulgari Christian Dior, Fendi, Gucci, and Louis Vuitton, which can all be shown off and worn as appropriate in both the online and offline, real, world.

Elsewhere Nike has been upping its stake as well, not only do they have their own **Virtual Mall**, which has now been visited by over 7 Million people, but they've also bought several virtual apparel companies such as RTFKT who on the one hand are selling their digital sneakers, for example, as **Non-Fungible Tokens** (NFTs), and on the other are now busy turning more of Nike's famous back catalogue into phydigital products. And that's before we discuss custom clothing like the $9,500 phydigital dress for an Instagram influencer ... and so on.

ACT NOW

Phydigital products represent a huge market opportunity for brands as more people become connected and there are now plenty of organisations that see them as an opportunity to build significant revenue streams and stakes in the virtual world, just as many of them have done in the real world. As a consequence organisations should at the very least experiment with this trend and get a point of view.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Creativity and Innovation, Media and Entertainment, and Retail
- Partner ecosystems and solutions
- New business and operating models
- Product development and innovation

ROBOT CUSTOMERS

3RD YEAR ON THE LIST



QUICK TAKE

Traditionally it has always been humans who have decided which goods and which brands of goods to buy, but as machines and different technologies become more capable, connected, and smart increasingly its robots that are doing more of the decision making, buying, and negotiating for us, whether it's for washing up capsules and toilet rolls, compute resources, or even utility brokering.

This means, therefore, that increasingly in the future organisations will have to have strategies that target both human and robot customers alike.

Data sources: Various.

IMPACT

One of the greatest impacts this trend will have on organisations is its ability to disintermediate them from their customers quickly, at scale, and potentially irrevocably. So, while it is clear this trend is an opportunity for some it's a disruptive threat to others.

As we see more of these robo platforms emerge and scale, many of which will eventually be enhanced by **Artificial Intelligence** (AI) and **Blockchain** technology, these "Robot Customers" will be able to autonomously order all manner of goods and services on our behalf, form buying consortiums, make decisions on our behalf based on Big Data inputs, and swing markets at a speed and scale no organisation today has ever experienced.

Imagine, for example, every Amazon white labelled smart appliance in the world automatically re-ordering and re-stocking products from Amazon Fresh rather than other suppliers and you can see the potential impact of this trend - especially when scaled across other sectors. This trend also takes us a step closer to **Autonomous Retailers** and other forms of **Autonomous Organisations**.

EXAMPLES

Today many of us are getting acquainted with this trend at a basic level in both the B2B and B2C markets, whether it's the printer that automatically monitors ink levels and orders new cartridges before it runs out, Alexa which decides what product or brand to put in our shopping baskets, or the edge computing infrastructure that buys compute from cloud providers.

As basic as these examples are though in time we'll see the emergence of more sophisticated auto ordering platforms, such as the Samsung Smart Fridge that predicts you're running out of milk, sees millions of others are too, forms a buying consortium, negotiates a bulk discount via an E-Auction with suppliers, finalises the orders and shipping, and then puts the savings into a third party investment account where the money gathers interest until you withdraw it.

As nice as this sounds alternatively Samsung could process and fulfil these orders themselves rather than using third parties and automatically decide which brands to recommend or sell to you, thereby becoming the default supplier for everyone who uses their products.

ACT NOW

By leveraging new business models, such as giving smart products and other so such platforms away for free then earning money from the profits on orders or via subscription, organisations can create new revenue streams.

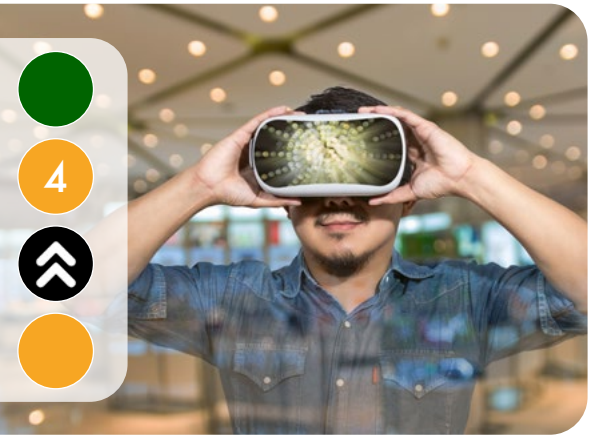
As the number of connected "smart" things, including smart speakers which also apply to this trend, increase we can see a time when today's dominant **Multi-Sided Platforms** can leverage this trend to their advantage to create even bigger monopoly positions. As a result it is imperative that organisations get ahead of this trend.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Cyber Security, Financial Services and Retail
- New business models, operating models, and products
- Partner ecosystems and solutions

VIRTUAL SHOPPING MALLS

3RD YEAR ON THE LIST



QUICK TAKE

As immersive technologies improve in cost and performance it's natural that organisations are trying to find new ways to both extend and re-invent the retail experience.

Virtual malls, which can either be a digital twin of a physical mall, or a stand alone experience, are potentially the next evolution of retail as organisations try to merge the benefits of real brick-and-mortar experiences with the convenience of E-Commerce ones. Furthermore, as the technologies evolve so too will the experiences.

IMPACT

In spite of retail's surging top line growth the decimation of the high streets and malls is no secret, and whichever way you looked at the future of brick-and-mortar stores it's hard to be optimistic about their future survival - although they will survive. As E-Commerce sales surge on average by over 20% per annum to top $5Tn, now accounting for over 20% of all retail sales - up from 5% a decade ago - equivalent brick-and-mortar sales have grown by just 3% with big name brands going to the wall, and investment in global retail real estate declining by over 25%.

While both online and offline retail models have their advantages traditional retailers, especially during the pandemic, struggled under the weight of their commercial commitments, and are almost always disadvantaged by their cost of customer acquisition, cost of operation, and customer reach. It is therefore hoped that new models, such as virtual malls which often target younger audiences, might provide traditional retailers with some hope and so far the results have been impressive, albeit within certain countries and within narrow customer segments.

EXAMPLES

Even though Virtual Reality (VR) is still emerging as a viable consumer technology virtual malls have been trialled around the world for many years now, with companies such as Alibaba even unveiling new In-VR payment systems.

As organisations continue to experiment with the format, especially in APJ led by China and Singapore, a cottage industry has now emerged to help brick-and-mortar retailers create digital clones of their physical stores in just a day using technologies such as Lidar and AI powered Synthetic Content Video to VR generation. 5G will also fuel the trend as it enables the streaming of immersive experiences via the cloud, as will the emergence of new consumer smart devices and formats, all of which will help lower the cost of entry.

So far the most successful virtual malls have been developed by IMM in Singapore and HKTV in Hong Kong, which now has 4,200 virtual outlets, but Amazon and Walmart are also experimenting with the format and filing patents, and many large name brands such as Lego and Prada are also

ACT NOW

While the technology to enable virtual malls is still maturing we are getting very close to being able to create digital copies that look as lifelike as the real thing, and experience them as though we were there via the use of haptics and other emerging technologies. However, that said, their greatest barrier to adoption will be cultural and that's where Asia may have the lead on the West, and organisations must be careful of the hype.

EXPLORE:

- Consumer trends
- Emerging technologies and technology roadmaps
- Future of Entertainment, Gaming, and Retail
- Hybrid retail models
- New landlord business models
- Partner ecosystems and solutions
- Running MVP pilots

Data sources: Alibaba, Alliance Studio, EPIC, SCMP, and various.

SPORTS INDUSTRY TRENDS

CONTENTS

... ALTERNATIVE SPORTS
... AUGMENTED TRAINING
... EXERGAMING
... GHOSTING

BOOK AN EXPERT CALL

WHAT IF ... ROBOTS STARTED PLAYING SPORTS?

IN AN age defined by rapid technological advancement the integration of robots into sports has emerged as a compelling topic of speculation and debate. What if the familiar sights of human athletes on the playing field were supplemented - or even supplanted - by robotic counterparts? Such a scenario prompts us to consider the potential ramifications and possibilities that arise when machines enter the realm of athletic competition.

Picture a world where robots, equipped with advanced AI and mechanical prowess, take to the field, track, or court. These mechanical athletes possess unparalleled physical capabilities, executing movements with flawless precision and efficiency. With lightning fast reflexes and superhuman strength, they excel in sports traditionally dominated by human athletes, offering spectators a glimpse into the future of athletic performance.

However, this futuristic vision also raises complex questions about the nature of sports and the role of technology in shaping athletic endeavours. As robots join the ranks of athletes, concerns arise regarding fairness, ethics, and the essence of competition. How do we ensure a level playing field when mechanical players possess inherent advantages over their human counterparts? What safeguards must be in place to uphold the integrity and spirit of sportsmanship in this new era of athletic competition?

As we contemplate the potential impact of robots in sports, we are compelled to reflect on the evolving relationship between humans and technology. While the idea of robotic athletes presents exciting possibilities for innovation and spectacle, it also challenges our fundamental assumptions about athleticism, sportsmanship, and the essence of what it means to compete.

STATS THAT MATTER

SPORTS

44 KMH

WORLDS FASTEST RUNNER, BOLT, 2009

IOC

8.5 KMH

WORLDS FASTEST SWIMMER, DRESSEL, 2017

IOC

$136 ML

HIGHEST PAID ATHLETE, RONALDO, GLOBAL 2023

FORBES

$56 BN

GLOBAL MEDIA RIGHTS MARKET VALUE, 2023

SPORT BUSINESS



5.1 BILLION

#1 SPORT BY FANS, FOOTBALL, GLOBAL 2023

FIFA

$512 BN

INDUSTRY SIZE, GLOBAL TOTAL 2023

RESEARCH & MARKETS

$55 BN

SPORTS TECHNOLOGY MARKET VALUE, 2023

GRAND VIEW

250 ML

EST. FOOTBALL PLAYERS, GLOBAL TOTAL 2023

FIFA

2.5 BILLION

#2 SPORT BY FANS, CRICKET, GLOBAL 2023

ICC

3.5 BN

#1 TOURNAMENT BY VIEWERS, FIFA WORLD CUP

FIFA

ALTERNATIVE SPORTS

3RD YEAR ON THE LIST



QUICK TAKE

Alternative Sports is the term given to sports that aren't regarded as being common, dominant, or mainstream - depending on your definition. But this doesn't necessarily mean that one day they won't be.

Such sports include base jumping, in line skating, motorcross, mountain biking, skateboarding, snowboarding, surfing, and many others, and while they may not be mainstream they're increasingly eating into the market share of more established sports and making some executives, for example in the American NFL, take note.

Data sources: Forbes, MarketWatch, Nielsen, RoundHill, and various.

IMPACT

While skating and mountain biking dominate the alternative sports market overall in the US alone the market is projected to reach a value of $13 Billion by 2023 with the majority of participants, and viewers, being between the ages of 15 and 35 years old.

Ironically one of the greatest impacts of this trend is being powered not by the sports themselves but by the rise of new content creators and content creator platforms that are helping extend the reach and appeal of these alternative sports.

Among others this impact is being felt the most by sports such as America's NFL, which recently secured an 11 year $100 Billion broadcast deal, but who are now increasingly worried about the pivoting of mainstream audiences towards these cheaper contract-free streaming alternatives. However, despite the NFL's worry they may be able to gain some solace in the fact that so far attempts to commercialise alternative sports has so far proved difficult which, ironically, will continue to mute their overall reach and impact.

EXAMPLES

Alternative sports have long been seen as sports in waiting, but many were heartened when the International Olympics Committee (IOC) took the decision to include some of them, including karate, skateboarding, sport climbing, and surfing, in the Tokyo 2020 Olympic Games that gave them a stage that allowed them to, in the words of some, communicate their message a lifestyle to billions of people.

While there are many examples of alternative sports one of the most interesting examples to highlight here are Table Tennis and Volleyball who between them command a global viewership of over 1.8 Billion people, and when you compare that with the NFL whose average viewership per game in 2020 declined by 7% to 15.4 Million that's impressive. And, just for the record, many in the industry are blaming the NFL's declining ratings on a "fragmented video landscape."

Sound familiar? It's no wonder then that the NFL are now experimenting with streaming games on Twitch ...

ACT NOW

The role that new content creators and new content platforms play on helping boost the prominence and ratings of alternative sports should not be underestimated, especially as major sports leagues attempt to do their utmost to control and, ironically, restrict the distribution of their content. It should also be remembered though that part of the alternative sports appeal based on the fact that they are alternative, and ergo not mainstream. As a result organisations looking to exploit the trend should tread cautiously.

EXPLORE:

- Business and impact assessments
- Future of Communications, Entertainment and Media, and Sports
- New business models, operating models, and products
- Partner ecosystems and solutions

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

AUGMENTED TRAINING

3RD YEAR ON THE LIST



QUICK TAKE

There is no denying the impact that technology continues to have on helping amateur and professional sports people alike improve their sports performance. But, that technology comes in multiple forms and formats hence my using the umbrella term Augmented Training for this trend.

While the benefits vary wildly, by demographic, by sport, by technology, and so on, improvements in Olympic performance, for example, so we can offer some level of consistency, vary between 24% and a staggering 221%. And that's the tip of the iceberg.

Data sources: Sheffield Hallam University, and various.

IMPACT

There is no denying that technology is helping improve the sports performance of individuals and teams alike, so much so that there's a name for it - **Tech Doping**. What might surprise you though is the breadth of technology that's now being used to grind out gains which includes everything from **Additive Manufacturing**, **Artificial Intelligence** (AI), Big Data, **Machine Vision**, and **Wearable Technology**, through to **Immersive Reality**, as well as **Neural Interfaces** technologies. While the field is too big to go into detail here I can provide you with some interesting, and odd, examples of this trends impact.

In the past 111 years the one hour Olympic cycling record has improved by 221% because of technological improvements in bike manufacturing and materials, and because of the ability of coaches to capture, analyse, and interpret athlete data that lets them optimise training. And, elsewhere the US Olympic ski team used brain stimulating technologies to improve their propulsive force by over 13%, and the cycling team saw a 5.2% gain in explosive force. All of which is before we look at more conventional tools ...

EXAMPLES

From tailored 3D printed carbon fiber bikes and professional cyclists who train using Zwift's Virtual Reality (VR) rigs, to Parkrun enthusiasts who are using their Fitbits and other wearable tech to monitor their heart rates and recovery speeds, and Strava to monitor their run, technology is everywhere and at every level of sport.

As we continue to see **Exponential Technologies** mature though, whether it's Smart Clothes with built in **Artificial Intelligence Coaches** like those being demonstrated by Speedo, Smart Contact Lenses and Glasses that overlay pertinent health and performance data over the users field of vision, and sensors that can gather even the most granular biochemical, biomarker, biomechanical, and other valuable biometric data, there's no doubt that augmented training will have an even bigger impact in the future than it does today.

All of which is before we discuss how sports such as Formula 1 are also using VR to help drivers visualise circuits, sharpen their reactions, and improve muscle memory, or the US Olympic team's use of Neurotraining technology.

ACT NOW

If you have any interest at all in improving sports performance then this trend cannot be ignored, but as we continue to see new innovations and technologies across the board it's also one you should explore thoroughly.

EXPLORE:

- Business and impact assessments
- Data Governance and Privacy
- Future of Health and Wellness, Manufacturing, and Sports
- New business models, operating models, and products
- Partner ecosystems and solutions

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

EXERGAMING

3RD YEAR ON THE LIST



Exergaming, Supernatural VR

QUICK TAKE

Exergaming, the trend which combines exercise with gamification and gaming and which is increasingly performed in Virtual Reality (VR) or other **Immersive Reality** environments is becoming increasingly popular as the amount of content and its quality improves and as the technology used to bring it all "to life" matures. A great way for people of all backgrounds and abilities to exercise and participate in different sports wherever they are there are a lot benefits and upsides to this trend, especially as costs come down and as the authenticity and usability of the platforms evolve over time.

IMPACT

While it's never been necessary to pop down a gym to get fit this trend clearly shows that consumers have an appetite for all manner of alternative exercise formats whether it's this trend, **Ghosting**, or more conventional on demand fitness products.

Specifically, in 2021 the global virtual fitness market was valued at $10.7 Bn, a growth of over 77% from 2019's figures, and by 2027 this is projected to grow by 33% CAGR to reach over $59 Bn. Furthermore, turbocharged by the global COVID-19 pandemic, and adding fuel to this trend is the overall growth of on demand fitness where we saw spending increase by over 128% during the same period, compared to just 6% growth for traditional gyms.

As technology advances and gives users everywhere the ability to exercise in new ways, and in ways that bring in all of their five senses, as well as in increasingly realistic and immersive environments, there is plenty to like about this trend especially as technologies such as **Telepresence** continue to mature and help turn what's primarily a solitary self-led activity into a more collaborative and social one.

EXAMPLES

Exercising and working out is a crucial part of maintaining your overall mental and physical health, but with busy schedules and commutes, as well as other daily pressures it can often be difficult to attend live workout classes, which is why this trend is on the ascent. And, as you'd expect there are lots of examples we could explore.

Some of the more notable examples include the use of exergaming in hospital rehab environments where patients, albeit often with specialised conditions, are able to use virtual fitness platforms to improve muscle strength and tone as well as use them to improve their mental health and wellness. And, so far research has shown that patients using these systems recover up to 30% faster than those who aren't.

Moving out of the hospital and rehab environment, as we see the emergence of **Digital Humans** and **Artificial Intelligence Coaches** which can be incorporated into the experience and provide real time instruction and form feedback, platforms like FitXR and Supernatural VR are bringing all manner of new gamified worlds into people's living rooms.

ACT NOW

Exercising at home used to involve little more than a small set of resistance equipment and a foam mat, but today this trend lets you go head to head with anyone, anywhere, anytime and turn exercising into a fun and outrageous multi-world multi-dimensional gaming experience. It's therefore no stretch to say that this trend has transformed exercise for many people and that it's here to stay as different technologies continue to mature and as the content becomes even better and more common.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Media and Entertainment, and Sports
- New business and operating models
- Product innovation

Data sources: Allied Market Research, Bloomberg, Market Watch, and various.

GHOSTING

3RD YEAR ON THE LIST



Virtually Live, Formula E

QUICK TAKE

Thanks to trends such as **5G**, **E-Sports**, **Haptics**, **Immersive Reality**, **Volumetric Capture,** and others the days of just being able to follow your favourite sports stars on TV are over because now you can "ghost" and play or race against them in real time - or not - wherever you are in Augmented (AR), Mixed (MXR), or Virtual Reality (VR), or in purpose built **Augmented Arenas**. Ghosting, the act of playing or racing against a digital clone or copy of a real life player, is now not just feasible but it's commercialising as different organisations switch up the customer experience.

Data sources: Nike, and various.

IMPACT

The ability to race against a virtual avatar of the real Usain Bolt or play against or alongside Novak Djokovic in an augmented arena to see how well you compare as you're coached in real time by an **Artificial Intelligence Coaches**, or just for fun, is no longer just some fan fantasy. It's real in the most literal sense. And this is just one example of the power of this trend which will only continue to accelerate as we see different trends, including **Digital Humans**, gain momentum in the gaming, media and entertainment, and sports industries.

Ultimately not only will this trend completely alter the **Fan Experience** but it will also give organisations the opportunity to create new hybrid sports in which thousands of people can simultaneously compete with pros and amateurs alike, while at the same time providing them with the opportunity to create new brands, products, revenue streams, and routes to market.

As for sizing this market opportunity however since it is still so nascent no specific data exists but the market sizes of both physical and E-Sports are large enough for it to be full of potential.

EXAMPLES

While this trend is still nascent some of the best examples so far have come from franchises such as Formula-E who first dipped their toe into the market in 2018 and created the global "Virtually Live" ABB FIA E-Championship series that used CGI and innovative telemetry technology to give fans the opportunity to put their skills to the test and race professional Formula-E drivers in real time as they pounded around the circuits.

Extending the concept out though with advances in multiple technologies this same principle could be applied to almost any sport, both traditional and non-traditional, including individual and team sports, including everything from athletics, cycling, shooting, and swimming, all the way through to drone racing and many new sports which could be purpose built to maximise the benefits and user experiences the trend is capable of delivering both now an into the future.

ACT NOW

Many of us have imagined in our minds playing with or alongside professional sports personalities and teams in our heads, but today technology is bringing imagination to life and making it possible.

EXPLORE:

- Emerging technologies and technology trends
- Future of Artificial Intelligence, Communications, Gaming, Media and Entertainment, and Technology
- New business models, operating models, and products
- Partner ecosystems and solutions
- Running MVP pilots

TELECOMS INDUSTRY TRENDS

CONTENTS

... CLOUD NATIVE NETWORKS
... HIGH ALTITUDE PLATFORMS
... OTT BROADBAND
... SATELLITE INTERNET

BOOK AN EXPERT CALL

WHAT IF ... EVERYONE WAS SATELLITE CONNECTED?

THE PERVASIVE influence of satellite systems has seamlessly woven a web of connectivity that spans the entire globe. This era of unprecedented interconnectivity has ushered in a new paradigm, where individuals, communities, and businesses are linked together in ways unimaginable just a few decades ago. At the core of this interconnected network are satellite systems, which serve as the backbone of modern communication and information exchange. With satellites orbiting the Earth, individuals across continents have instantaneous access to high-speed internet, enabling seamless communication, collaboration, and access to information regardless of geographical location.

The benefits of this global connectivity are multiple. Businesses leverage satellite enabled technologies to expand their reach, optimise operations, and tap into new markets. From E-Commerce platforms reaching customers in remote regions to multinational corporations coordinating global supply chains, satellite systems play a pivotal role in driving economic growth and facilitating international trade.

Moreover, satellite enabled technologies have revolutionised various industries, including agriculture, healthcare, transportation, and emergency services. Farmers utilise satellite imagery and precision agriculture techniques to optimise crop management and increase yields, while healthcare providers leverage tele-medicine to deliver remote care to under served populations. In times of crisis, satellite communication systems provide vital links for disaster response teams, facilitating rapid coordination and saving lives.

Beyond its practical applications, the interconnectedness facilitated by satellite systems fosters global cooperation and collaboration. It transcends borders, fostering mutual understanding and collective action on pressing global challenges, from climate change to public health crises. In essence, it's not merely a technological advancement but a catalyst for societal transformation, underscoring the importance of fostering inclusivity, innovation, and cooperation on a global scale, paving the way for a more connected, resilient, and prosperous future for all.

STATS THAT MATTER

4,519

OPERATIONAL STARLINK SATELLITES, 2023

SPACEX

58%

PCT. OF INTERNET TRAFFIC FROM MOBILES, 2023

EARTHWEB

81%

STREAMING, PCT. OF INTERNET TRAFFIC, 2023

BLUE CORNOA

4.8 ZB

INTERNET TRAFFIC, TOTAL DATA VOLUME, 2023

CISCO

5.18 BILLION

INTERNET USERS, GLOBAL TOTAL 2023

STATISTA

$3 TR

INDUSTRY SIZE, GLOBAL TOTAL 2023

RESEARCH & MARKETS

12 BN

CELLULAR CONNECTIONS, INC. IOT, GLOBAL 2023

GSMA

TELECOMS

1.4 ML KM

SUBMARINE CABLES, GLOBAL TOTAL 2023

TELEGEOGRAPHY

4.8 BILLION KM

FIBER OPTIC CABLING, GLOBAL TOTAL 2023

MARKETS&MARKETS

300 X

MOBILE TRAFFIC, INCREASE IN 10 YEARS

ERICSSON

CLOUD NATIVE NETWORKS

3RD YEAR ON THE LIST



QUICK TAKE

There is no doubt that the future of computing, or to be more accurate service delivery, is **Cloud Computing** and that as a result CSPs and their networks as well as the way that applications are designed and run need to adapt in order to deliver the most optimal user experiences. Cloud native, which is a term adopted from the IT industry, is therefore the term used to describe the building and running of network functions that take advantage of this model that lets CSPs develop and deploy networks more quickly thereby making it easier for them to respond to increasing demand and new services.

Data sources: Ericsson, Juniper, Nokia, and various.

IMPACT

The continued growth of mobile data traffic and new services over the past few years has put most legacy network architectures, such as those using Virtualised Network Functions (VNF), under significant strain and as **5G** Core and 5G SA deployments continue to accelerate around the world this will only get worse which is why 84% of surveyed Communications Service Providers (CSP) plan on moving to cloud native models sooner rather than later with some already making the leap.

It's also why the industry overall believes that deploying cloud native networks, with Cloud Native Functions (CNF) that include automation, microservices, and software containers, aren't just necessary to deliver on 5G's promise, but that they're critical.

The necessary transition from legacy architectures to a cloud native one that also includes BSS and OSS though isn't straight forwards, but ultimately over the medium and long term this trend will help service providers reduce capital and operational expenditure and help them improve time to market while at the same time improving overall network flexibility, resilience, and scalability.

EXAMPLES

Cloud native networks allow customers and operators alike to realise the full benefit and potential of cloud computing and cloud services, whether it's as a basis to improve their network operating models or to deliver the best experiences and services to customers, but this trend requires organisations to re-design almost everything from application development, infrastructure, and processes, to management and orchestration.

While the move from VNF based networks to CNF based ones is a big under taking though organisations such as Accenture, Cisco, Ericsson, Google, Nokia, Redhat, and others are collaborating to help public and private CSPs make the transition and develop cloud native vertical stacks that stretch all the way from the datacenter infrastructure layers at the bottom to the application and service layers at the top.

As such some of the more notable examples of this trend include AT&T, Verizon, and Vodafone who were among the first to begin their transformation journeys and move from "cloud ready" to cloud native in 2020.

ACT NOW

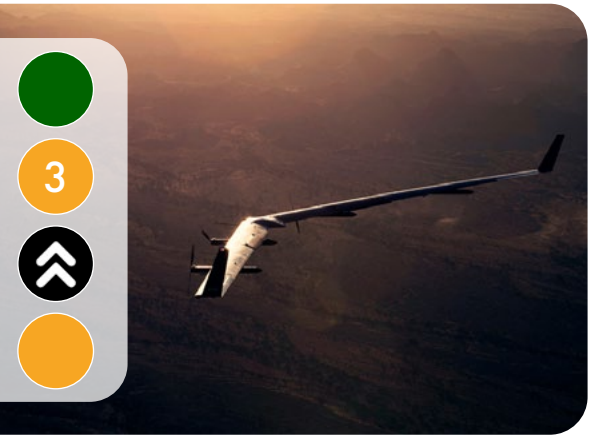
Being cloud native not only requires a radical re-think of the CSP tech stack it also requires them to transform everything from their approach to culture, hiring and development, procurement, technology standards adoption, and many others. Despite these necessary shifts though everyone in the industry appears to be singing off the same hymn sheet and voicing their support for the transformation to happen sooner rather than later.

EXPLORE:

- Best practises and case studies
- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications and Technology
- Standards development
- Partner ecosystems and solutions

HIGH ALTITUDE PLATFORMS

3RD YEAR ON THE LIST



A solar powered HAPs drone

QUICK TAKE

High Altitude Platforms (HAPs) are airborne platforms such as aircraft, airships, balloons, and drones, that operate at altitudes between 17km and 22km which provide wireless communications services to users in dense urban environments as well as across wide geographic areas.

Especially useful for providing rapid and reliable coverage for areas with poor communications infrastructure, as well as disaster zones, HAPs are playing an increasingly important role in enabling and providing global communications services.

Data sources: Various.

IMPACT

Today the majority of communications services, certainly in developed countries, are provided via a combination of fixed line and wireless communications technologies, and needless to say remote areas where infrastructure is costly and hard to install often gets saddled with poor coverage at best or no coverage at worst.

Not only does this situation mean over half the world's population still has little to no internet connectivity it also means that many parts of the world remain off grid and unable to access the benefits that connectivity offers.

HAPs are one solution that help overcome this problem by providing connectivity from above that can be easily and cheaply beamed to local base stations then onto users.

However, while the market is estimated to be worth $450 Million by 2026 it is only growing at an average of 3% CAGR as would be providers struggle to develop and deploy the right mix of autonomous platforms and get tangled up in logistics and regulatory issues.

EXAMPLES

While the principle of using HAPs to connect various parts of the world is sound organisations such as Google, with Project Loon, and Facebook with Project Aquila, have found that the idea is harder to execute than they anticipated and in both cases canned their respective projects.

But, despite Google's failings ironically Project Loon played a vital role in helping connect disaster zones, such as those in Peru after catastrophic floods hit the country, and demonstrated that the technology does in fact have a future - albeit once the "kinks," especially in terms of reliability and Return on Investment, are worked out.

In spite of these setbacks not only do HAPs look like they will play a pivotal role in the forthcoming 6G era as part of the technology's so called Integrated Space-Air-Ground-Underwater Network (ISAGUN) standards, but organisations like ThalesAlenia with their Stratobus airship project and Avealto are trying to keep the dream alive.

ACT NOW

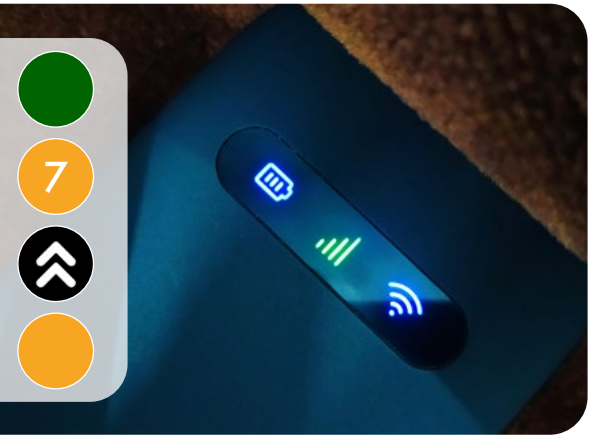
There is little doubt that HAPs will play a role in future global communications networks and help bring coverage to the under served parts of the world, but as many organisations are finding out to their cost developing and deploying autonomous technologies that are designed to stay aloft and operating for years at a time is difficult. However, while at the moment this trend may be ahead of its time it's our advice that you keep an eye on it.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Energy, Materials, and Transportation
- Legal and Regulatory environments
- New business models, operating models, and platform opportunities
- Partner ecosystems and solutions

OTT BROADBAND

3RD YEAR ON THE LIST



QUICK TAKE

It used to be the case that if you wanted home or office broadband then you needed to be connected to a physical fiber network, but as mobile communications technologies such as 4G, **5G**, and eventually 6G, as well as **Satellite Internet** systems have improved in latency, speed, and reliability in many cases this is no longer the case and customers are able to "cut the cord." Asides from being disruptive to traditional fixed line broadband providers this trend also represents a permanent shift in customer behaviours, especially as all these different technologies improve with age.

Data sources: OpenVault, and various.

IMPACT

Those people living in cities have always had access to better quality broadband than their peers living in rural areas, and while there is still a gap between the two new mobile and satellite communications technologies not only mean it's decreasing but also mean that in some cases those people living in rural areas have access to faster broadband than those in urban areas.

However, while many OTT Broadband providers might rejoice at the news of being able to take business from their traditional fixed line competitors as the trend of **Over The Top Content** (OTTC) accelerates we're also seeing a massive increase in data traffic with the average US household in 2021 consuming a whopping 520.8 Gb of data a month which, needless to say would put the networks of even the best **Cloud Native Networks** CSP's under massive strain as time goes on.

Nevertheless though in the UK and other countries it's now estimated that over 30% of people use OTT Broadband as their primary broadband provider with 61% saying it's a better experience than using traditional FTTC fixed line, and that number's increasing.

EXAMPLES

The **Work From Anywhere** trend, as well as other workplace trends, is partially responsible for more people than ever before using OTT Broadband as their primary way to connect, but unlimited mobile data plans have also played their part especially as more people embrace the OTTC trend.

However, as customer data volumes continue to ramp we have to question how long CSPs will be comfortable providing these plans, especially as more people have the option to cut the cord - the cord which today is arguably transferring the bulk of the OTTC traffic.

That asides though with OTT Broadband playing an increasingly important role in peoples lives, with 76% of 18 to 34 year olds saying it would influence where they choose to live, it's clear the trend's having wide reaching consequences.

ACT NOW

Over time this trend is likely to continue ascending, especially as mobile and satellite communications speeds increase and in spite of the fact that new laser and optics technologies are pushing FTTC fixed line speeds into the Terabit range. And while this trend gives operators the ability to deliver new services and attract new customer segments they must be careful to pay attention to the rise in data traffic which, as other trends continue to ascend, will likely accelerate exponentially.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Artificial Intelligence, Communications, Creativity and Innovation, Media and Entertainment, and Work
- New business and operating models

SATELLITE INTERNET

3RD YEAR ON THE LIST



QUICK TAKE

While people have talked about being able to use constellations of satellites to connect the world for decades now it is only in the past decade that the cost of rocket launches and launching goods into space has become low enough to make it an economic reality.

Now, as thousands of satellites head into LEO and VLEO orbits what once seemed as fanciful thinking is becoming reality and it's already disrupting the established communications industry status quo.

IMPACT

Today only half of the world's population has access to reliable communications and connectivity services, but this trend will change that and by the end of the decade everyone who has the means to connect will be able to - and that is significant.

The acceleration of the satellite internet trend - with multiple countries and organisations now entering the race - will not only change the economics of the global communications industry, but as the technologies improve, especially in terms of speed and latency, it will completely disrupt traditional terrestrial providers and their business models.

Never before have we seen individual private organisations gifted the opportunity to become the global telecommunications provider of choice, and that's what we could be looking at here. Furthermore, by 2027 it's estimated the satellite communications market will top $122 Billion in revenues with an average growth rate of over 9% CAGR, and that the overall addressable market will be worth over $1 Trillion.

EXAMPLES

While there are many examples the two that stand out at the moment, all be the fact that they will soon be joined by other significant competitors, are OneWeb and SpaceX's Starlink projects.

While OneWeb is now literally getting off the ground Starlink meanwhile has global coverage with thousands of satellites in orbit, millions of people on the waiting list, and is already providing 4G busting speeds of over 200 Mbps at 20ms latency - both of which will improve quickly in the years to come as the organisation zero's in on speeds of 1.5 Gbps and a sub 5ms latency.

Originally targeting the $72 Billion US market and still in the early stages of scaling Starlink already has a staggering valuation of $81 Billion, based on revenues of $10 Billion by 2025, and by 2040 it's estimated they will have over 340 million subscribers.

It's therefore no surprise that organisations including Amazon, Arianespace, Boeing, and others, as well as Canada, China, Europe, and Japan are putting the wheels in motion to launch their own rival networks.

ACT NOW

There is alot of hype still about the future potential of satellite internet but so far the numbers and the technology have held up and even the regulators are enthusiastically embracing the trend. That said though as ever we would advise organisations proceed with caution and evaluate the trajectory of the market and the technologies thoroughly before developing a point of view.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Manufacturing, and Space
- Investment options
- Legal and Regulatory environments
- New business models, operating models, and platform opportunities
- Partner ecosystems and solutions

Data sources: Morgan Stanley, Nasdaq, SpaceX, and various.

TRANSPORT INDUSTRY TRENDS

CONTENTS

... AUTONOMOUS VEHICLES
... HIGH SPEED RAIL
... MOBILITY AS A SERVICE
... MODULAR VEHICLES
... UNI-MODAL TRANSPORTATION
... VEHICLE ELECTRIFICATION

BOOK AN EXPERT CALL

WHAT IF ... EVERYONE WORKED IN VR?

BY 2035 the once relentless drone of grid locked vehicles and the chaos of rush hour traffic are but distant memories of a bygone era. No longer are peoples daily lives dominated by where they live or the time zone they live in, or the daily commute. Traffic accidents are a thing of the past and some roads, now abandoned and unused, start to fall into irreversible disrepair. In this multiverse instead using vehicles it's not a new kind of vehicle or high speed train that's whisking us to work, it's an invisible pair of Virtual Reality (VR) smart contact lenses.

In this new era of full bodied telepresence the lines between the virtual and the real worlds have all but been eliminated and people can no longer differentiate between the real and virtual worlds. With a blink of an eye people are instantly at work in the virtual office. Enabled by Artificial Intelligence (AI), haptics, better than real high definition rendering, and ultra high speed networks they can interact with and talk with human colleagues and virtual colleagues effortlessly, exchange ideas, and take leisure breaks without ever having to leave home - or the coffee shop.

With advancements in haptics and other sensory virtual technologies a colleague's handshake feels firm, a coffee feels mug cool and comforting in one's hand, the office bagel smells and tastes real, and the rustling of virtual papers is eerily tangible. But these VR offices and worlds do more than mimic reality - they augment it. One's office backdrop can be the blackness of deep space, a serene forest, or a Thai beach, the hubbub of office chatter can be silenced with a single button click, and a companion for a virtual coffee is but an invite away.

The dawn of this new world will not only transform the world of work but will also redefine all aspects of our global society - and ergo the need for transportation itself - turning what were once stressful journeys into nothing more than a blink of an eye ...

STATS THAT MATTER

102 BN

ROAD PASSENGER JOURNEYS, GLOBAL 2022

ITF

12 BN

RAIL PASSENGER JOURNEYS, GLOBAL 2022

ITF

4.5 BN

AIR PASSENGER JOURNEYS, GLOBAL 2022

ITF

2.9 BN

WATER PASSENGER JOURNEYS, GLOBAL 2022

ITF



1.31 MILLION

TOTAL GLOBAL ROAD DEATHS, 2022

WHO

65 ML KM

ROAD NETWORK SIZE, GLOBAL TOTAL 2022

GRIP

1.3 ML KM

RAIL NETWORK SIZE, GLOBAL TOTAL 2022

WORLD BANK

TRANSPORT

95.7 ML

CARS PRODUCED, GLOBAL TOTAL 2022

OICA

1.44 BILLION

NUMBER OF CARS ON THE ROAD, GLOBAL TOTAL 2022

HEDGES & CO

26 ML

ELECTRIC CARS, GLOBAL TOTAL 2022

IEA

AUTONOMOUS VEHICLES

3RD YEAR ON THE LIST



Autonomous Semi-Truck Vera, Volvo

QUICK TAKE

Alongside **Vehicle Electrification** Autonomous Vehicles represent one of the most significant disruptive shifts the sector has seen in its entire history.

Furthermore, now that manufacturers are free to eliminate the need for vehicle dashboards, pedals, and steering wheels they are now left with autonomous "pods" that let them re-imagine their industry at the most fundamental levels - whether it's embracing **Mobility as a Service** (MaaS), offering new services, or designing new **Modular Vehicles** and **Uni-Modal Transportation** systems.

Data sources: HGV Allliance, WHO, and various.

IMPACT

The impact of autonomous vehicles on the economy, environment, and society as a whole - let alone the sector - will be staggering in many different ways.

On the one hand they will let urban planners radically transform cities and infrastructure, and on the other they will give people with disabilities new freedoms. But that's just the beginning. Globally 1.3 Million people a year are killed in car crashes and Autonomous Vehicles should be able to reduce that by 99% - while this is a very good thing some of the consequences of this include the impact on the healthcare industry's human organ transplant needs, and also insurance premiums and revenues.

Furthermore, this trend will also help optimise traffic flow and reduce congestion, energy consumption, and pollution, reduce the amount of vehicles on the roads by an estimated 30% in the long term, and potentially make 18 Million taxi drivers and over 6 Million truck drivers - as well as the hundreds of millions of people who directly and indirectly rely on them and the sector - redundant. All of which represent shifts of titanic proportions.

EXAMPLES

Not only do Autonomous Vehicles give manufacturers the opportunity to create radical new vehicle concepts but they also let them re-imagine the sector and what's possible when different vehicle modules can be swapped in and out at will to change both the form and function of said vehicles.

While this rend ultimately signals the death of the car, and the rise of the "Pod" some of the best examples of the art of the possible hail from the automotive industry from manufacturers including Citroen, Mercedes, and Toyota who have all created their own modular vehicle designs which, for example, let their vehicles fulfil almost any function.

In the morning, for example, the Citroen Skate, Mercedes Vision Urbanetic, and Toyota E-Palette can all take on the duty of a school coach or taxi, then they can swap vehicle modules and perform **Autonomous Last Mile Deliveries** before transitioning again to become mobile diners, gyms, hotel suites, offices, shops, and all manner of other functions. And then, in Airbus' case they can hook into an EVTOL chassis and provide **Flying Taxi Services**.

ACT NOW

Autonomous vehicles will change society at a fundamental level - they will free up people's time, improve people's health, longevity, and productivity, and change our cities and our environment for the better while at the same time opening up a multitude of new market opportunities for manufacturers and operators. But they will also have consequences in terms of the mass dislocation of jobs.

EXPLORE:

- Emerging technology and technology roadmaps
- Future of Entertainment and Media, Healthcare, Logistics, Supply Chains, Retail, and Transportation
- New business models and product concepts
- Urban planning initiatives

HIGH SPEED RAIL

3RD YEAR ON THE LIST



Hyperloop concept, Zeleros

QUICK TAKE

For decades the fastest trains have those like the famous Japanese L0 Series Maglev which travel in excess of 370mph or 600 kmh, and even though many have tried so far these trains still hold the record for the fastest in the world. However, after Elon Musk took an 1800's British design for a vacuum tunnel based transportation system under the river Thames to heart the race to create the first levitating supersonic trains, dubbed Hyperloops has been on and now trains that can travel as fast as 2,500 mph or 4,000 kmh, are on the drawing boards.

IMPACT

Despite some people questioning the feasibility of the technology behind Hyperloops, as well as the sky high costs associated with building out regional, intra-regional, and trans-continental Hyperloop networks, which if fully realised could transport goods and people anywhere in the world within 14 hours at the speed of air travel and for the cost of road freight with zero emissions, ultimately the benefits of this technology are clear.

Not only would trains that can travel at Mach 1 or above extend the economic areas of many cities and allow people hundreds of miles away to reach them in 30 minutes or less, but Hyperloops could also disrupt both the aviation and logistics industries, especially when you factor in their lower operating costs and almost enviable environmental credentials.

Hyperloops then also become even more interesting when you consider their role in helping accelerate and shape the future of the **Autonomous Last Mile Deliveries** and **Uni-Modal Transport** trends, both of which could change the economics and future of goods and passenger transport.

EXAMPLES

As more governments around the world conduct due diligence studies there's no doubting that Hyperloops and other trains of this ilk could have a significant economic and environmental impact with, for example, Chicago and Pittsburgh estimating that a Hyperloop network between the two cities would create in excess of $300 Bn of economic benefit, eliminate over 2.4 Mn tons of CO2, and remove 1.9 Bn cars from their roads over a 30 year period. Numbers not to be sniffed at.

However, as organisations around the world try their hardest to develop the first commercially available Hyperloop systems that can travel at Mach 1 or above many of them are falling by the way side, including Virgin Hyperloop's own passenger Hyperloop system which was dissolved after the company axed its staff and doubled down on CargoSpeed, their joint cargo venture with DP World.

Not to be out done though, as organisations like Zeleros make good headway, further East the Chinese have their own plans to create their own Hyperloop alternative, the T-Flight, capable of travelling at above Mach 3.

ACT NOW

There's no doubting that we have the technology to create supersonic trains, but developing them and getting them certified is one thing, and funding the development of the high speed networks they'll need to run is an entirely different matter, and that's going to be the challenge for this trend. And that's before we discuss the rise of many other alternative transportation systems such as **Flying Taxi Services**, green **Supersonic Aircraft**, and others that could challenge them both economically and technologically.

EXPLORE:

- Benefits and impact assessments
- Emerging technologies and technology roadmaps
- Future of Communications, Energy, Technology, Transportation, and the Workplace and Workforce
- Infrastructure funding
- Partner ecosystems and solutions

Data sources: DP World, FT, US DoT, and various.

MOBILITY AS A SERVICE

3RD YEAR ON THE LIST



The Autonomous Travel Suite, Aprilli

QUICK TAKE

As we continue to see progress in the development and deployment of **Autonomous Vehicles** manufacturers around the world are switching their business models from selling vehicles to selling Mobility as a Service (MaaS).

Not only does this represent a fundamental shift in their business and operating models, but it also opens up new opportunities for growth and market expansion, especially when combined with the **Modular Vehicles** and **Uni-Modal Transportation** trends.

IMPACT

Breakthroughs in Autonomous Vehicles and the death of the car, for example, as it becomes a "blank slate space" or pod on wheels, are changing how people and goods get from A to B - whether those two points are close together, or on the other side of continents. As a result the impact of this trend will be wide reaching, affecting automotive manufacturers and transportation organisations alike, and also affecting the Energy, Insurance, Healthcare, and Media sectors - all of which will see new opportunities and threats emerge, such as the loss of General Insurance (GI) business as we see the continued emergence of **Self-Insured Organisations**, or the emergence of commuters who, now freed from the shackles of driving, can consume content with impunity.

Seen by many as the **Digitisation** of the sector analysts estimates of the growth and size of the market in the years to come vary wildly between $271 Bn and $1.7 Tr by 2025, with growth rates of between 23% and 15% CAGR respectively, with urban penetration rates of 40% as analysts flounder with their figures and include both old and new service offerings.

EXAMPLES

While traditional public service transportation systems have offered MaaS for a long time now, by offering different ticketing and subscription models, this trend is now expanding to include all vehicle types and all service offerings - from cars, vans, and trucks, to more futuristic concepts including **Flying Taxi Services** and self-driving shops on wheels from the likes of Toyota with their E-Palette concept.

This latter example is especially interesting since today we think of mobility in terms of the movement of people and goods rather than of "spaces." However, as new vehicle formats emerge that allow organisations to put different spaces on wheels all of a sudden players in this space have the potential to offer everything from autonomous hotel rooms, bars, dining, doctors surgeries, games rooms, gyms, maker spaces, offices, schools, shops, and more on wheels - all under the umbrella of MaaS.

MaaS will also allow consumers, for the first time, to rent out their own vehicles - such as Tesla's model - and earn an income from them which then flips the concept of car ownership on its head.

ACT NOW

MaaS gives organisations in all sectors the ability to expand into new markets, and re-invent mobility and the customer and passenger experience, and as such the impact of this trend will be greater than many realise.

EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- Future of Energy, Financial Services, Infrastructure, and Transportation
- New business models and product concepts
- Partner ecosystems and solutions

Data sources: BIS, Deloitte, Emergen, and various.

MODULAR VEHICLES

3RD YEAR ON THE LIST



An autonomous hotel room, Citroen x Sofitel

QUICK TAKE

At their most basic level you can think of modern Modular Vehicles as vehicle frames with wheels, on top of which you can put different modules or pods. While this trend makes maximum use of the **Autonomous Vehicles** trend it allows vehicle manufacturers and operators to change the form and function of their vehicles at will.

Not only does this open up radical new markets and opportunities for them, and allow them to create new innovative business models and operating models, but it also allows them to re-invent their product and service offerings.

Data sources: Various.

IMPACT

Ultimately the biggest impact of this trend will be to make all manner of previously centralised or fixed location services mobile and give vehicle manufacturers and operators, as well as their extended Partner ecosystems and solutions a new way to monetise products and services, and extend their brand reach.

In short, now that "spaces" are mobile, and vehicles are autonomous, organisations have a blank canvas from which to work and show off their ideas.

While this trend also benefits heavily from the **Mobility as a Service** trend, which is estimated to be worth between $271 Bn and $1.7 Tr by 2025, with growth rates of between 23% and 15% CAGR respectively, with urban penetration rates of 40%, at the moment it's still a very new market with more unknowns than knowns.

However, that doesn't stop organisations from exploring new market opportunities and concepts, pushing the boundaries and thinking outside of the box.

EXAMPLES

So far there are enough vehicle manufacturers exploring this trend that it looks like there is a high probability of it becoming commercially available at scale in the medium term future, and even though some of the vehicles and concepts look awkward that's what exploration is all about.

At its core this trend opens up a whole new host of "as a Service" opportunities that, as demonstrated by the likes of Citroen, Mercedes, and Toyota, among others, with their Skate, Vision Urbanetic, and E-Palette concepts respectively, open the door to everything from "Mobile Gym as a Service" and "Mobile Hotel Room as a Service" to all manner of other opportunities that include everything from autonomous mobile bars, dining, doctors surgeries, games rooms, maker spaces, offices, schools, shops, and many more.

Include Airbus, with it's own modular vehicle frame and EVTOL pod and suddenly organisations could also soon be offering **Flying Taxi Services**. So, as you can see the opportunities are literally sky high.

ACT NOW

The ability to bring traditionally centralised and fixed location services to people wherever they are via MaaS could not only revolutionise some industries - such as healthcare where the doctors surgery could literally come to your neighbourhood - but it also offers a new opportunity to reshape our cities and re-think both urban and rural lifestyles and services.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Infrastructure, and Transportation
- New business and operating models
- New product concepts

UNI-MODAL TRANSPORTATION

3RD YEAR ON THE LIST



A Uni-Modal pod, NeXT

QUICK TAKE

Today governments and transport operators everywhere think in terms of Multi-Modal Transportation - where an individual travelling from A to B has to take multiple different vehicles and vehicle formats, such as cars and trains, in order to reach their destination.

However, as we see the emergence of **Autonomous Vehicles** and **Mobility as a Service** this is no longer necessarily the case as, with the right infrastructure and operating models, consumers can get into one vehicle, or autonomous pod, and stay in it throughout their entire journey.

Data sources: Various.

IMPACT

The concept of Uni-Modal Transportation (UMT), for the first time, takes a consumer first view of future transport networks rather than a disparate operators view. After all, today consumers often have to switch transportation modes multiple times to reach their final destination with all the cost, safety, reliability, stress, and time issues that goes with it.

Ultimately the biggest benefit of UMT is the fact that consumers can buy a service with one operator, and remain in one vehicle of their choosing for the whole journey as they travel door to door.

Ironically, today some of the future benefits of this trend can be quite well highlighted with the maritime industry where goods are loaded into containers. As the goods move from A to B they stay in the same physical space, but the vehicles that transport these containers, or these "Pods,"changes. Imagine having to keep transferring those goods every time the mode of transport changes and you have a basic idea of what we as consumers are having to deal with today as our status quo.

EXAMPLES

Unsurprisingly, the ability to get into one kind of vehicle, or use purpose built autonomous **Modular Vehicles**, and go door to door in it's very appealing. And while this trend is still nascent there are now a few countries looking into rolling it out - one of which is the UAE where customers will soon be able to hail a customised autonomous Next Pod to take them to their destination.

Taking a journey from Dubai to Abu Dhabi as our example customers will be able to hail their pod like an Uber and get into it as it pulls up outside their building. Once on board it will whisk them to the local Hyperloop station where the pod loads itself into specially designed carriages. Then, when the Hyperloop arrives in Abu Dhabi it simply disembarks and travels to the customers final destination. No transfers involved and a seamless rider experience if ever there was one.

Intriguingly variations of this trend could also be used to take pre-checked passengers and their luggage straight from their homes directly to the airport gates, so as you can see there are multiple opportunities to change the status quo.

ACT NOW

There are far too many examples of where today's Multi-Modal Transportation systems are overly costly and inefficient. Uni-Modal Transportation offers governments and organisations the opportunity to create a truly seamless, integrated transportation networks.

EXPLORE:

- Business and impact assessments
- Future of Infrastructure and Transportation
- Urban planning initiatives

BOOK AN EXPERT CALL

EXPLORE STARTUPS & MORE

VEHICLE ELECTRIFICATION

3RD YEAR ON THE LIST



QUICK TAKE

The transportation industry is one of the world's most polluting, for a variety of reasons, and as a result of environmental, political, and societal pressure and incentives manufacturers the world over, representing every type of vehicle - from aircraft, bikes, and cars to cargo ships, vans, and trucks - are now electrifying their products.

As we see huge amounts of investment continue to pour into the sector, and as we see dramatic improvements in battery energy density and other energy technologies, as well as infrastructure investment, this trend is set to accelerate.

Data sources: EPA, IEA, World Bank, and various.

IMPACT

Today the global transportation industry accounts for over 24% of all global greenhouse gas emissions, with road vehicles accounting for two thirds of that value, and emissions have been growing at a rate of 2% annually for the past two decades.

Over the past couple of years sales of Battery Electric Vehicles (BEV), especially cars, has increased by over 40% year on year, albeit from a low base, and now represent 3% of all global car sales and around 1% of the total global car stock.

While sales overall are surging as the trend gets under way the high cost of BEV's, in the absence of any subsidies, is still a major hurdle to adoption, although significant improvements in battery and vehicle design and manufacturing now mean that in the next few years many BEV's will be cheaper to buy than traditional combustion engine vehicles and, more importantly, will have a much lower TCO. Furthermore, while many people still have concerns about these vehicles environmental credentials there are already a myriad of supporting technologies coming to their aid.

EXAMPLES

Today almost every vehicle manufacturer, whether it's Daewoo and Hitachi Heavy Industries who are building some of the world's largest cargo ships, Airbus and Boeing , Tesla or Toyota, or hundreds of other vehicle manufacturers, are all electrifying their products, and they are doing it using a variety of energy types - from Ammonia and Hydrogen, through to more common-a-garden energy sources such as Biofuels, Lithium Ion (LiON) batteries, photovoltaics, and Solid State batteries.

Within the shipping industry there is a battle brewing between using Ammonia and Hydrogen as a primary energy source, supplemented by LiON and renewables, whereas in the aviation industry the battle is increasingly Biofuels versus Hydrogen versus LiON, with others appearing to be moved down the priority list.

Meanwhile, in the road based EV market it's LiON all the way - that is until the hundred or so other energy alternatives, which include everything from alternative battery types, high efficiency photovoltaic materials, hydrogen, and wireless energy technologies, become viable.

ACT NOW

While vehicle electrification is its own trend, and there are many ways that fleets are being electrified, it's part of the larger trend of a sustainable Carbon Zero future. As such developments in this space will be accelerated by developments elsewhere.

EXPLORE:

- Consumer trends
- Emerging technologies and technology roadmaps
- Future of Energy, Infrastructure, Manufacturing, and Transportation
- Partner ecosystems and solutions

CONCLUSION



PEOPLE SAY change is a constant, but in today's technology fuelled world this simple phrase is a deceiving, and often comforting, misnomer because change isn't constant, it's exponential, and the only boundaries to what we can achieve as individuals and as a global society are the ones that we invent for ourselves.

As researchers and scientists increasingly prove that nothing is impossible, that yesterdays science fiction is simply the future generations status quo, and as we all continue to bear witness to an increasingly rapid rate of change that's affecting and transforming every corner of global business, culture, and society the future belongs to all of us equally, and we should never loose sight of that.

As you race into your own future I wish you well, and never forget you have all the friends and support you need around you as we all voyage through time and space together on this fragile living spacecraft we call Earth.

Explore More

Matthew Griffin
Founder & Futurist in Chief
311 Institute

Notes:

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