Thematic Investing

Covid-19 Investment Implications Series: The World After Covid Primer

Thematic Investing

03 May 2020

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"The Day After Tomorrow"

Covid-19 is one of those rare events in history – like the Great Depression and fall of the Berlin Wall that will completely reshape geopolitics, societies, and markets. It is likely to be a catalyst for further tectonic shifts in the US & China decoupling, peak globalisation of supply chains and central bank quantitative failure. The consequences could be far-reaching, ranging from social unrest to further instability in oil, new economic doctrines, and re-evaluation of the social contract in sovereign states.

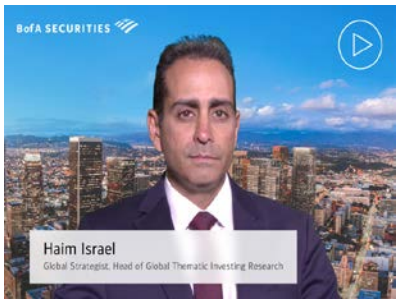
Post-Covid: times they are a-changing in the world order

Data is being created at the fastest rate ever, already up 50% vs. pre-Covid in parts of the west. The effect is intensifying the tech war, with governments becoming bigger and more influential – the Fed printed US$1mn every second at peak panic. Societies will be safer but less private, with more than 30 countries issuing citizen tracking orders.

5 themes and best/worst placed after the Great Isolation

Alongside a global survey of BofA analysts covering 3,000 companies and spanning 25 sectors, we outline 5 themes with US$20tn market cap of enablers for the world post-Covid. Among the secular beneficiaries are healthcare, digital consumer, ESG, staples, industrial real estate, and technology. Some of the challenged sectors include: fossil energy, commercial real estate, autos, legacy consumer, and the sharing economy:

1. **Geopolitics & Globalisation – the dragon vs the eagle, round II:** rising tensions clashing East/West doctrines. 'Global to local' on fast-forward. A third of BofA analysts now expect their companies to push for supply chain reshoring.
2. **Tech War – the race for supremacy:** data is the new must need resource, meaning a resurfacing tech-war as the new geopolitical battleground. Half of our analysts expect higher IT spending than pre-Covid. We anticipate a wave of investment in new infrastructure, AI technologies and moonshot future tech.
3. **Big Government – a new social contract:** the state has a new economic & social mandate. A third of analysts expect some erosion of shareholder rights = rise of stakeholders. Government 'data fever'. Privacy will be the currency to buy safety.
4. **Health – the new wealth and focus for ESG:** public health is the new national wealth. Stakeholders will increasingly focus on health-related ESG metrics; governments will come to appreciate health more as an economic resource.
5. **The New Consumer – "OK, Zoomer":** Gen Z is uniquely prepared for the new era of social distancing, the online world, and sustainability. Other generations will be slow to adapt. Millennials, the "double downgrade" generation, is most exposed to earning cuts as more US jobs have been wiped out this past month than have been created since the great financial crisis. EM middle class growth will stall.



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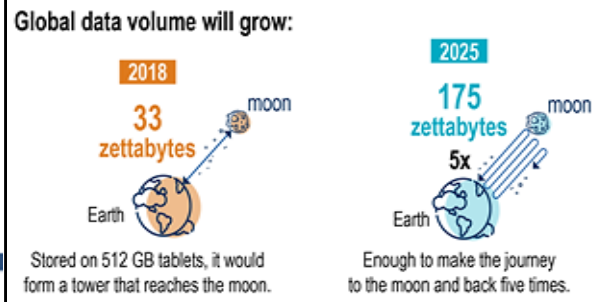
Everything you need to know about Life After Corona in 10 charts

Exhibit 1: Everything you need to know about Life After Corona in 10 charts...

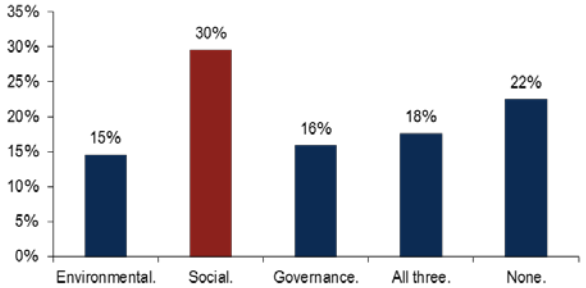
1) Government has just got bigger...
are we about to see a new world order?

2) This is the first crisis to bring unprecedented boost to data volumes

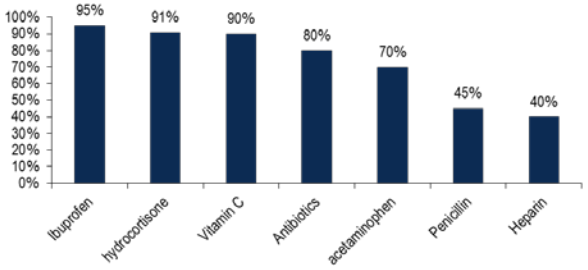


3) But also the death of privacy?
Over 30 countries have openly implemented tracking techniques on their citizens

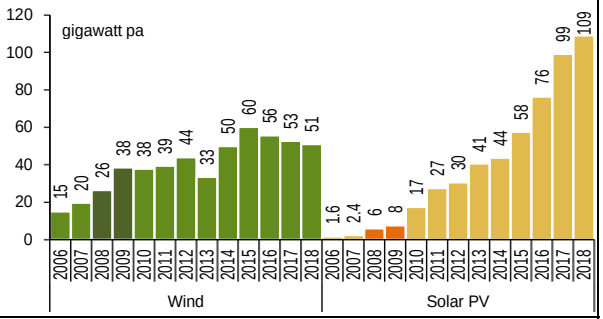
4) Covid means Social the hot topic in ESG
The most influential factor on ESG in this crisis?



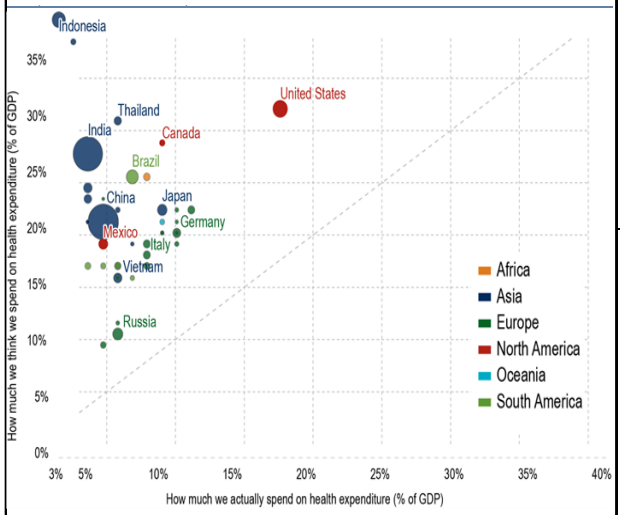
5) But has also highlighted new risks of a globalised system, meaning more supply chain diversification and reshoring
Over dependence: % US active drug ingredient imported from China



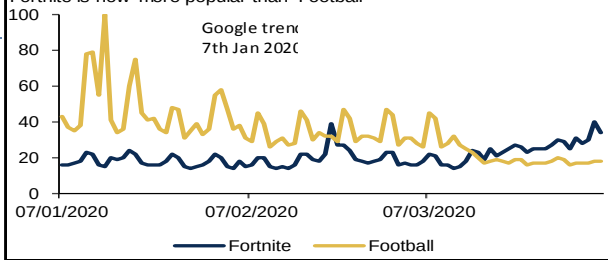
6) Half of analysts expect climate change investing to increase post crisis
Renewable volumes grew strongly few years after 2008 crisis



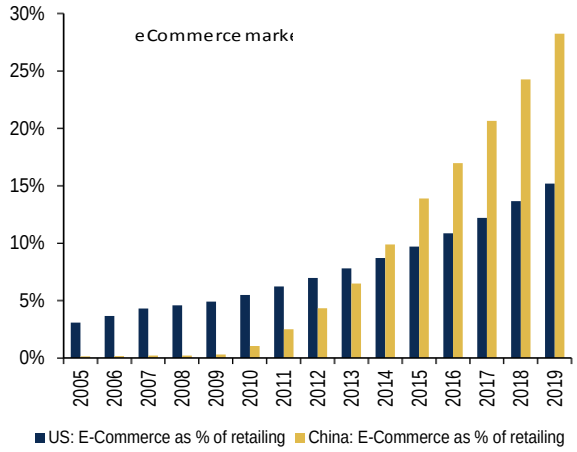
7) Overhaul of healthcare: We're spending much less than we think on health, time to reassess?
Perception and actual health expenditure measured as % of GDP, 2016



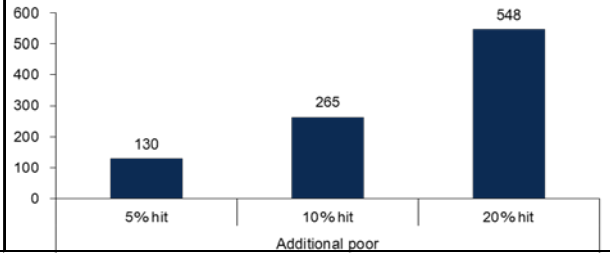
8) Everyone has to learn how to be a Gen Z
Fortnite is now more popular than Football



9) Half of analysts expect shift to online to accelerate post crisis due to covid
eCommerce in the US still has a long way to go even compared to China today



10) Double downgrade on Millennials, Bottom Billion reversal?
A 20% contraction = 500mn entering poverty



Source: BofA Global Research

Table 1: Beneficiaries & challenged sectors in a post-Covid world

Sector	Beneficiaries/Challenged	Covid-19 Comments
Communication Services		
Telco Service Providers	Beneficiary	Work from home (WFH) after coronavirus will require better connectivity infrastructure, risk from 5G capex costs & cybersecurity bringing network down
New Media & Entertainment	Beneficiary	Gen Z will drive faster shift towards eSports, video & music streaming consumption, total reality will be nextgen media platform to enable this in the future
Big Tech Platforms	Beneficiary	Covid-19 showing connected importance of multi-vertical platforms (social media, messaging, online shopping), but beware of data privacy regulatory headwinds
Old Media & Entertainment	Challenged	Coronavirus will accelerate cord cutting of TV and switch to streaming, advertising agencies suffer further through lower consumer spend on top of digital marketing disruption
Consumer Discretionary		
eCommerce	Beneficiary	Online is king now with innovation in logistics (warehouse automation, same day/drone delivery), further growth in voice AI shopping to catalyse ecommerce
Homebuilders/Home Improvement	Beneficiary	Stay at home theme to be long lasting with peak urbanization in DMs where people look to move to rural suburbs, DIY home improvement should benefit
Autos	Challenged	Less commute demand, cut to consumer incomes, growing demand for sustainability, continued improved air quality. Consumer preference for private over shared mobility, longer term need for AVs could be positive.
General/Apparel Retail	Challenged	Peak stuff and shift to online eCommerce accelerated post-Covid growing the disruption, private label disruption, fast fashion sustainability concerns, global to local apparel/sourcing automation is costly
Consumer Durables & Luxury	Challenged	Potential addressable market to grow slower/shrink as bottom billions' move to middle class stalls, but limited long term impact on high income market from Covid may limit cut in existing demand
Consumer Services (Hotel/Travel)	Challenged	Lasting mistrust of consumers over safety concerns, less business travel as meetings migrate online, sustainability pressures
Consumer Staples		
Household & Personal Care	Beneficiary	Hygiene and health is the new wealth for consumers, but private label may disrupt incumbent "billionaire brands" with Millennials and Gen Z less brand loyal
Food Staples	Beneficiary	Lockdown necessity and essentials, DM rising focus on health & wellness, plant based alternatives, EM Consumer also structural driver for FMCG
Beverages / Alcohol	Beneficiary	Consumer turning to at home drinking, younger generation preferences for craft alcohol, marijuana/cannabis infused drinks innovation
Food Retail	Beneficiary	Lockdown necessity, online innovation (food delivery, meal kits), future contactless stores, logistics automation
Tobacco	Challenged	Coronavirus impact on respiratory disease could reduce smoking/ecigarettes/vaping, legalization of marijuana could be further disruption
Energy		
Oil & Gas – Majors & Refining	Challenged	Covid19 could be final nail in the coffin for sector with OPEC crisis: EVs impact on demand, growth of renewables & energy storage, plastic backlash/petchem risk
Financials		
Other/Diversified Financials/Wealth	Beneficiary	Even greater demand for wealth management by Boomers, Millennial demand for robo-advisors, growth of ESG investing to boost assets
Payments	Beneficiary	Cash is no longer king nor hygienic with the growth of mobile/eCommerce transaction volume, future implications of blockchain on sector
Banks	Challenged	Retail banking branches may have to close faster with online & fintechs disrupting traditional banking (FX transactions, digital, mobile), big data/open banking (PSD2)
Insurance	Challenged	Liabilities for sectors increasing from: extreme weather risks, longevity risk, pandemics/travel impact, autonomous/connected vehicles (telematics)
Real Estate		
Industrial, Storage, SF Rental, Logistics	Beneficiary	Higher demand long-term from eCommerce logistics and re-shoring manufacturing needs, Millennials likely can only afford to rent more rather than own property
Data Center, Telco Tower	Beneficiary	Work from home (WFH) to accelerate demand for data intensive services like streaming, online shopping, edtech, eSports, 5G etc
Rural, Multifamily	Beneficiary	Dwellers could increasingly move from urban to rural areas to avoid dense cities, higher demand long-term from social distancing needs
Offices	Challenged	Work from home trend to accelerate post Covid, decreases demand for office in dense cities although companies may need more square feet, less co-working
Commercial/Shopping Malls/Lodging	Challenged	Decrease in demand for commercial real estate, reduction in corporate travel to dent hotel demand, death of the mall with more online shopping
Health Care		
BioPharma & Biotech	Beneficiary	Healthcare sector reweighting to become ESG story, innovation in AI driven drug discovery and helping to cure other disease (malaria, cancer Alzheimer's, Parkinson's)
Life Sciences Tools/Diagnostics	Beneficiary	Disease surveillance as arms dealer of healthcare by enabling nextgen human DNA genome sequencing, personalised medicine, biomarkers
MedTech / HealthTech	Beneficiary	Covid 19 to drive revolution in digital health, telemedicine, electronic healthcare records (EHR), patient data analytics, growth in robo-surgery
Healthcare Distributors & Services	Beneficiary	Retail pharmacies could be beneficiaries of more point of care diagnostics, but facing increasing Big Tech disruption (Amazon Pillpack) on distributors, PBMs
Health REIT/Facilities/Hospitals	Challenged	Pressure on hospitals, senior living, skilled nursing facilities, retirement homes, shift from volume-to-value based healthcare + rise of private startups to disrupt further
Industrials		
Capital Goods	Beneficiary	Reshoring of manufacturing likely to drive growth in domestic industrial automation driven by IIoT, sensors, big data, industrial software, renewable equipment
Defence	Beneficiary	Increasing geopolitical tensions to spur spending on homeland security, tech war likely to increase focus on sector
Business Services	Beneficiary	Multiple beneficiaries include safety & security, pest control, data analytics, educational content, waste management
Aerospace / Transport	Challenged	Air travel likely to remain muted in medium term, trade war also likely to decrease global shipping but need for automated logistics could benefit sector
Materials		
Metals & Mining	Beneficiary	Coronavirus to accelerate climate change decarbonization which is positive for metals e.g. EV demand for lithium, cobalt, nickel, gold, copper
Construction Materials	Beneficiary	China One Belt One Road and Blue Dot Project to boost new infrastructure spend to benefit cement/concrete, climate-resilient buildings, energy efficiency (insulation)
Paper & Packaging	Beneficiary	eCommerce is the leading sector driver, growth in parcels deliveries, plastic sustainability, better packaging to reduce food waste, forest tree carbon sinks
Chemicals	Challenged	Increasing ESG risk from PFAS, plastic backlash/petrochemical risk, ag chems fertilizers risk but could also benefit from EV battery an future food ingredients
Information Technology		
Semiconductors	Beneficiary	The biggest beneficiary of coronavirus with Moore's Law as the key enabler of the connected world (IoT, sensors, chips, driverless cars),
Cloud, Software and Services	Beneficiary	Shift to cloud computing is another key pillar of the connected world, shift away from hardware to software, cybersecurity boom
Tech Hardware	Beneficiary	WFH requires demand for smarter devices (smartphones, wearables, AR/VR headsets), 5G telco equipment capex cycle
Utilities		
Integrated Utilities / IPPs	Beneficiary	Utilities can grow by pivoting towards renewables despite modest volumes & pricing impact. Utilities offer some defensive attributes & can benefit from low yields.
Renewables, Grids & Water	Beneficiary	Covid-19 to accelerate shift towards clean energy, energy storage, EV charging and smart grids. Some water utilities offer defensive attributes.
Waste	Challenged	Waste volumes could remain lower for longer as recovery from economic shock takes time and focus on sustainability increases.

Source: BofA Global Research

Did You Know? The world B.C. and A.C.

(Before Corona and After Corona)

- All G20 countries have implemented some sort of shelter-in-place order, equivalent to 80% of global GDP under lockdown[1]
- Global carbon emissions could fall by 8% this year, equivalent to what India emits per year which would be the biggest drop ever recorded[2]
- The fall in greenhouse gases this year alone could be greater than all the recessions of the past 50 years combined[2]
- The Fed was buying more than US$1 million in financial assets every second during the peak panic phase of the crisis[3]
- It took airlines 64 years to reach 50 million users, Netflix 7 years, but Disney+ achieved this in just 5 months with the kids under lockdown (Gen Z bonus stat: it took the HouseParty app just 1 month!)[4]
- At 4 billion people, more citizens are now under lockdown than those who have access to internet broadband, social media or even safe toilet sanitation[4]
- The US$20tn market cap of thematic enablers identified in the post-Covid era is bigger than the GDP of the US, Europe or even China + India[4]
- c90% of painkillers and antibiotics (ibuprofen, penicillin, etc) on average have active drug ingredients imported from China[4]
- For the first time in history, China is outspending the US on R&D (US$501bn vs. US$493bn)[4]
- The number of unemployed Americans now exceeds the population of Australia[4]
- More US jobs have been wiped out in the last month than were created in the past 10 years since the Great Recession[5]
- Sir Isaac Newton discovered gravity during the Great Plague of 1666 when he had to practise social distancing and work from home[6]
- Zoom daily active users jumped 30x in just four months from 10 million in December to 300 million in April 2020[7]
- Zoom's terms & conditions are longer than the US Constitution[7]
- Fortnite is now more popular than football by Google searches[8]
- If you were to stack up the US$2 trillion US fiscal stimulus package in 1 dollar bills, they would be 6x higher than the International Space Station (c. 2,400km)....
- ... if you were to put them side by side, they would stretch from Earth to Mars...and halfway back again![4]

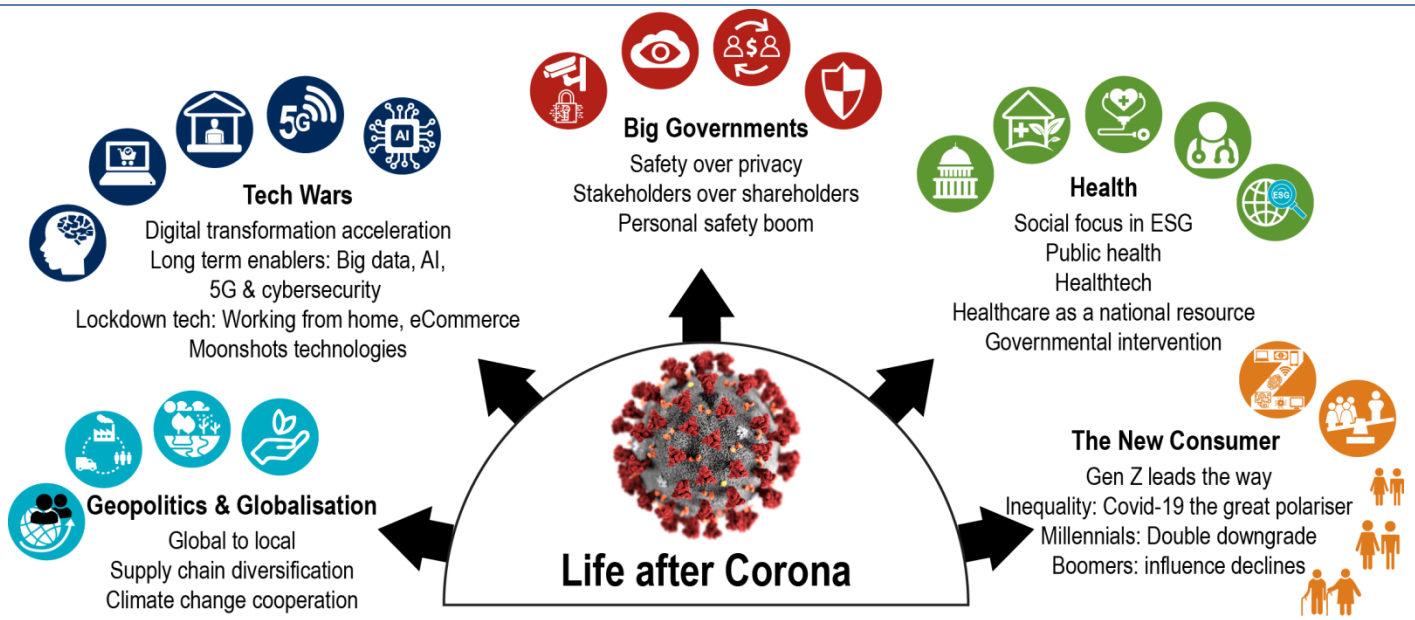
Source: [1]Bond Capital, [2]IEA, BofA Research, Guardian, Carbon Brief, [3]BofA Research, FT, [4]BofA Research, [5]New York Times, [6]Bloomberg, [7]Zoom, [8]Google Trends

Exec summary: the year the earth stood still

Similar to other historical global crises, Covid-19's influence will extend beyond the current lockdown peak. We expect this pandemic to accelerate many macro trends that would have taken five or more years to play out before, from peak globalisation, to renewed tech wars and a reappraisal of healthcare systems and government influence. In this primer, we highlight five top trends that will define the aftermath of Covid-19. Our survey of BofA fundamental analysts helps us to better assess the implications of these trends for sectors and markets and to quantify the effect.

1. Geopolitics & Globalization
2. Tech Wars
3. Big Governments
4. Health
5. The New Consumer

Exhibit 2: Life after Corona 5 themes



Source: BofA Global Research

The investment universe: US$20tn market cap of enablers

We identify sub-segments across our big 5 themes that are well placed to benefit in the Post Covid-19 World, with the total market capitalisation of c.$20tn (see Table 1).

Table 2: Investment opportunities for the Post COVID-19 World across various sub-segments totalling c.$20tn in market capitalisation

Geopolitics & Globalisation		Tech War		Big Government		Health		The New Consumer	
Sub-segments	$bn Mcap	Sub-segments	$bn Mcap	Sub-segments	$bn Mcap	Sub-segments	$bn Mcap	Sub-segments	$bn Mcap
Total	2,114	Total	10,344	Total	603	Total	4,425	Total	2,891
Industrial Automation	554	High Tech	6,613	Homeland	411	BioPharma	2,513	Food	1,288
Global to Local	442	Processing Power	1,120	Internet of Things	132	HealthTech	722	Digital Entertainment	572
Clean Energy	326	Data Analytics	771	TIC	60	Managed Care	486	eCommerce	489
Electric Vehicles	273	Telecom Tech	559			Life Sciences	412	DIY (Do it Yourself)	301
Future Food	187	Payments	330			Healthcare Digitalisation	157	Video Games	159
Energy Efficiency	165	Telecom Infra	267			Biotech	136	Learning	82
Environmental Services	125	Connectivity Software	260						
Sustainable Packaging	44	Cybersecurity	259						
		Data Infra	165						

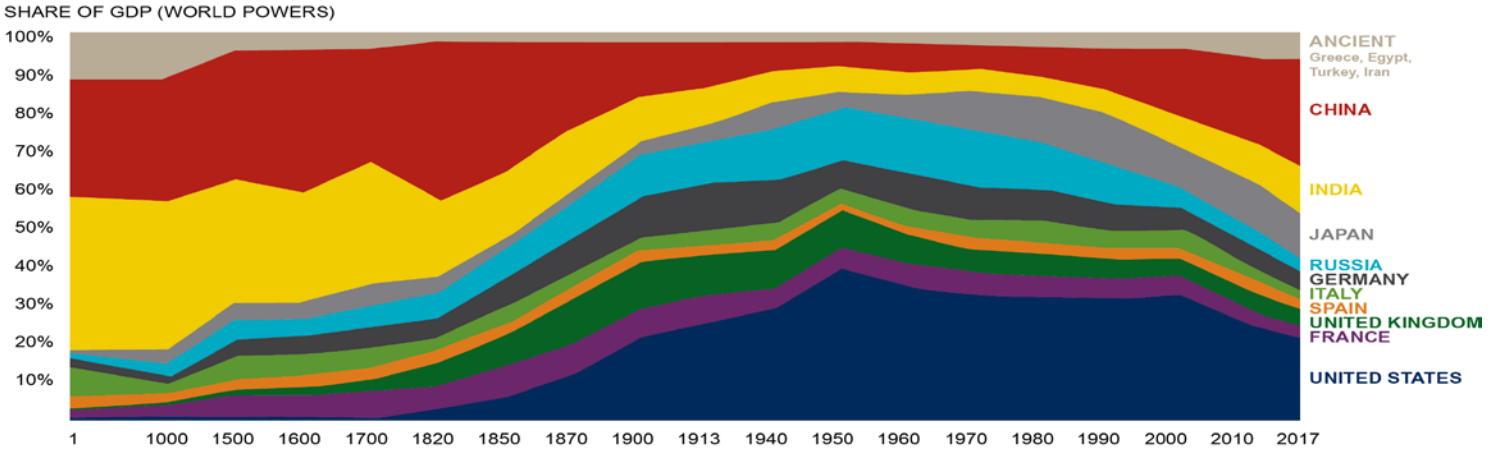
Source: BofA Global Research

1. Geopolitics & Globalization: enter the dragon, cometh the eagle

The ascent of China and the decline of US and European manufacturing since 1990 led to a rise in anti-globalisation sentiment even before Covid-19, boiling over with the US-China trade wars. This pandemic could significantly ramp up geopolitical tensions relating to manufacturing jobs, security of supply, technology and privacy risks and import over-dependence in critical areas (e.g. tech, pharma), particularly on China. The most significant legacy of Covid-19 could be a reshaping of the world order in manufacturing, sourcing, trade, tariffs, sanctions and technology, driven by geopolitics. It is likely to drive a much faster-than-expected shift in manufacturing away from China. Increased focus on sustainability, social impact and climate change should also accelerate de-globalisation. *Beneficiaries: Automation, Industrial Software, Cleantech; Challenged: Shipping, Materials, Fast Fashion, Fossil Energy*

Exhibit 3: The past 2,000 years of economic history

Share of GDP by country over time

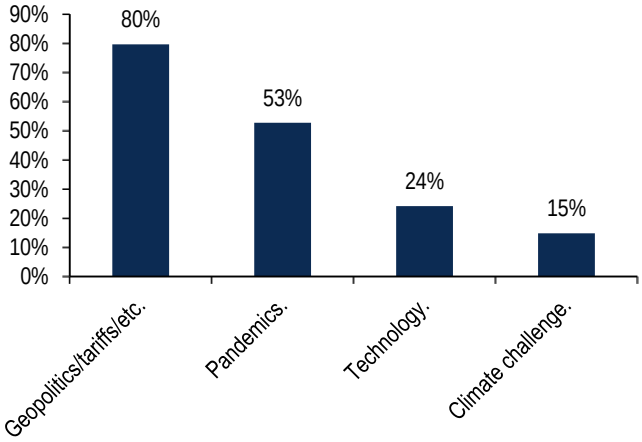


Source: Visual Capitalist

Our survey tells us that 80% of our analysts see geopolitics/tariffs as the key de-globalisation driver (pandemics 53%, technology 24%). Over a third of analysts have seen or are expecting reshoring or diversification in supply chains while half of analysts expect climate-friendly investments to increase post Covid-19

Chart 1: Geopolitics most impactful in globalisation trend

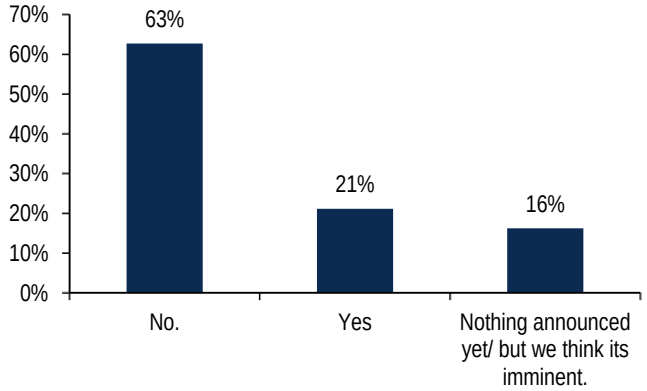
What will be the key driver(s) for decline in globalisation?*



Source: BofA Global Research *Analysts were able to select more than one response

Chart 2: 37% of analysts have seen or expect supply chain plans to be affected by Covid

Has the Covid-19 pandemic affected plans for re-shoring supply chains for companies in your coverage group?

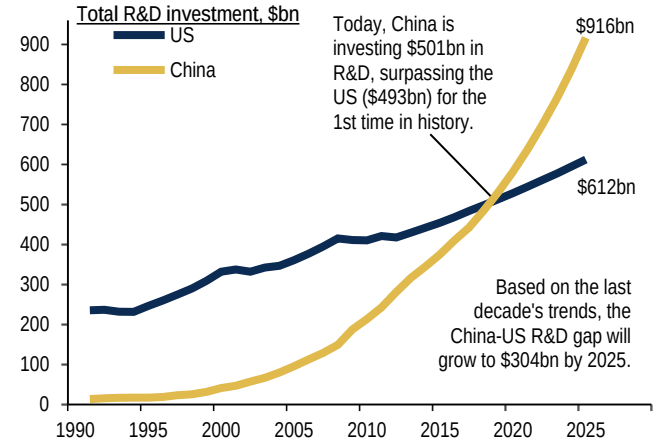


Source: BofA Global Research

2. Tech Wars: The race for supremacy to spark a new wave of investments

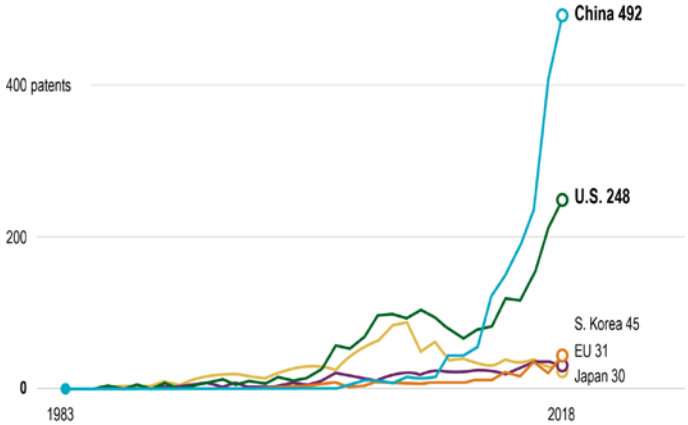
Covid-19 has accelerated structural shifts in consumption and working, and our use and deployment of technology. The lasting legacy of this will be a combination of new communication infrastructure, data generation, cloud computing power, and bandwidth. Underlying infrastructure may differ regionally, though, due to on-going trade tensions, which technology is at the heart of. This could pull forward commercialisation of Moonshot technologies such as autonomous vehicles, quantum computing, and vertical farming, as nations look to get an edge in the race for tech supremacy, and shifting industrial and political priorities. Nearer-term, trends like working from home, eCommerce, and stay-at-home activities (such as streaming and eSports) could see increasing long-term adoption. However, there are several short-term challenges. Economic uncertainty may constrain overall demand and funding. Concerns over social distancing may negatively affect sharing economy platforms. Increased data tracking and personal monitoring raise privacy and ethical concerns that will vary internationally. *Beneficiaries: Cloud, 5G, Processing Power, Robotics; Autonomous Vehicles. Challenged: Privacy, Old Media, Bricks & Mortar, Sharing Economy.*

Chart 3: China overtaken US in R&D spending



Source: BofA Research Investment Committee, OECD

Exhibit 4: Quantum Computing patent filings by country. China 2x US, 13x Europe...

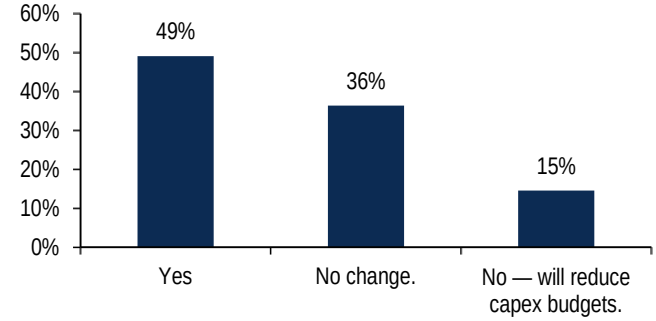


Source: Patinformatics

Our survey tells us that half of sector analysts expect technology investments in their sectors to increase, with 44% expecting more robots & automation.

Chart 4: Tech remains a spending priority for almost all

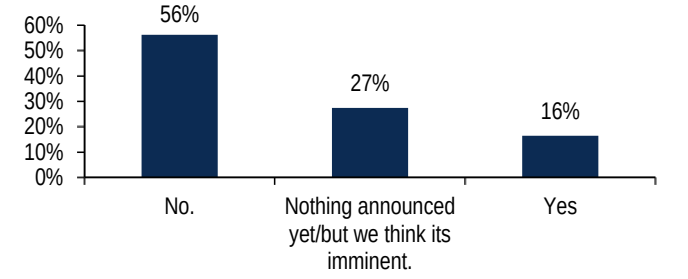
Are your companies planning to increase capex spending on tech?



Source: BofA Global Research

Chart 5: 43% of analysts have seen or expect robotic/automation plans to be affected by Covid

Has the Covid-19 pandemic affected plans for deploying robotics or automated processes for companies in your coverage group?



Source: BofA Global Research

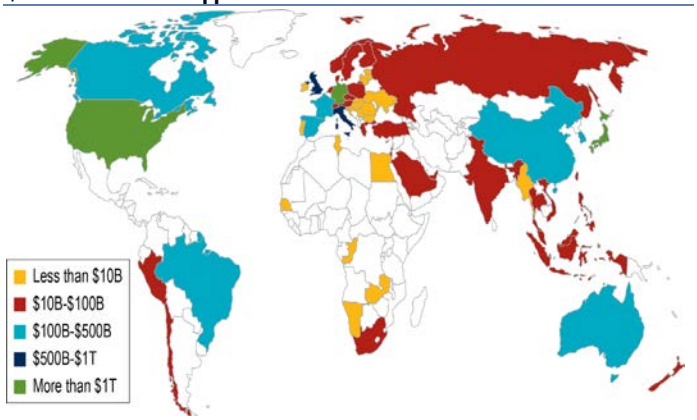
3. Big Government: a new social contract

Growing surveillance, inequality and the current inadequacy of some healthcare systems versus others highlighted by the current crisis will act as a catalyst for change in politics, furthering populism trends and increasing the risk of social unrest. Covid-19 has handed governments a new social mandate to protect their citizens. Governments will exert greater influence on businesses with shareholder supremacy potentially eroding in favour of stakeholders. Further, this crisis has made the technology industry useful – if not vital – for implementing government power. We think this is unlikely to reverse, resulting in a renewed debate about the rights of the individual and privacy but including the role of government in this conversation too. Finally, similar to funding post defence-related and other crises, government spending on personal safety will remain elevated compared with pre-Covid levels for years to come. *Beneficiaries: Stakeholders, Tech, Safety, ESG; Challenged: Privacy, Debt, Shareholders*

Exhibit 5: Over 30 countries have openly implemented tracking techniques on their citizens

Source: OneZero, Medium

Exhibit 6: Surging stimulus - Governments worldwide pledge more than $8 trillion in fiscal support

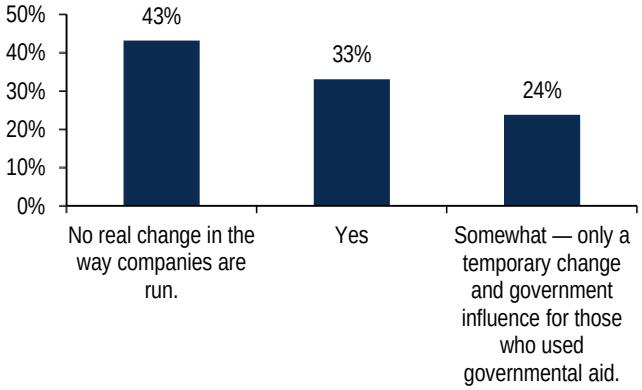


Source: Government data, Bloomberg, updated April 22, 2020

Our survey tells us that 33% of BofA analysts expect shareholder rights to be eroded either through government intervention or changing priorities within companies beyond temporary erosion from companies taking government aid.

Chart 6: A third of analysts expect permanent change to shareholder rights

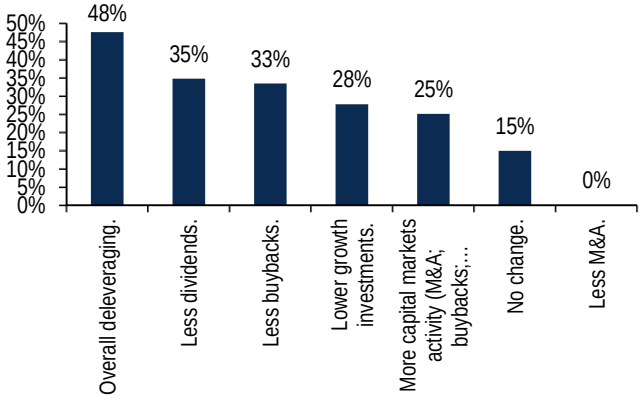
Are shareholder rights/voice being eroded?



Source: BofA Global Research

Chart 7: Half expect deleveraging for the next 2-5 years

In the next 2-5 years, how do you expect the current crisis to impact capital structure?*

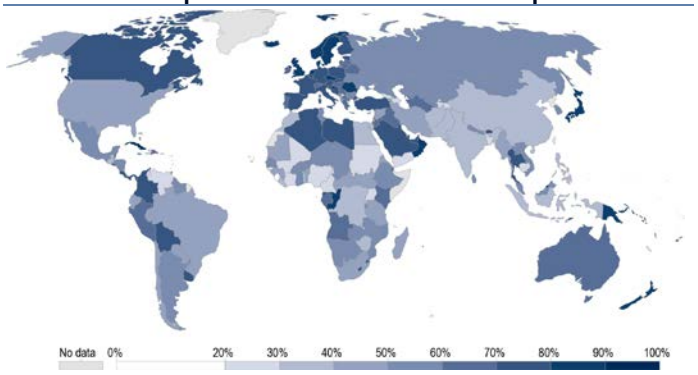


Source: BofA Global Research *Analysts were able to select more than one response

4. Health: the new wealth and focus for ESG

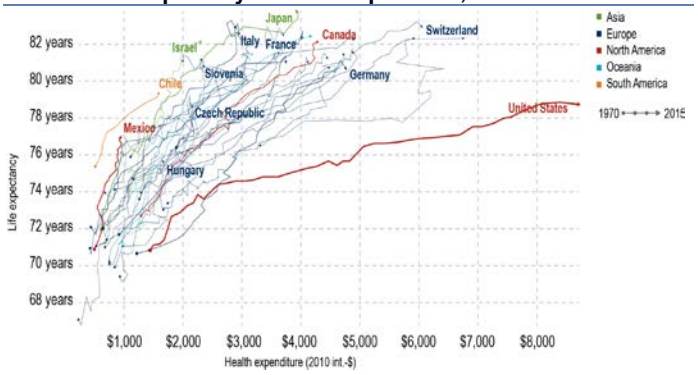
Our societal welfare, economic or otherwise, is built on having a healthy and thus productive population. Public health systems haven't always been uppermost in investors' minds when it comes to ESG issues. However, Covid-19 will amplify the importance of healthcare and its social role and accelerate other pressing global public health issues such as drug pricing, antibiotics resistance, future pandemics prevention, universal vaccines for all, etc. The debate around universal healthcare coverage will intensify: the US is the only developed country that doesn't have such a system. Overall, roughly 10% of GDP is spent on healthcare globally yet 20-40% of this is wasted. A more efficient system that focuses on value-based outcomes, preventive care and greater use of technology (big data, AI, telehealth, wearables etc) will be important in securing a healthier world population post-coronavirus. *Beneficiaries: Social in ESG, HealthTech; Challenged: Traditional Healthcare Model, Data Privacy.*

Exhibit 7: Public expenditure as % of total healthcare expenditure



Source: World Bank + WDI, Our World in Data

Exhibit 8: Life expectancy vs. health expenditure, 1970 to 2015



Source: Our World in Data

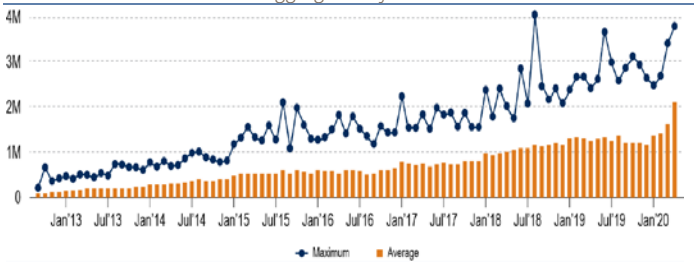
Our survey tells us that 2/3rds of analysts surveyed flag that employee healthcare was already or will become more of an important ESG factor for their company coverage.

5. The New Consumer: "OK, Zoomer"

Gen Z may be uniquely prepared for the new era of interactions following the coronavirus crisis – other generations will need quickly to learn from them and change their consumer habits, enlarging the addressable markets for technology products such as streaming, social media, eCommerce, etc. On the flipside, this generation – alongside Millennials – is the most exposed to reduced earning potential over the long term. Further, this global pandemic could result in a slowdown or reversal of the decades-long march to pull billions out of poverty – just a 20% fall in income could push over half a billion people into poverty. Finally, following a fall in births nine months after the crisis, there could be a baby boom, as seen after many famines, earthquakes, and disease outbreaks. *Beneficiaries: Gen Z, New Media, Payments, ESG; Challenged: Millennials, Bottom Billions, Traditional Consumer*

Exhibit 9: Number of concurrent viewer for Amazon's Twitch gaming platform doubles in 4 months

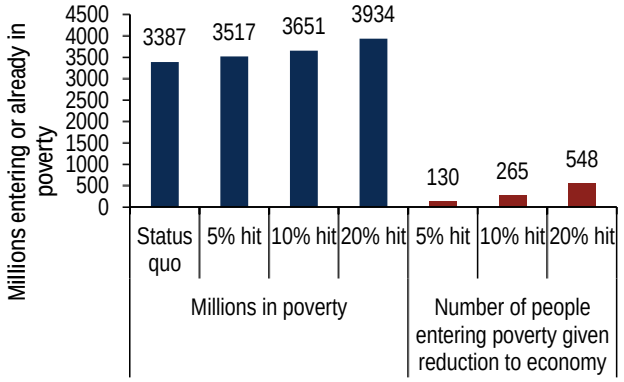
Concurrent viewers in Twitch aggregated by month



Source: Twitch

Chart 8: Over half a billion people could enter poverty if incomes contract by 20%

Number of people below the US$5.50/day poverty line given 5%, 10% , 20% cut to economy (millions)



Source: Sumner et al UNU-Wider 2020

Our survey tells us that half of relevant analysts expect social distancing to have a lasting impact on their sector coverage.

Covid-19: once-in-a-generation crisis – and transformation

'When written in Chinese the word *crisis* is composed of two characters – one represents danger, the other represents opportunity' - **John F Kennedy**

'There are decades where nothing happens, and there are weeks where decades happen' — **Vladimir Lenin**

'Never let a good crisis go to waste' – **Winston Churchill**

Covid-19: Not just a temporary crisis, a permanent disruptor

Historic global crises like wars, revolutions, pandemics, etc often feel like they put history on fast-forward. Processes that normally take decades or longer to play out unfold in a couple of weeks. Coronavirus is the political, economic, and psychological event of our lifetimes that will drive disruption and transformation for years to come. It will bring a radical transformation of the kind that occurs only once in a generation.

The crashes of the 20th century – World War I/II, The Great Depression – were hard to understand at the time because their main causes were set in motion decades before. The backdrop to Covid-19 has been no different. In the past few decades, globalisation, air travel, and international supply chains have made human beings more physically connected than ever before. We believe a key legacy of coronavirus is that countries could seek greater self-sufficiency in their supply chains.

Every crisis leaves its innovative legacy

The Black Death, which killed as much as a third of Europe's population during the 14th century, led to severe labour scarcity. Resultantly higher wages eroded feudalism, encouraged innovation in agriculture technology and accumulation of capital, and ultimately spurred on the Industrial Revolution. The Great Depression created a 'waste not, want not' attitude that defined consumer patterns for decades. The 1970s oil supply shock led to the first efforts on energy conservation, efficiency and independence. And more recently the 2003 SARS epidemic helped jumpstart China's nascent eCommerce sector and ushered in the era of mobile payments in the country. The moral of the story is that humanity always innovates after crisis.

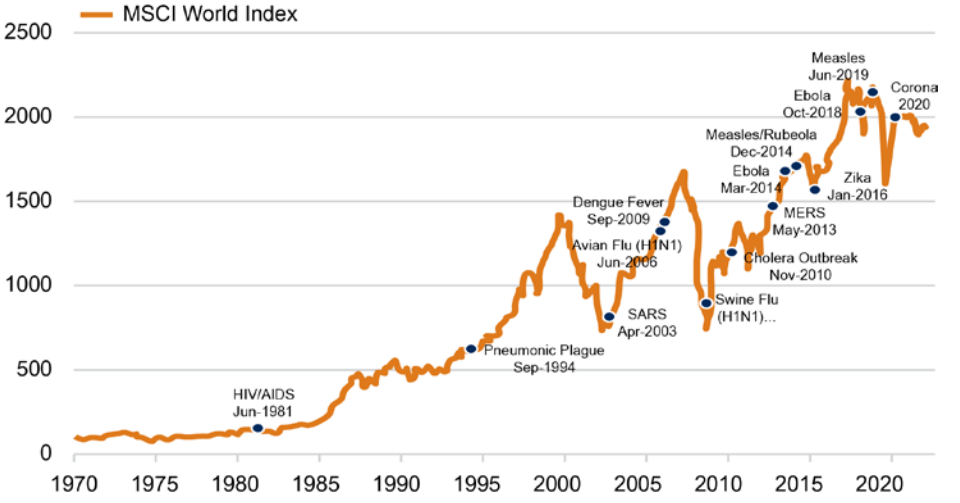
'Every pandemic in history has changed the world. Pandemics are like rivers. They alter national boundaries. They interrupt national alliances. They restructure internal political systems. There's something about each one though that is unique, and it goes way beyond the number of death and casualties...'

Dr. Larry Brilliant – Chair of Skoll Foundation: Ending Pandemics fund

Looking beyond the peak: a legacy of huge data creation

What will Covid-19 leave? Unlike other crises, Covid-19 will leave the legacy of massive data and knowledge creation in the medical, technological, and social fields, among others. While global knowledge typically doubles every 2-3 years, we can assume Covid-19 will be a major data accelerator, speeding up thematic disruption from decades away to only years away for certain themes.

Exhibit 10: World epidemics and global stock market performance



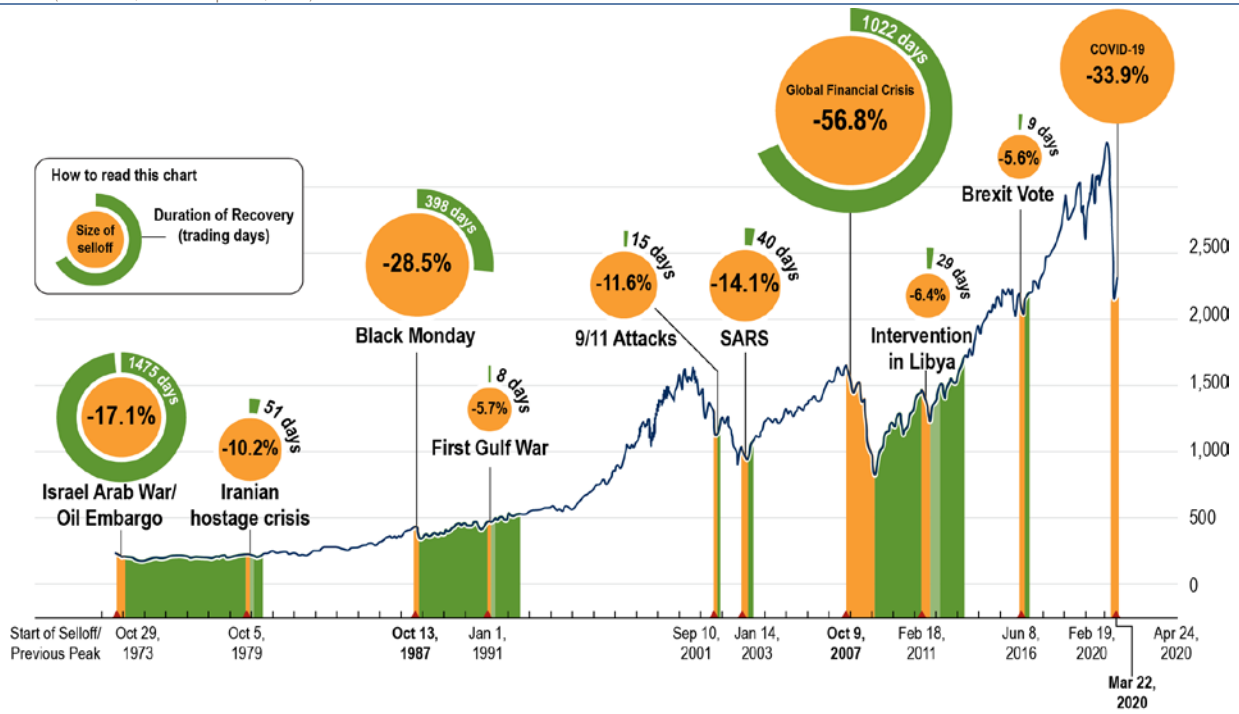
Source: BofA Global Research, Charles Schwab, Bloomberg

Furthermore, we think one should not fear expansion of Big Government post coronavirus. For it was from the World Wars that the modern-day social contract across healthcare, pensions, and public services emerged. Governments who were trying to restore economic and living conditions and fight off mass unemployment intervened more in the economy and accelerated their building of social insurance systems and public services in health, education, and housing. We believe coronavirus will spur a re-imagination of the social contract that reduces inequality.

And, finally, in many ways preventing Pandemics is similar to preventing Terrorism. We know roughly where it can originate and what's responsible, but we don't know exactly when the next will happen. Hence, the approach to tackling them can be similar – by improving preparation and funding of safety measures before the next crisis to protect civilians to the best of government's abilities.

Exhibit 11: Black Swan events: Short-term crisis, Long-term opportunity

S&P 500 Performance (October 1,1973 to April 24,2020)



Source: Visual Capitalist, Bloomberg

The post-Covid investing framework

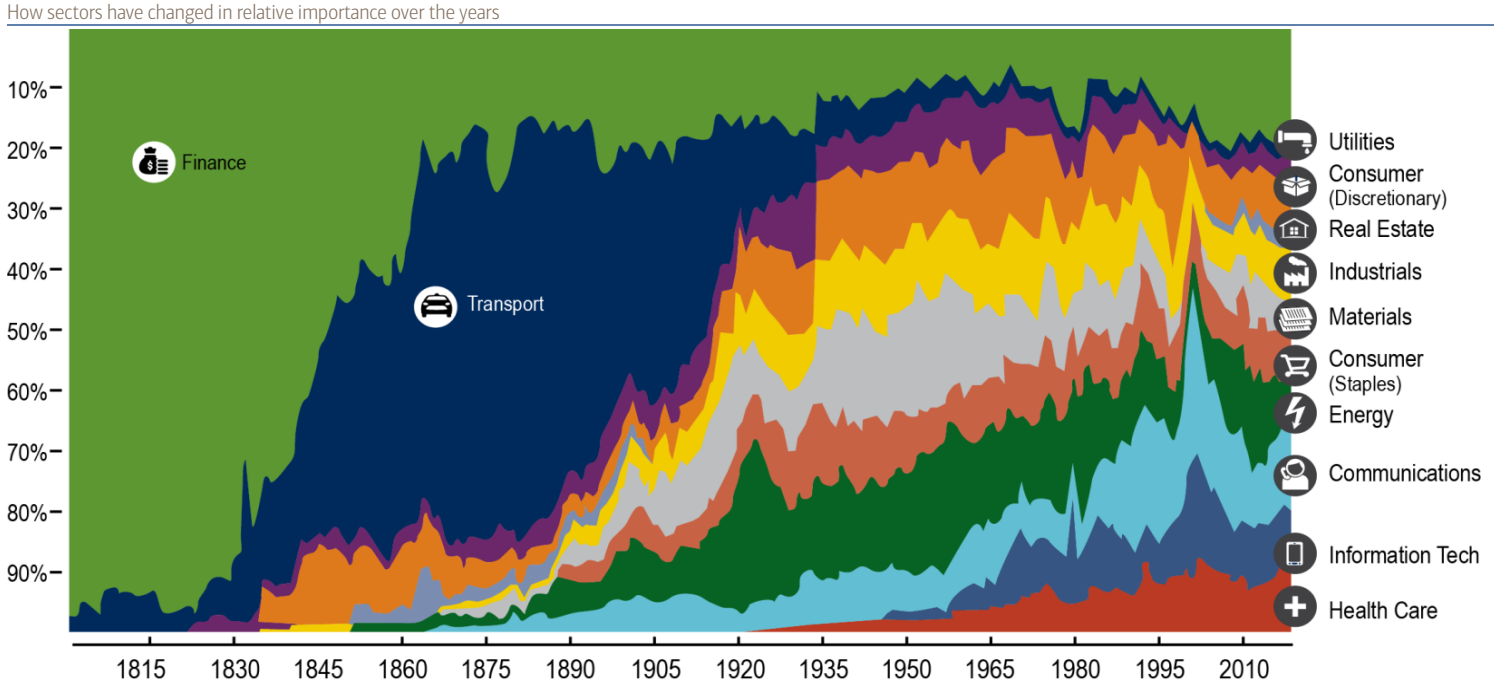
We are now truly witnessing a Transforming World. We believe this crisis is a call to action for a new framework which is more important and relevant than ever in the current climate. The megatrends mentioned in our Decade Ahead: 2020s report - will happen at a more intense pace than originally predicted and offer important solutions for tackling the greatest challenge of our time. We see themes further driving and disrupting asset markets in the 2020s. Looking forward, we believe that thematic investing can outperform in the brave new post-coronavirus world: People – on scarcer allocation of human resources; Innovation – on the faster disruptive role of technology; Markets – on greater allocation of scarce financial capital; Government – on a bigger role of state public policy; and finally Earth – for the cleaner allocation of natural resources.

New investment approach would suggest different weights vs. GICS

Our thematic approach to investing places more emphasis on the Healthcare, Technology, and Communication Services sectors, with less emphasis on Energy and Financials in a post-coronavirus world.

Exhibit 12: Visualizing 200 years of US Stock Market History

How sectors have changed in relative importance over the years



Source: Visual Capitalist, BofA Global Research

The Great Acceleration: the coronavirus turbocharger

We believe coronavirus has turbocharged many of the thematic megatrends. The Great Moderation was the reduction in the volatility of business cycle fluctuations in developed countries that started in the mid-1980s, compared with the decades before, and arguably could be extrapolated to the 2010s post the Great Financial Crisis, up until the onset of Covid-19. Conversely, The Great Acceleration is the concept of accelerating change in tech. It refers to the dramatic continual and roughly simultaneous surge in growth rates across a large range of measures of human activity, first recorded in the mid-20th century and continuing to this day. This will be further accelerated by Covid-19 where we see a moonshot technology revolution rather than evolution.

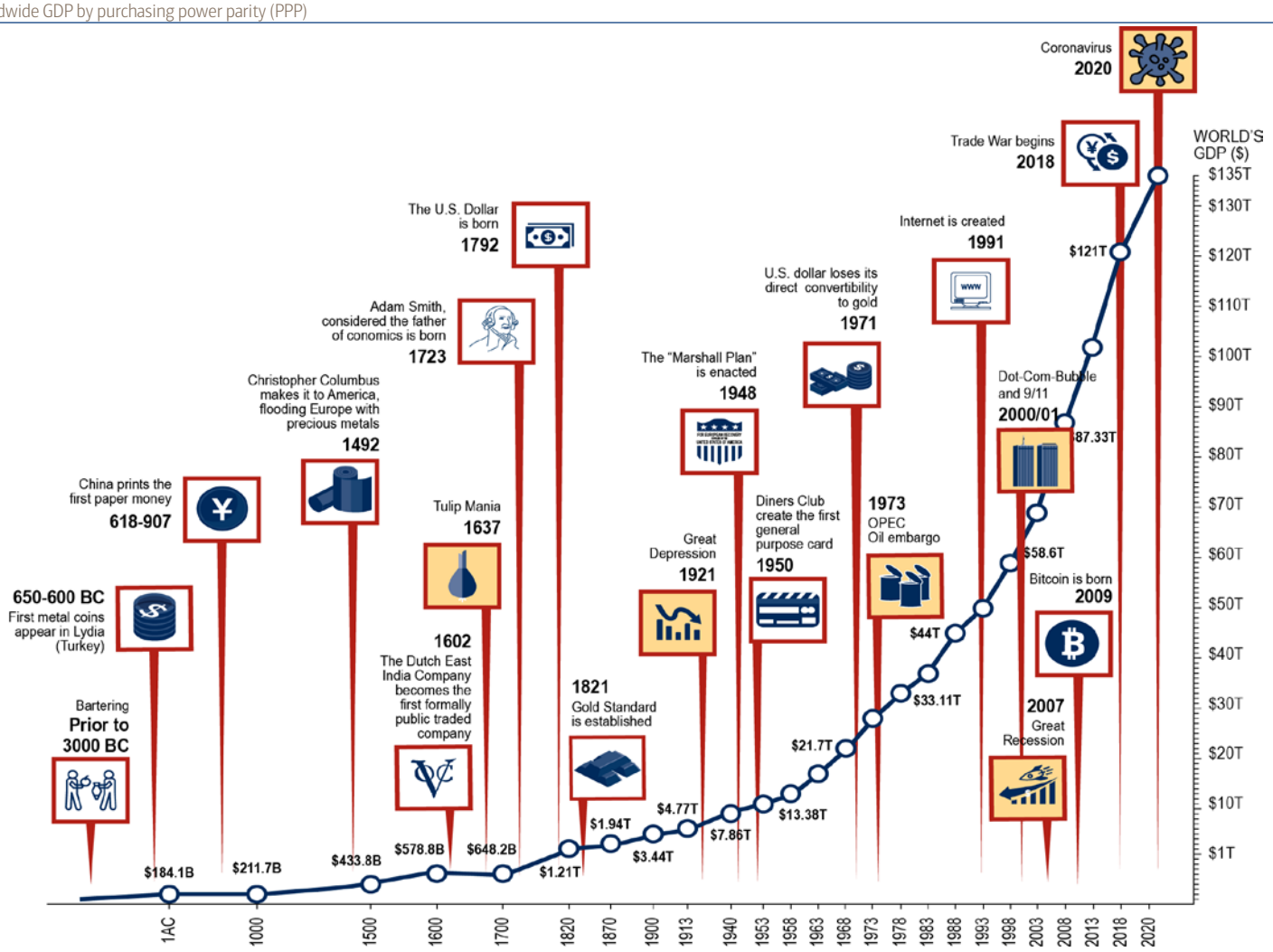
Shifts in global power accelerated by Covid-19

Covid-19 is likely to further accelerate global influence being shared across more countries, including China. Peak globalisation, the Splinternet tech war and now the diverging responses of the US and China to Covid-19 have highlighted the growing split in governance opinions across the globe. Furthermore, combined with the declining

influence of OPEC owing to the continued rise of renewables, this could result in some of the largest shifts in power ever seen in modern economic history.

Exhibit 13: Economic growth over the past 2000 years

Worldwide GDP by purchasing power parity (PPP)

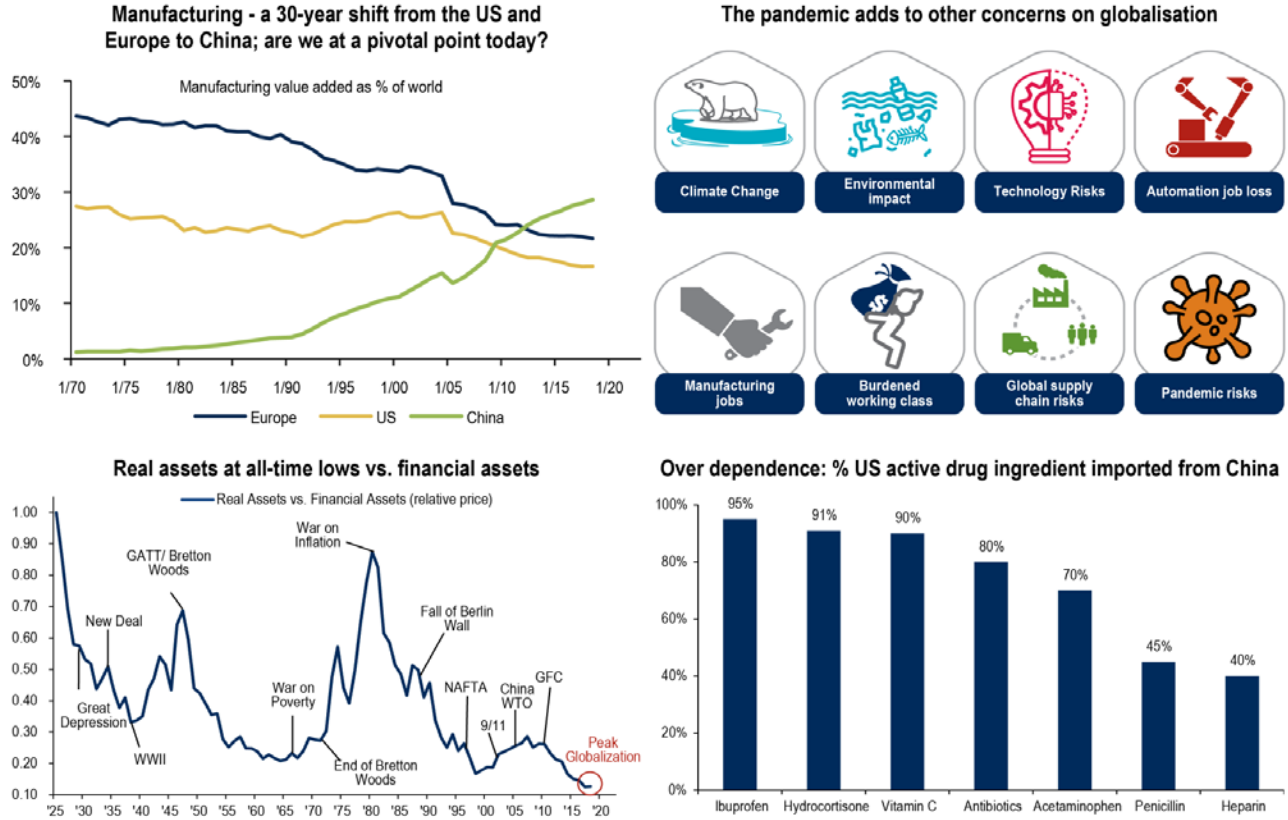


Source: HowMuch, BofA Global Research

Geopolitics and Globalization: virus adds fuel to the fire

- **Did you know?** China's global share of manufacturing value has risen from 3% in 1990 to 25%, fuelling anti-globalisation and geopolitical tensions.
- **Key takeaway:** Faster shift from China as supply chain fears compound concerns over inequality, technology, privacy and climate change. But the biggest impact is likely to be rising geopolitical tensions between the US and China, the West vs. the East. Shift to DM (automation, critical areas, jobs) or other EM (diversification, labour).
- **Our survey tells us** that 80% of our analysts see geopolitics/tariffs as the key de-globalisation driver (pandemics 53%, technology 24%). Over a third of analysts have seen or are expecting reshoring or diversification in supply chains, while half expect climate-friendly investments to increase post Covid-19.

Exhibit 14: Faster de-globalisation post Covid-19 as security of supply fears added to other concerns like jobs, climate change & technology



Source: World Bank, US Commerce Department, US-China Economic and Security Review Commission, BofA Global Investment Strategy, BofA Thematic Investing Strategy

Exhibit 15: Peak Globalisation Trends & Strategies

TRENDS	WINNERS		LOSERS	
Global to Local	Automation	CleanTech	Shipping	Fossil Energy
Supply Chain Diversification	Industrial Software	Local	Global	Privacy
Climate Change Cooperation	Security		Fast Fashion	Air Travel

Source: BofA Global Research

Covid's lasting legacy: turbocharged geopolitical tensions

Covid-19 & Peak Globalisation: The straw that broke the camel's back?

The ascent of China and the decline of US/Europe manufacturing since 1990 had led to a significant rise in anti-globalisation sentiment even before the Covid-19 pandemic, boiling over with the US-China trade wars since 4Q18. We believe the Covid-19 pandemic significantly ramps up geopolitical tensions and concerns in diverse areas such as manufacturing jobs, security of supply, technology / privacy risks and over-import dependence in critical areas (tech/pharma), particularly on China. The most significant legacy of Covid-19 could be a wholesale reshaping of the current world order in manufacturing, sourcing, trade, tariffs, sanctions and technology.

Covid pandemic to re-ignite tectonic movements

Given the supply disruptions already faced and how the overdependence on complex global supply chains has been laid bare during the pandemic, there are major questions around how countries and companies could reshape their approach to sourcing, manufacturing and technology. How fast should reshoring/relocation happen? Should manufacturing be shifted away from China to other EMs or back to local regions? What is more important – cost efficiency or security of supply (the former was winning so far)? Should tariffs on most imports be the norm to level the playing field for local players? Should Western companies rely on Chinese or Asian tech, e.g. in 5G or smartphones? Should Chinese tech companies have access to US financial markets? Will consumers prioritise price or attributes like local production and sustainability? Will the Chinese market become even more challenging for Western players to access?

US and China decoupling on all fronts turbocharged by Covid-19

We see a potential US and China decoupling as a key legacy of Covid-19, which could impact many nations and industries. This decoupling could have an impact on many fronts, which we discuss below.

- **Let the "Blame & Mistrust Games" begin:** The first side-effect of Covid-19 is the blame game, which we are already starting to witness (e.g. President Trump calling Covid-19 the "Chinese virus"). The pandemic's origins in China and that China was able to control the pandemic and restart its economy fast do not help on this front, as Western societies/economies face deeper impacts. The outbreak could erode goodwill and trust between the Chinese and American people, strengthening the hand of the hardliners on both sides, as per our China equity strategists. The rise of hardliners and West vs. East have wider implications.

- **Trade Wars – Charity begins at home:** There is a risk that progress on de-escalating the US-China trade war is derailed, the blame game continues and hardliners rise on both sides. Regions like Europe could push their own trade agendas or get caught up in the US-China trade war (e.g. the UK considered banning China from 5G during Covid). The big driver will be governments shifting their priorities to create local jobs due to unemployment. The ultimate fall-out of trade wars could be higher tariffs and higher inflation.

- **US-China Tech Wars:** The US-China trade war had already started to focus on technology, e.g. 5G and semiconductors. Both countries value technological superiority as a bedrock for the future. The US has been leading for decades but China is catching up (even surpassing) in areas like digital adoption, surveillance, telecom, electric vehicles and even quantum computing. China has long-term directed investment focus while the US/Europe follow free market approaches. And China invested more than the US in R&D last year. The pandemic could lead to stronger state-driven tech agendas and the emergence of different standards in China vs. US/Europe. The US could force or persuade other countries to reduce dependence on Chinese tech. Also, the US, Europe

and China will all look to invest heavily in new technologies, accelerating innovation.

- **The West vs. the East:** In DM, the pandemic is sparking a debate on many issues such as security of supply, loss of skills, technology dependence and inequality. It's not just about US vs. China but also West vs. East. Europe will have to decide its path – where to ban Chinese tech and where to force change in imports due to unemployment at home or sustainability concerns. Other EM nations may have to decide where to accept Chinese funding for projects, e.g. in mining or infrastructure. The West may have to engage proactively in EM like China did to secure minerals (e.g. in Africa). Healthcare self-sufficiency could be a priority as countries that recover fast from pandemics can have an advantage.

- **Flexing financial powers:** Till now, many Chinese companies have accessed US capital through cross-border listings but there may be scrutiny now of such listings and access to Western funding in general. A race between China and the West to fund countries/companies affected by the pandemic could emerge in order to gain access to markets, data or technology. But politicians are already calling for a ban on M&A (e.g. Italy, US), especially cross-border. Funding could increasingly be used as a tool but there will also be greater scrutiny. The US has an advantage given the dollar is still the main global reserve currency.

- **Data – collection and control:** The US, China and Europe will also look to have more control over citizens' data, not only for pandemic control but also to drive political agendas and innovation. China has an advantage as it can capture much more data on its citizen than the West, where the situation is complicated by the focus on privacy and democracy. Still, there will be more data captured by most governments and more surveillance, at least in the name of safety. The big questions are whether Chinese companies will be allowed to access Western data (e.g. via social network, ecommerce or equipment) or if US tech behemoths can expand their ex-China dominance even further?

- **Global influence – One Belt One Road vs. Blue Dot:** China was pursuing its "One Belt One Road" (OBOR) or "Belt and Road Initiative" (BRI) approach to building infrastructure, especially in Asia/Europe, to facilitate Chinese access to the West. But the US, together with Japan and Australia, launched a competing Indo-Pacific quality infrastructure initiative called the "Blue Dot Network". Post the pandemic, China and the US could be in a big race to increase their influence through such infrastructure initiatives. Funding, rising nationalism in target regions and clashing ideologies (democracy vs. authoritarianism) could be key factors in this debate.

- **Clash of government & societal ideologies:** Ultimately, the US-China decoupling will become a clash of many important ideologies – democracy vs. authoritarianism, surveillance vs. privacy, economic growth vs. sustainability, low cost vs. security of supply, profits vs. societal stability, capitalism vs. communism, and so forth. In many cases, the systems in China and US/Europe will be on opposite sides of the debate, which could continue to fuel the US-China decoupling and reshape global trade for years and decades to come.

Could Covid-19 end 30-year China manufacturing story?

The pandemic surely adds fuel to the "de-globalisation" fire

The pandemic is likely to shift manufacturing away from China faster than would otherwise have been the case, in our opinion. Globalisation fears were already reaching a boiling point (e.g. recent US-China trade war) as China's manufacturing value-added share reached c.25% globally from just c.3% in 1990. Concerns on manufacturing jobs,

technology/privacy or emissions/pollution were key until now but the debate has shifted to security of supply and dependence on China in critical areas (e.g. medicines, tech).

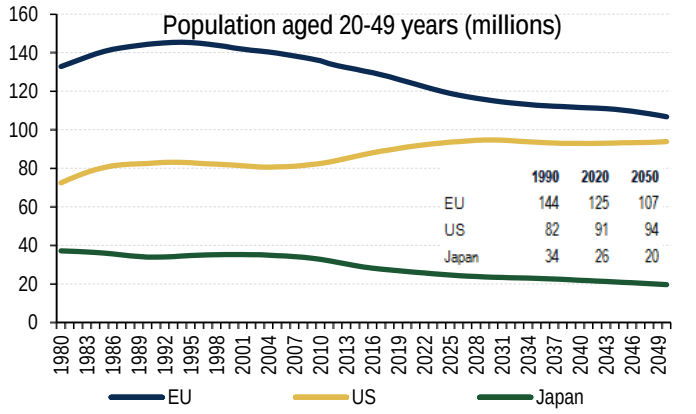
Focus on supply chain security & sustainability post Covid – likely inflationary

Post Covid-19, companies may try to diversify supply chains as focus shifts from just costs to (1) supply chain security, especially in critical areas (e.g. medicines, technology) and (2) environmental sustainability. Policies such as tariffs or technology bans may play a role but companies may even voluntarily move to better prepare for risks. Mid-term, inflation may rise due to rising costs, ending a three decade long era of low inflation.

Ageing DM workers a driver of manufacturing to China but not the only one

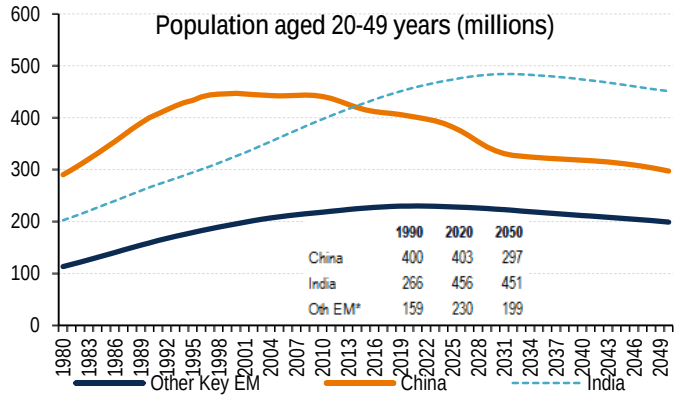
DM ageing, along with cheaper costs, has been one reason for the shift in manufacturing to China. The 20-49 age group in Europe/Japan shrank notably (c.30mn fewer in 2020 vs. 1990) but in China, grew by c.100mn during 1980-90 to boost the Chinese workforce. But ageing does not explain everything – the 20-49 age group in the US expanded during 1990-20 but US still experienced decline in manufacturing value-added share.

Chart 9: Ageing partly explains manufacturing decline (but in not the US)



Source: World Bank Population Data

Chart 10: China is also ageing fast from here, India's ageing profile better

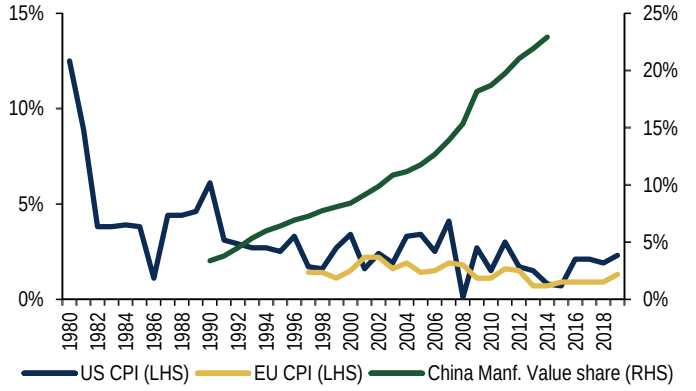


Source: World Bank Population Data

China-led deflation and shift to knowledge economy also boosted globalisation

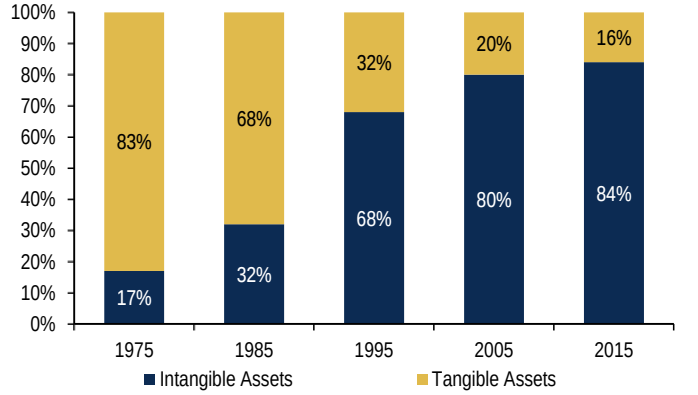
China manufacturing was acceptable as it kept inflation low but the knowledge economy since the 1990s "Internet Era" and higher education had a role, During 2000-18, almost as many Americans gained higher education (Masters or higher) as total manufacturing US jobs and more Americans gained Doctorate degrees than jobs lost in manufacturing (source: National Association of Manufacturers, US Census). Technology is evident in S&P 500 assets shifting towards intangibles – 84% share in 2015 vs. just 32% in 1985.

Chart 11: Cheap Chinese goods helped keep inflation low in the West



Source: Bloomberg, World Bank, NB: all measures in % and annual

Chart 12: High intangible share in S&P 500 reflects shift to knowledge



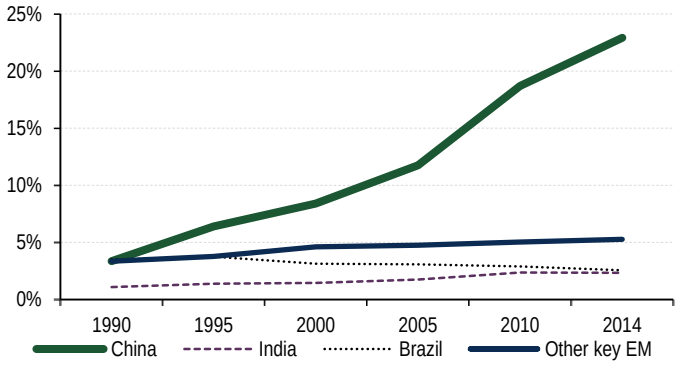
Source: Ocean Tomo Annual Survey 2017

Leaving China is not easy – other EM don't have same manufacturing strength

The industrial heartland of China is like a "Goldilocks Zone" offering the optimum mix of costs, quality, efficiency, human resources and infrastructure for the past 30 years. No wonder it accounts for a quarter of the world's manufacturing value-added. To get a sense of the China's edge, it is estimated one Chinese worker can manufacture about the same value of goods as four from four ASEAN countries combined while the lead time to hit the shelves in US stores can take up to 40 days from Thailand, 2x vs. China.

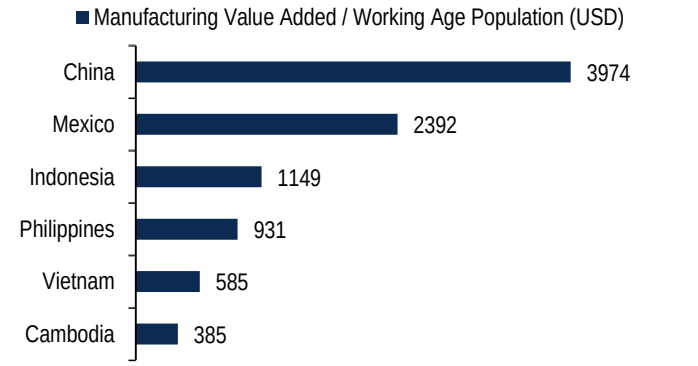
Chart 13: Globalisation is mostly a China manufacturing story

Impact of a country on world manufacturing value added (% share, World Bank)



Source: World Bank, NB: Other Key EM include S. Korea, Vietnam, Mexico and Bangladesh

Figure 1: Labour productivity – one Chinese worker can manufacture about the same value of goods as four workers from ASEAN countries



Source: United Nations Population Database, World Bank

China made a co-ordinated effort – cheap labour is not the only driver

Even wage differentials don't explain everything – India has had a huge rise in the working age population and has lower wages than China but India (like many other EM nations) has not been able to gain a major share in global trade. Thus, China's infrastructure, supplier ecosystem, massive scale, trained/disciplined workforce and most importantly, industrial policy, are critical drivers relative to just labour costs. Furthermore, Western corporates not only have to consider China's manufacturing advantages but also its huge market, with China's GDP now almost 60% as big as USA's.

It may have taken a while to move from China but Covid-19 speeds the process

China's dominance in manufacturing is so vast that it may have taken years – even decades – for a meaningful redistribution Take Apple, 14 of its 17 assembly facilities are in China. Moving elsewhere would require full electronics ecosystems (i.e., sub-suppliers, not just Apple's assembly facilities) to be developed in other locations. But the Covid-19 pandemic could speed redistribution away from China sooner, we believe.

Figure 2: Apple suppliers globally: Assembly Concentrated in China

Apple suppliers globally

- 346 from China
- 126 from Japan
- 69 from US
- 41 Taiwan

Apple assembly facilities – 18 sites globally

Supplier	Location	Country	Products
Apple	Hollyhill, Cork	Ireland	Mac
Quanta	Fremont, CA	US	Mac
Flextronics	Austin, TX	US	Mac
Hon Hai	São Paulo	Brazil	iPhone, iPad
BYDE	Longgang, Shenzhen	China	Accessories
Compal	Nanjing, Jiangsu	China	iPad
Inventec	Shanghai	China	iPod
Hon Hai	Bao'an District, Shenzhen	China	iPhone, iPod
Hon Hai	Longhua, Baoan, Shenzhen, Guangdong	China	Mac, iPad, Accessories
Hon Hai	Chengdu, Sichuan	China	iPad
Hon Hai	Shanghai	China	Accessories
Hon Hai	Zhengzhou Airport District, Henan Province	China	iPhone
Hon Hai	Taiyuan, Shanxi	China	iPhone
Pegatron	Kunshan, Jiangsu	China	iPhone
Pegatron	Pu Dong New District, Shanghai	China	iPhone, iPad
Quanta	Shanghai	China	Mac, Watch
Quanta	Jiangsu	China	iPod, Watch
Wistron	Kunshan, Jiangsu	China	iPhone

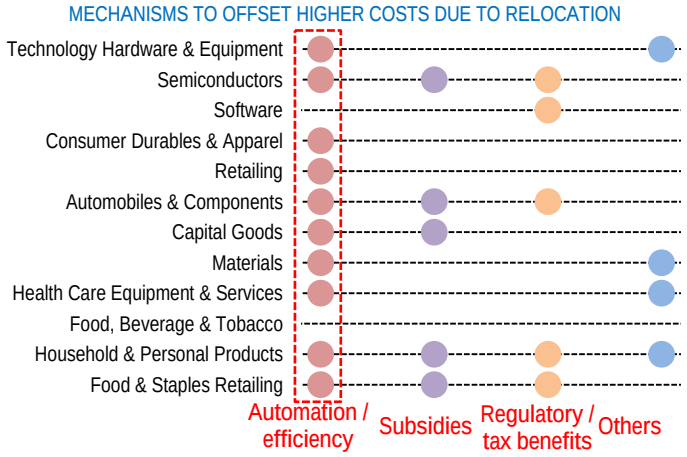
- 14 in China
- 2 in US
- 1 in Brazil
- 1 in Ireland

Source: Apple

Re-shoring and relocation from China looks likely for many sector

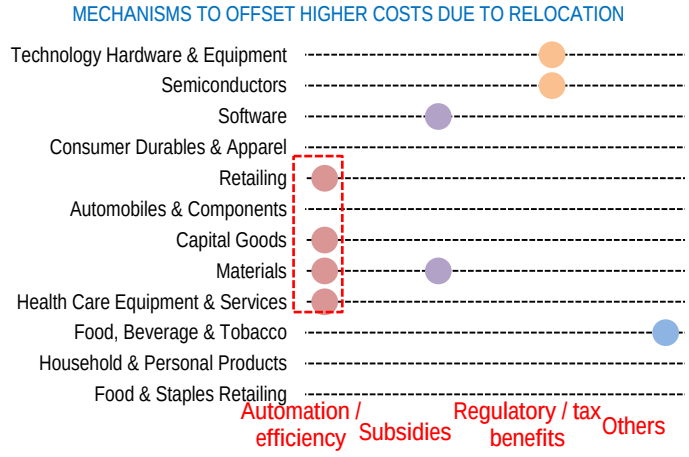
The reasons for re-shoring and relocation away from China are numerous: rising wages; environmental issues; complex regulatory framework; China's focus to transform into a high-skill service-oriented economy; and tariff-related uncertainty. As per our previous "Global to Local" research and analyst survey published in early 2020 (by Candace Browning), companies across sectors are considering automation as a way to offset relocation costs but BofA analysts also believe that close to half of sectors are hoping to get subsidies, or tax benefits.

Figure 3: N. America – Automation key to combat rising costs associated with relocation – 10 out of 12 sectors are considering it



Source: BofA Global Research

Figure 4: European companies – only one-third has some form of automation/efficiency technique in place to offset relocation costs

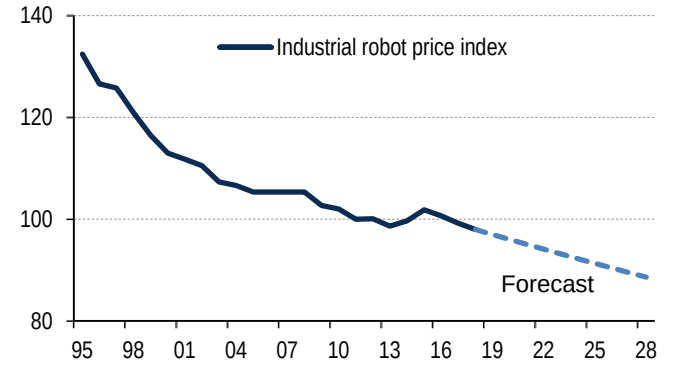


Source: BofA Global Research

Industrial robot installed base could double by 2025E, enabling some re-shoring

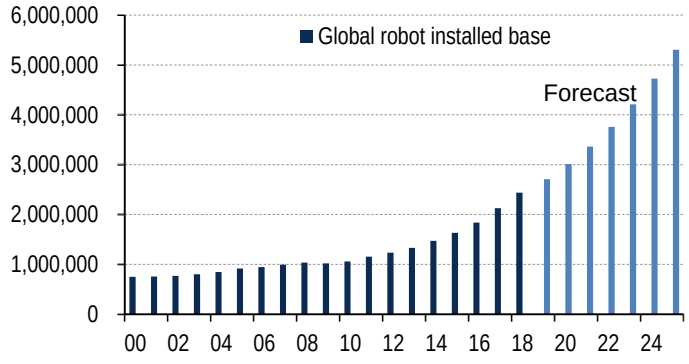
In the same "Global to Local" research, our strategists highlighted that the global installed base of industrial robots could hit 5mn units by 2025, doubling from 2019 levels, as they become more affordable, and more flexible and autonomous by virtue of artificial intelligence. The Boston Consulting Group estimates a 1% reduction in robot prices and 5% improvement in productivity annually over the next decade. This could help some proportion of manufacturing to be re-shored back to Western countries, especially if labour input can be minimised.

Figure 5: Industrial robot prices – expect to keep falling



Source: BoJ, BofA Global Research, BCG. Price indexed to 100 in 2011

Figure 6: Global industrial robot installed base to double in next 5 years



Source: IFR, BofA Global Research estimates, World Bank

Re-shoring and robotics – not that easy however

While rhetoric on re-shoring has been increasing, whether it actually happens depends on many factors. Compared with China/EM, factories in the West have to negotiate tougher environmental, emission and labour laws, even before considering labour costs and the industrial ecosystem. We believe companies would always look at the overall

picture before re-shoring, but the direction of travel and likely government policies would favour relocation and re-shoring once politicians shift focus away from Covid-19.

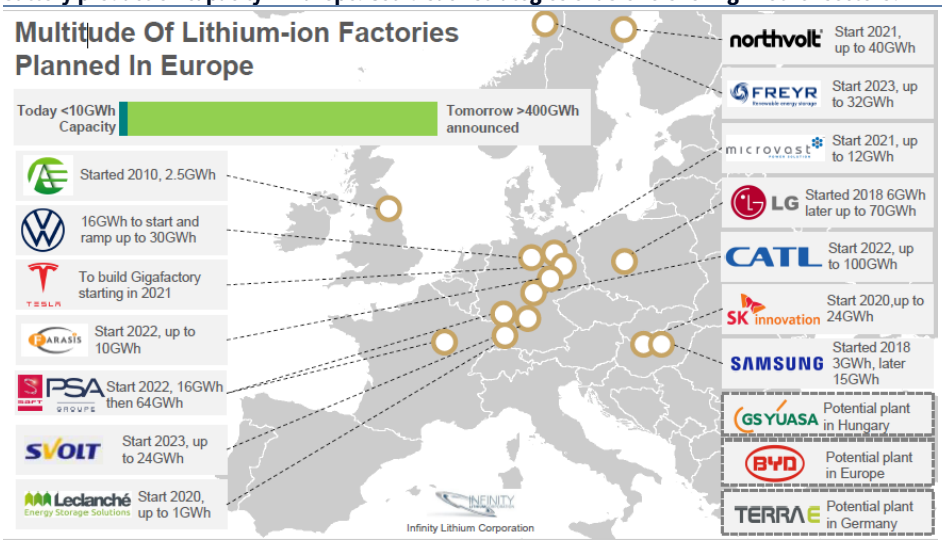
Adidas backpedals on robotic shoe production with Speedfactory closures
In Nov-2019, Adidas announced it would close its robotic "Speedfactories" in Atlanta (USA) and Ansbach (Germany) during 2020. Set up in 2016-17, the factories were part of a strategy to use robotic production to decentralise manufacturing away from Asia (rising costs) and closer to end-markets. Early into the initiative, Adidas even talked about fully moving to a "Speedfactory" model by 2030. But Adidas now plans to send some of the insights from these factories to its production facilities in Asia, a move it stated that will be "more economic and flexible." (Sources: Techcrunch, Hypebeast)

Policy support will be key for any re-shoring

Policies such as local content rules, industrial strategy, environmental standards, tariffs, subsidies, tax breaks and technology specifications may impact re-shoring decisions. A holistic approach towards the overall manufacturing set-up would be crucial in any re-shoring initiative in the West, just like China undertook over the last 30 years. Batteries are a good example, where the European Battery Alliance had a notable impact.

The European Battery Alliance (EBA), spearheaded by the European Commission (EC), brought together more than 200 companies, national governments, the European Investment Bank and research organisations around battery manufacturing in Europe. The EU sees local battery production as a strategic imperative for clean energy transition, the competitiveness of its automotive sector and sustainability. In part due to the EBA initiative, global companies announced battery projects in Europe targeting >400GWh pa of battery production capacity before 2025 vs. <10GWh pa in 2019-20.

Exhibit 16: EU's European Battery Alliance brings companies from around the world to build local battery production capacity in Europe. Could such strategies enable re-shoring in other sectors?



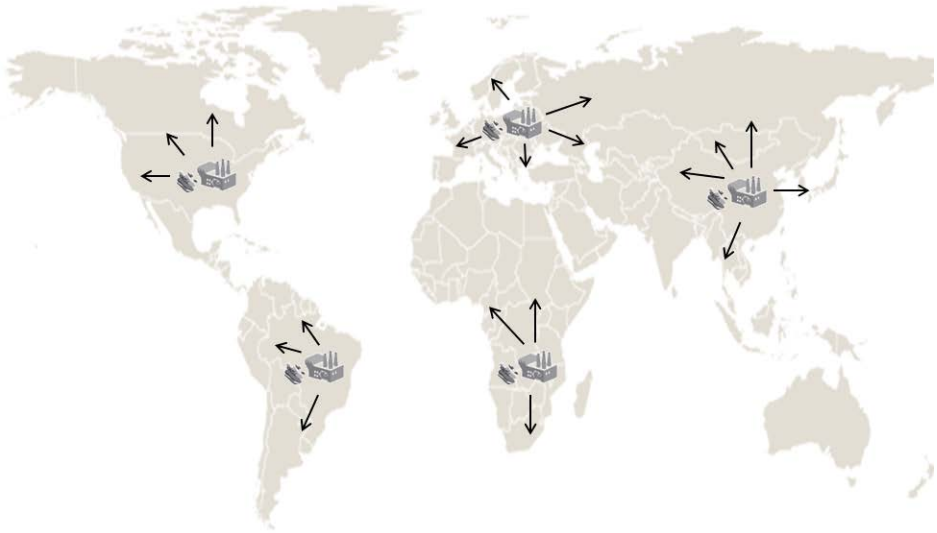
Source: Infinity Lithium

Moving to a "local-for-local" or "edge-to-edge" model might be the answer

"Edge-to-edge" factories that produce locally for local markets could ultimately result in a rebalancing of the current global manufacturing footprint away from China and Asia. Clearly automation would be vital in such redistribution but considerations around labour

costs can still remain relevant. Some labour-heavy, low-value activities may remain in EM (away from China though) but higher value automated processes may move to DM.

Figure 7: "Edge-to-edge" factories could be deployed for local-to-local manufacturing



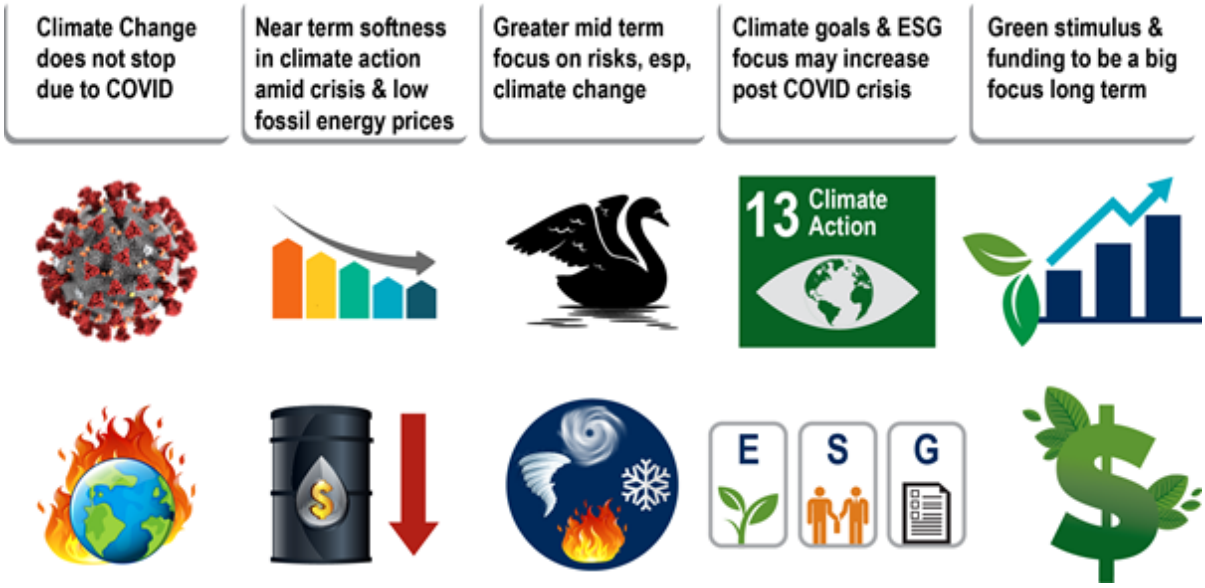
Source: BofA Global Research

Focus on sustainability & climate change to increase

Pandemic shines bright light on the biggest global risk – Climate Change

Most countries were not prepared for a black swan pandemic. Covid-19 will likely bring renewed focus on long-term risks such as climate change, environmental degradation, cybersecurity and inequality. As such, long-term government policies around trade and economic stimulus as well as corporate strategy around sourcing will take supply chain security and climate change much more seriously than in the past. Investors may place a higher value on companies that address long-term risks and are thus safer.

Exhibit 17: Climate change is the biggest long term risk as per WEF and focus on long term risks may increase post Covid-19



Source: BofA Global Research

Two schools of thought now on climate action – slowdown vs. acceleration

Before the pandemic, momentum was growing for climate action as evident from tougher policies, activism and even in capital markets (clean energy > fossil, growth in ESG). But with the pandemic driving down fossil energy prices, the pace of climate

action is being debated. Should climate action be slower on low fossil prices and government focus shifting to global health crisis/economy? Or should there be stronger climate action as focus shifts to long-term risks and stimulus is "green"? Both sides have some valid points, we think, but timing is key – near term vs. long term.

Table 3: Debate points on Climate Action

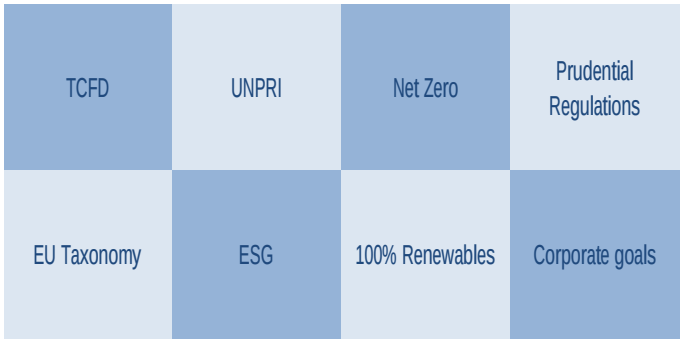
Positives for Climate Action			Negatives for Climate Action		
#	Theme	Comments	#	Theme	Comments
1	Offers scarce growth	Renewables and electric vehicles to grow - low base, less risky, sustainable, goals	1	Cheap fossil delays climate	Cost advantage of renewables over fossil less pronounced, cheap oil affects EV
2	Long term targets or policies	No change to long term targets (renewable) or policies (city ICE bans) due to Covid	2	Low demand for all, clean or not	Less overall demand means less new renewable capacity or EVs sold
3	Green fiscal stimulus	Fiscal stimulus is likely to prioritise clean energy & clean transport	3	Climate not #1 focus short term	Climate action could take a backseat vs. more immediate economic recovery policies
4	Low yields / input costs	Required return and equipment are biggest costs for renewables - both lower now	4	Low power & energy price risks	Some merchant renewable capacity face lower earnings, EV economics worse
5	Right of first use on grid	Fossil generation falls more as at margin while renewables have first right / low share	5	Caution reduces investments	Cautious investment outlook could delay/defer renewable projects or EV investments
6	Energy independence & resilience	Renewables & EVs enhance energy independence & resilience (local, distributed)	6	Targets & timelines delayed	Near term green goals relaxed / delayed, path towards long term targets slower

Source: BofA Global Research

Climate action: near-term softness but stronger long-term outlook post-Covid

Near term (1-2 years post Covid-19), some softness in climate action would not surprise as policy focus shifts to economy/jobs amid lower energy demand and fossil prices. But long-term climate targets are unlikely to change for now and medium term (3-5 years post Covid-19), we think the focus on long-term risks like climate change will increase, especially when considering fiscal stimulus measures and re-shoring strategies.

Exhibit 18: Key policies for cleantech, sustainability & climate action



Source: BofA Global Research

Exhibit 19: Corporates are joining a wide range of climate initiatives

Source: Company sources

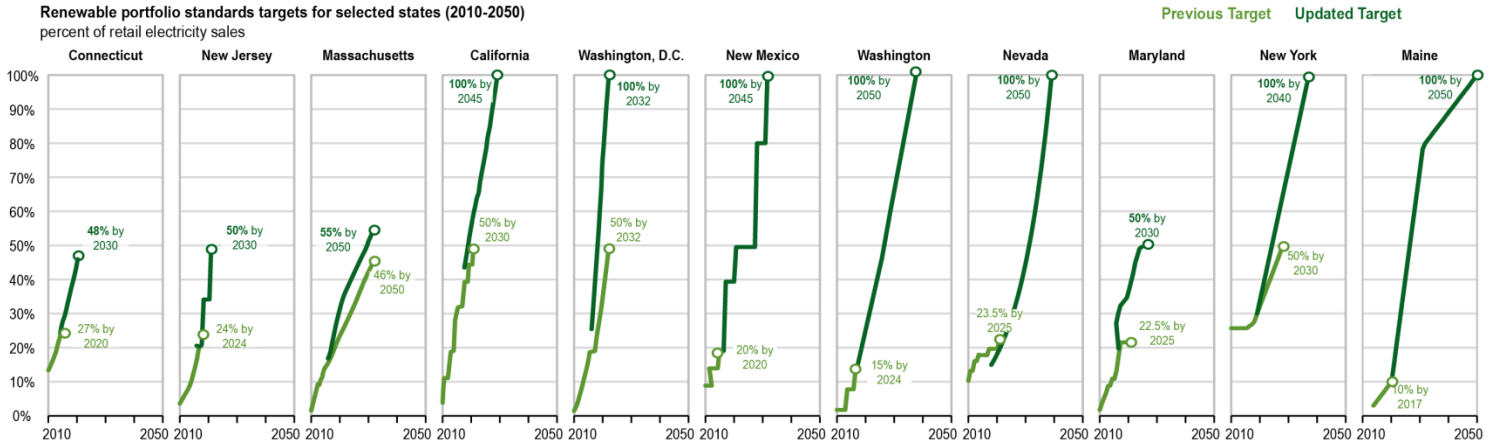
- **Long-term government policies intact:** Increasingly tough climate goals to drive investments towards climate-friendly from climate-unfriendly activities. Current targets vary by region but most were raised in the past 2-3 years due to cheap alternatives (e.g. renewables), technology (e.g. electric vehicles, energy storage), public opinion (e.g. activism) and worse climate events (e.g. wildfires).

- **Corporate climate goals unchanged:** Corporates can drive the shift to a low-carbon economy with climate-friendly approaches, potentially having a bigger impact than public policy with their firepower, decisive actions and influence. Covid-19 probably speeds up corporate green goals as companies scrutinise their emissions and pollution footprints in light of long term risks such as climate but also to create more resilient, diverse and socially just supply chains.

- **Cities and regions are important** for climate action – Sydney and Canberra plan to buy all of their electricity from renewables from as early as 2020. Many US states (e.g. New York) have major climate goals. Despite weaker US Federal

government focus, at least 11 US states have 50%+ renewable goals by 2030 and 7 have 100% renewable targets by 2050 – all announced in recent years.

Exhibit 20: The United States of Green America - 11 US states have c.50% or higher long-term renewable targets (targets upgraded in recent years)

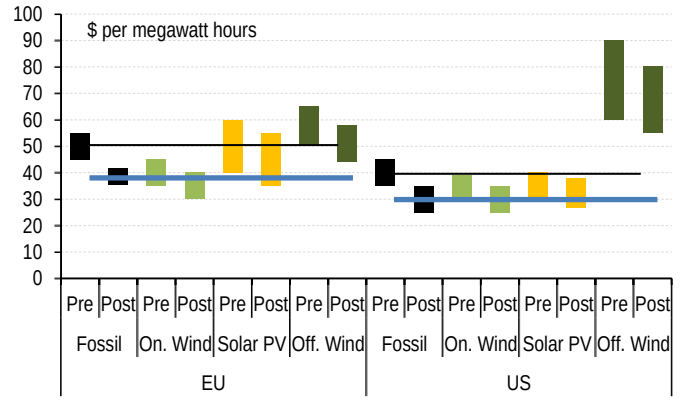


Source: EIA (US Department of Energy), BofA Global Research

Economics – renewable & EV cost trajectories slightly worse but not derailed

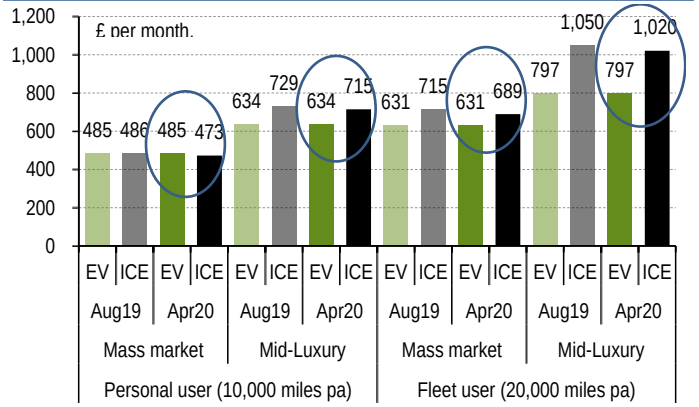
Even with lower fossil prices now, renewables are slightly cheaper vs. fossil power on average while the cost-parity pathway for electric vehicle (EV) is broadly intact. Long term outlook for fossil energy prices and forward curves (rather than spot prices) are more relevant when comparing renewable or EV costs vs. fossil. Costs are not the only driver for cleantech though – government policy, consumer attitudes, corporate policies and improving technology also drive growth for cleantech in the mid-to-long term.

Chart 14: Renewable cost advantage smaller but still there (illustrative)



Source: BofA Global Research, BNEF, NB: On. Wind = Onshore Wind, Off. Wind = Offshore Wind

Chart 15: Not much change in Total Cost of Ownership (TCO) for ICE vs. EV (UK example)

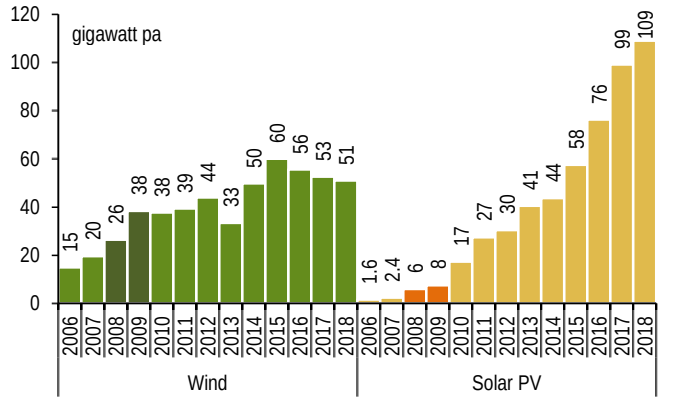


Source: BofA Global Research, ICE = Internal Combustion Engine, EV = Electric Vehicles, Mass market are Nissan Leaf (EV) and Ford Focus (ICE), Mid-Luxury are Tesla Model 3 (EV) and BMW 3 Series (ICE)

Renewables & electric vehicles can enjoy better growth on low base & policy

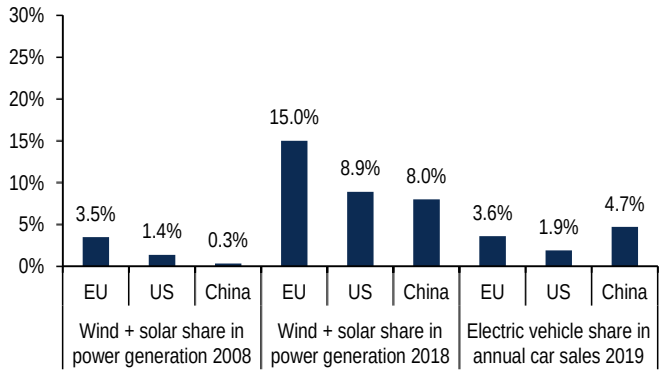
During the 2008 crisis, there was a brief pause in renewable activity as governments struggled to balance budgets and subsidies were cut. Lower fossil prices and funding difficulties did not help either. But after 3-4 years post the 2008 crisis, renewable volumes grew strongly helped by policy, improving technology and low penetration. The post Covid-19 world has many similarities to the 2008 crisis but both renewables and electric vehicles are probably better placed vs. how renewables were placed in 2008. In 2008, renewables were expensive and therefore badly exposed to subsidy cutbacks. This is not the case anymore as renewables are cheap now. The focus on climate action is much stronger today globally compared to 2008. And lastly, penetration levels are still low just like in 2008, especially for electric vehicles, providing a runway for growth.

Chart 16: Renewable volumes grew strongly few years after 2008 crisis



Source: GWEC, Statista, solarpowereurope, BofA Global Research

Chart 17: Low share of renewables & electric vehicle support growth



Source: BNEF, Country/Region System Operators, IEA, InsideEVs.com, BofA Global Research

Better clean than sorry – cleantech turned out to be better investment in 2020

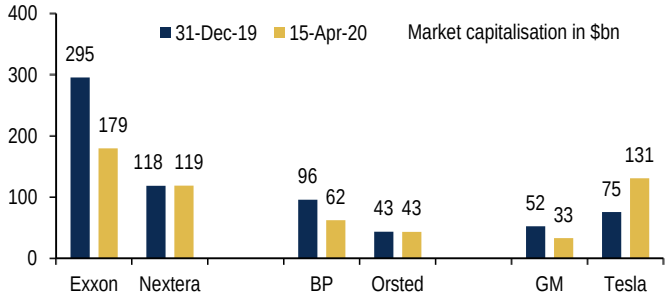
We believe many investors value long-term themes such as climate action over structurally challenged segments such as fossil energy. In the last 2-3 years pre-Covid and during the Covid driven market correction, many cleantech stocks outperformed the overall market and especially relative to the fossil energy stocks which have been particularly hard hit by weak demand, pricing and inventory issues. We believe thematic investors will continue to focus on cleantech & ESG investing as evidenced by strong flows into ESG funds YTD and even during the during 1Q 2020's market volatility.

Exhibit 21: Climate action drivers unchanged or even likely enhanced

Renewable targets	Corporate green goals	Green Stimulus
Climate agenda	Consumer awareness	Long term Sustainability
Green finance	Utility green strategy	Green growth
ESG pressure	Strict reporting	Energy Independence

Source: BofA Global Research

Chart 18: Markets penalized fossil names vs. cleantech (YTD 2020)

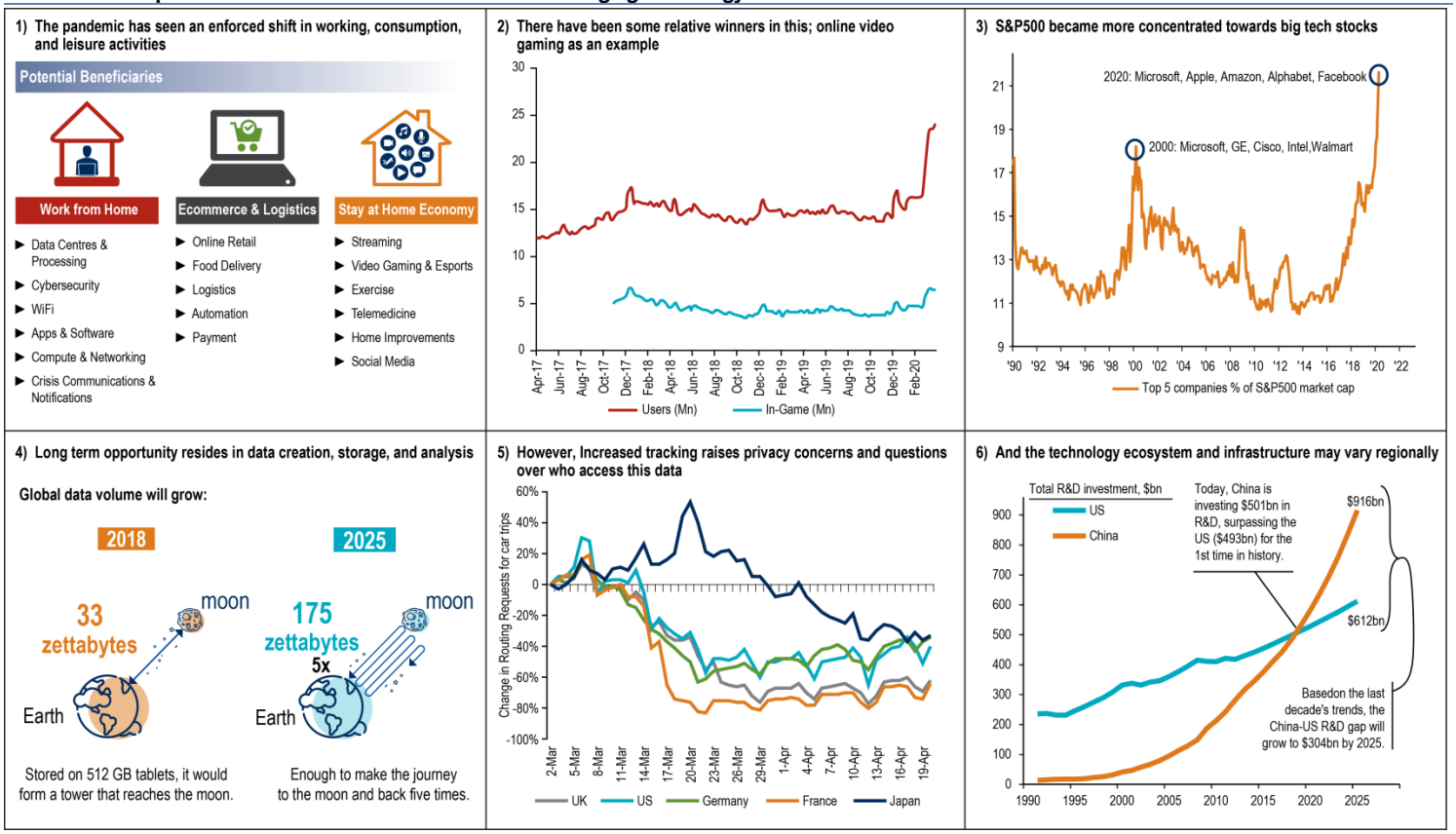


Source: Bloomberg, BofA Global Research, NB: Market capitalisation in $ billion

Technology: seizing the opportunity, enabling the recovery

- **Did you know?** Video conferencing tool Zoom saw daily average users rise 30x in Jan-April 2020, and up to 60% of salary-paid US workers could work from home (US Bureau of Labour Statistics).
- **Key takeaway:** Covid-19 has seen an acceleration of structural shifts in how we use and deploy technology, leaving a legacy of advanced computing, data generation, new infrastructure and bandwidth. Commercialising "Moonshot" technologies such as autonomous vehicles, quantum computing, and vertical farming could also be accelerated. Work from home, ecommerce, and stay-at-home activities are nearer-term shifts. Challenges include constrained demand, funding, and further erosion of privacy.
- **Our survey tells us** that half of sector analysts expect technology investments in their sectors to increase, with 44% expecting more robots & automation.

Exhibit 22: Disruption accelerated several structural shifts leveraging technology



Source: [1]BofA Global Research, [2]Steam, [3]BofA Global Investment Strategy, Bloomberg, [4]European Union 2020, [5]Apple Mobility Trends Reports, [6]BofA Research Investment Committee, OECD

Exhibit 23: Technology Trends & Strategies

TRENDS	WINNERS		LOSERS	
Digital transformation acceleration	Streaming, eSports	Cybersecurity	Old Media	Bricks & Mortar Retail
Long term enablers	Cloud, Data centres	Broadband & Networking	Corporate Travel	Privacy
Short term solution providers	eCommerce & Logistics	5G	Real Estate	Autos & Mobility
Moonshot technologies	Exercise & Telemedicine	Robotics & Automation	Sharing Economy	

Source: BofA Global Research

Keep calm and carry on (contactless)

While the economic disruption from Covid-19 was unexpected and the impacts felt across most industry sectors, technology has been critical in enabling businesses to continue operating, albeit with several needing to adapt. The crisis has highlighted the potential and pitfalls of certain technologies as alternatives to what we're used to.

Disruptive times require disruptive minds

In this section we consider the technologies and services that have been prevalent for consumer or business use in the wake of Covid-19, and their potential long-term implications. We believe some of the behavioural changes exhibited in the crisis will accelerate structural shifts already underway prior to the crisis. Thus, while the short-term economic impact has been negative, there will be beneficiaries from these transitions, with regard to both existing companies and new deployment of technology to capitalise on these trends in the years ahead.

> 'Be fearful when others are greedy and be greedy when others are fearful...'
> *Warren Buffett*

The Outcome: Big(ger) Data. Better Infrastructure Smart(er) Cities.

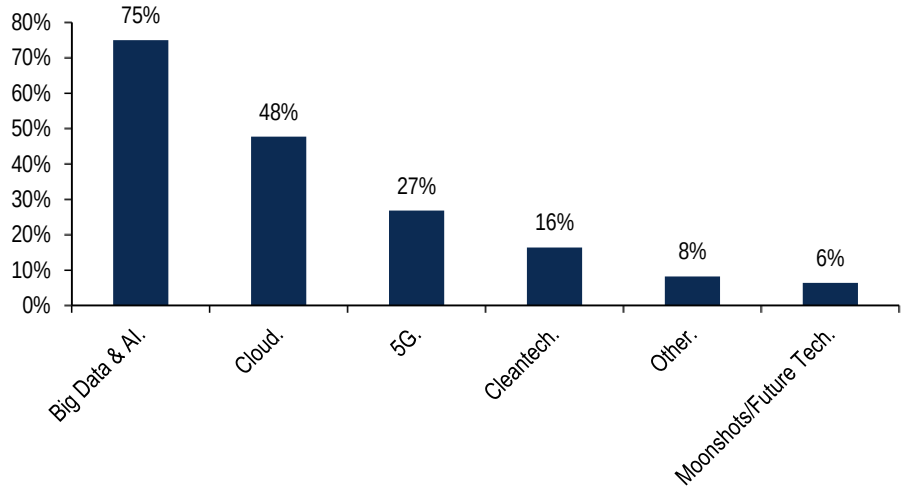
The longer-lasting technological outcomes post-Covid-19 will derive from a combination of data and technology infrastructure, in our view. The structural shifts in retail and flexible working will lead to accelerated investment cycles in the enablers mentioned above: data storage, utilisation of more compute & semiconductor capabilities, communication infrastructure (especially 5G), and more precise tracking, monitoring & surveillance. We see three key implications of this:

1. More robust communications backbone: increasing bandwidth deployment of 5G can accelerate new business models (e.g. OTT streaming with AR/VR, 5G-based cloud gaming, B2B services such as Smart Factories/Hospitals) and the use of AI to handle this increased data
2. Big Data & AI: creation, storage, analytics and utilisation of data at an accelerating pace, and enabling more disruptive innovation (accelerating the commercialisation of moonshots such as autonomous vehicles, quantum computing)
3. Smart Cities: advanced potential for cities to use this new infrastructure and data for surveillance, mobility, safety, energy and diagnostics.

The vast majority of our sector analysts (75%) believe that Big Data & AI will be the most important technology for their sector post coronavirus, followed by cloud computing (48%) and 5G (27%).

Chart 19: 3 in 4 BofA analysts believe Big Data & AI to be a key technology for their sector

Which of these technologies are the most important for your companies post-coronavirus?



Source: BofA Global Research

The Enablers: Techceleration in computing, data, AI, 5G, cybersecurity and more

These on-going structural shifts present several opportunities to the technologies that enable them. Indeed, despite economic headwinds, 50% of our sector analysts believe technology budgets for their sectors will increase post the crisis.

Exhibit 24: Key technologies enabling the post-Covid recovery

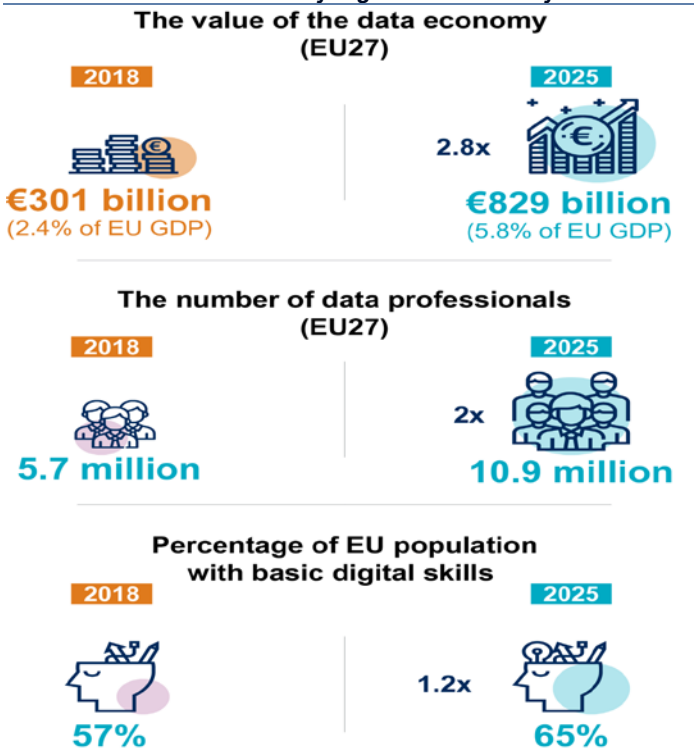
Source: BofA Global Research

We combine several of our sector analyst views with our own to highlight the following.

Increased traffic = better delivery networks:
Our technology team highlight an expected 30% increase in network traffic during the pandemic due to working from home shifting load patterns, locations and timing; while there is sufficient capacity to handle this, in their view, Content Delivery Networks (CDNs) and Edge cloud computing companies could be long-term beneficiaries of rising spending to bring working from home to a broader user base. Cloud computing more broadly will continue to reduce costs, in their view.

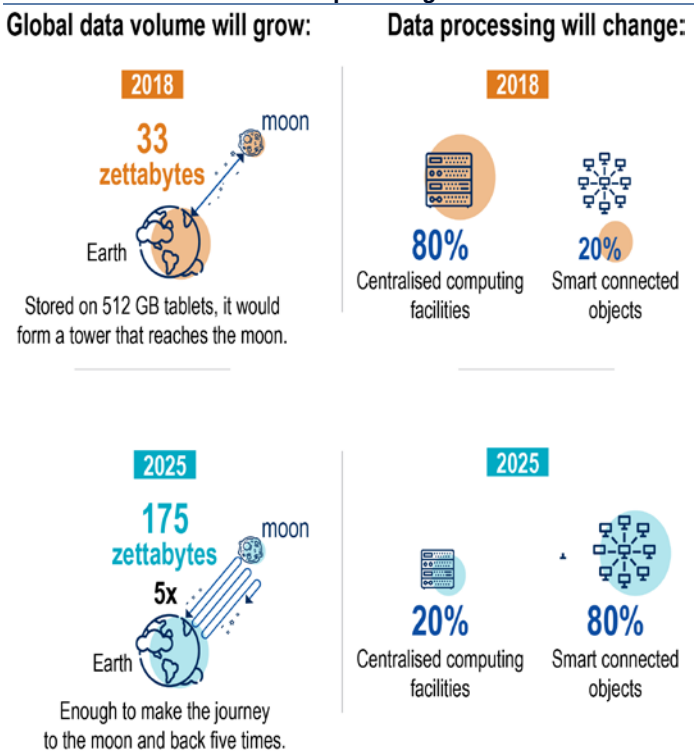
Data Centres are the new real estate:
Another lasting legacy could be further acceleration of data volume and processing requirements: the EU believes data volume will rise 5x between 2018-25 for example (Exhibit 27 & Exhibit 28). Data centres provide the critical infrastructure that supports remote working, education and TV streaming. Additional capacity and connectivity are predicted longer-term to support this accelerating structural shift, benefiting data centre operators controlling network access points (to lower latency and improve connectivity), and wholesale providers through increased hyper-scale cloud capabilities.

Exhibit 25: Value of data economy to grow 2.8x in next 5 years...



Source: European Union 2020, BofA Global Research

Exhibit 26: ...as is data volume and processing



Source: European Union 2020, BofA Global Research

Home network upgrades: +US$1.5bn
Despite home network broadband market revenues being broadly flat in 2017-19, the market is projected to rise from US$3.5bn to US$5bn in 2019-23 due to increased working from home, streaming and demands on the network requiring better wireless broadband in all areas of the home.

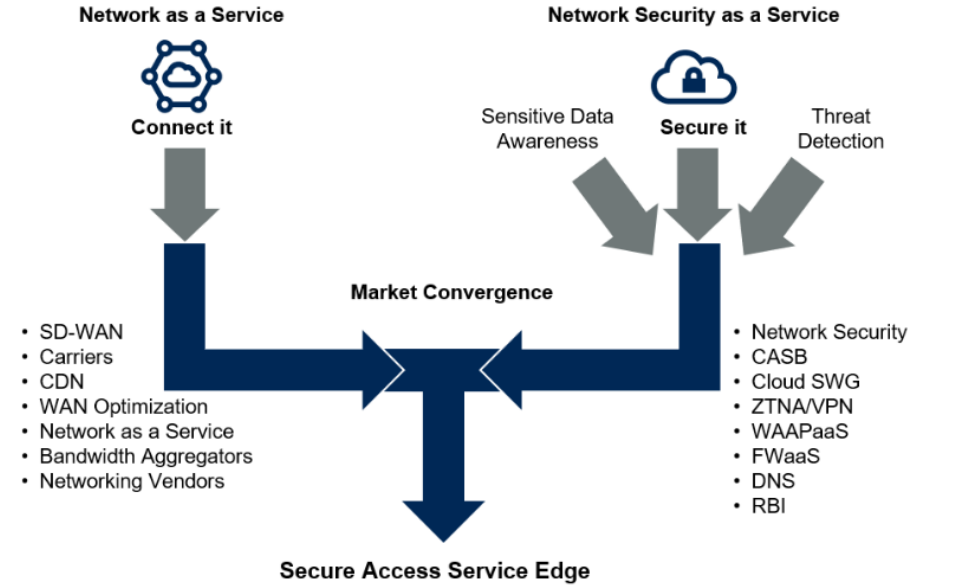
Semiconductors: beneficiaries at all levels (consumption, computing, cloud)
Our Technology & Semiconductor analysts highlight most of the technology related enablers post Covid benefit semiconductors. Remote working and ecommerce/home consumption could drive a corresponding increase in processing and bandwidth requirements, benefiting compute-levered semiconductor providers. Working from home has highlighted the need for enterprise resiliency and is speeding the transition to the cloud. The need for better diagnostics, faster screening and population monitoring is likely to increase artificial intelligence investments in healthcare and smart cities.

Increasing online gaming will require better gaming components. Furthermore, on-going trade tensions are pushing China and the US to a path of greater self-sufficiency and supply-side duplication. All of which creates more demand for semiconductor equipment makers.

Cloud Computing & Cybersecurity become crucial

Covid-19 could accelerate adoption of cloud computing as companies prioritise enterprise resiliency, operational redundancy and resource flexibility. On cybersecurity, our technology team believes that while Virtual Private Networks (VPNs) have been extensively used for home working during the pandemic, 60% of companies will phase them out by 2023 owing to their inefficiencies, replaced by cloud-based connectivity and security software via zero trust network access (ZTNA), which will be more cost-efficient and enable faster connection speed and data traffic closer to the user.

Exhibit 27: Convergence of Network and Security into Secure Access Service Edge (SASE)



Source: Gartner, BofA Global Research

5G/WiFi-6 & Splinternet: China racing ahead on 5G?

Greater home use is boosting demand for online gaming and pushing telecoms to move ahead on 5G and Wifi-6 in order to improve the customer experience. But the bigger picture (and potential opportunity) post-Covid is the on-going US/China tensions leading to potentially separate 5G ecosystems emerging, with considerable investment. Our Telecoms team believe China is racing ahead on 5G, set to roll out >630k 5G base stations by the end of 2020 to achieve "dominance in a digital era". These tensions and national security concerns over 5G infrastructure sees an increasing risk of two 5G ecosystems emerging (supply chain, software), as governments are increasingly involved in selecting 5G vendors. This may delay the process of 5G rollout, with US/European applications and available capex limited in the short term.

Robotics & Automation

Increased factory automation and logistics fulfilment could be accelerated in light of the crisis. Our survey showed 39% of analysts believed their companies would invest in more robotics & automation, in response to keeping operations open without humans. The long term effects this will have on employment therefore could be negative.

Is Covid the catalyst that shifts Autonomous Vehicles (AVs) into gear?

One unlikely beneficiary of the pandemic could be the commercialisation of self-driving vehicles. Until now, their commercial deployment has faced several challenges:

1. Regulatory approval varies internationally with no single standard or certification level as of yet.
2. Cost competitiveness and the technology deployed in the vehicles can vary, resulting in a current estimated cost of $150,000-$200,000 for car-based autonomous vehicles, according to our autos team, due to requiring specialised hardware such as LIDAR and new as-yet unproven software.
3. And lastly, the public acceptance of travelling in a vehicle without a human driver seemed a scary concept to most: just 22% claimed they'd feel safe in an autonomous vehicle in BofA's Global Mobility Survey, for example.

The crisis may change some of this rhetoric and mitigate some of these challenges, accelerating the piloting of and eventually the transition to automated vehicles. We see altering development stages for personal and commercial vehicles.

Robotaxis: lack of a driver switches from negative to positive perception
The need to socially distance and limit human interaction could lead to a short-term preference for private over shared mobility and public transport. As such, driving a private car might be preferable, but still wouldn't be feasible in many big cities owing to congestion, parking, and air quality restrictions. Use of a commercial autonomous vehicle service for private use – a so-called on-demand robotaxi such as those being developed by companies such as Waymo, Cruise, Yandex and others – could be relatively more attractive and allay some of the fears that the public have around AVs. ***In essence – the main drawback or concern that the public had with AVs – the lack of a driver – could become its biggest selling point in a post-Covid world.***

Regulation, technology testing and scalability mean it might take longer
Despite the potential customer acceptance, the majority of companies testing AVs on public roads have had to pause operations to ensure safety of their riders and engineers during the pandemic. In the US, for example, Waymo, Argo, Cruise, Zoox, Baidu, Pony.AI and Aptiv all temporarily closed their robotaxi testing. This limits the data collection, mapping of streets, and eventual commercial launches of such services.

Regulatory approval also remains a key hurdle to deployment of AVs at scale, as well as the need for certifiable technology. This has proved costly so far, with over $29bn of disclosed investments into AV companies between 2010-19 (McKinsey), as well as likely several more billions invested not disclosed by public automotive and technology companies. Alphabet's Waymo raised a further $2.2bn in March 2020, for example, indicating the significant investments required to develop the technology. The rising investment requirements coupled with potential limits to private funding available in the likely post-Covid recession may lead to some consolidation. ***Thus, AV deployment for passengers in the form of robotaxis is not going to be achieved quickly at scale, and in fact may be slightly delayed in light of Covid-19.***

Autonomous (Commercial) Vehicles: Robots to the Rescue
While most transit-based public autonomous vehicle trials were closed, those used for civil and delivery purposes have somewhat accelerated. Some examples of their deployment and changes during Covid-19 included:

- Robot vans deployed to disinfect streets. For example startup Neolix deployed 200 vehicles in February/March 2020, compared with 125 units since their production started last May, including 50 vehicles across 10 cities in China during lockdown periods for disinfection of roads.
- Autonomous delivery vans such as Nuro (delivering Dominos Pizzas in the US), and small delivery robots completed food and parcel delivery. Starship Technologies extended its pilot in the UK for food delivery, for example, and

Yandex launched its Rover vehicle (Exhibit 10) in Moscow for city staff to receive documents and packages while offices are closed.

- Autonomous shuttles (e.g. Navya, Optimus Ride) were repurposed from transporting passengers to medical supplies and meals/packages, respectively.
- Long-haul autonomous freight pilots were expanded; TuSimple's fleet of 40 autonomous trucks was deemed an essential operation in the US, delivering goods and food between Texas and Phoenix, and commenced free deliveries for a local food bank (Exhibit 9).

The pandemic has highlighted the fragility of supply chains. Autonomous commercial vehicles could be part of the solution longer term, and their deployment be accelerated based on the lessons learned during the crisis.

Exhibit 28: Deployment of AVs for commercial uses such as long haul freight could be accelerated post Covid-19

Autonomous trucks were deemed an essential service during Covid-19

Source: TuSimple

Exhibit 29: Short distance, low speed robotic vehicles that limit human interaction could also be deployed more widely

AVs were piloted during Covid for food delivery, disinfecting streets and more

Source: Yandex

Covid-19 accelerates Digital Transformation for Work, Home and Play

People around the world have been instructed to stay at home and work there where possible. This could have meaningful long-term impacts on companies that provide the technologies that enable this. We consider these in particular in relation to remote working, the "stay-at-home" economy, and rising penetration of ecommerce linked to this.

1. Working from Home
2. The ecommerce and delivery economy
3. The "at home experience economy"

Similar to the rise of new business models such as the sharing economy after the last financial crisis, and a wave of lasting innovation after the dotcom era, the post-Covid era will be defined by a combination of new technologies and companies enabling better services to eat, work, relax remotely (at home in particular in the short term), and the shift from offline to online being brought forward across all sectors and demographics. Thus, Covid-19 may accelerate the need for digital transformation.

Exhibit 30: Digital Transformation for Work, Home and Play

Source: BofA Global Research

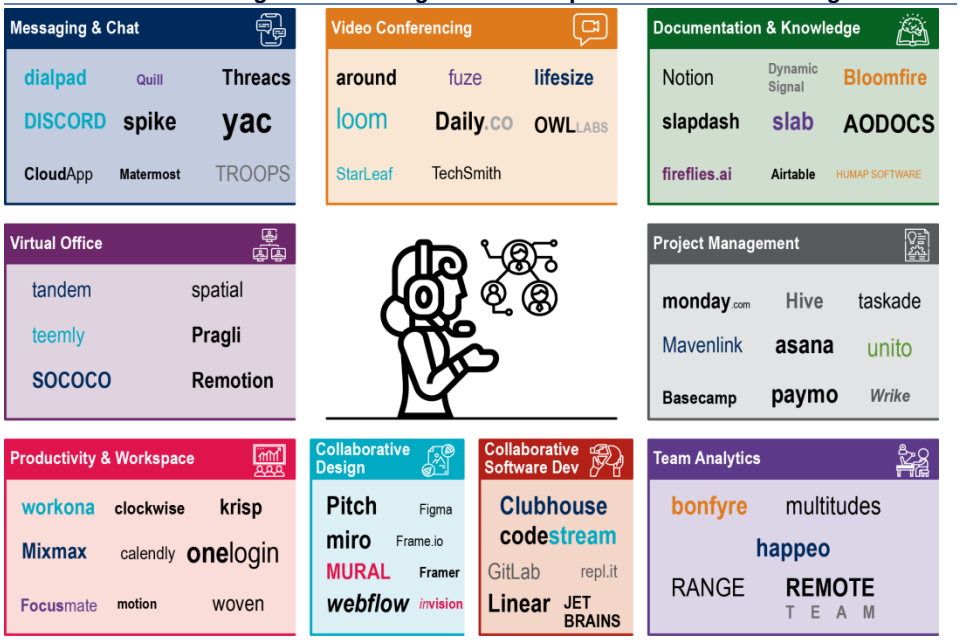
Working from home: short-term shock, or long-term reset of how we work?

Perhaps the biggest test of technology has been the need to work from home where feasible, with Covid-19 causing most companies to temporarily close their offices. This had an immediate impact on companies facilitating working from home: video conferencing app Zoom saw daily average users rise from 10m to 300m from Jan to April 2020, for example.

While the number of people claiming to work mainly from home prior to the crisis was relatively low (e.g. 5% in the UK in 2019 (ONS)), it has highlighted which industries can adapt to it – and there are more than many previously expected. As our technology team notes in its Telecommute101 primer: in the US alone, the Bureau of Labour Statistics estimates that 60% of the 118m salary-paid workers could work from home, in addition to the 5-7% that already have the capability.

The pandemic has demonstrated the potential for a distributed work revolution in the longer term, as companies and staff accelerate investments in working from home technologies, and change working patterns to enable this transition. While it may not be applicable for every company or individual depending on circumstances, there is likely to be higher adoption of distributed/flexible working post crisis, in our view, owing to a combination of the flexibility, commuting savings and productivity improvements it offers employees, and the corporate overhead cost savings it offers employers. Beyond just travel to work, these technologies could also become instrumental in limiting or avoiding some business travel for certain sectors.

Exhibit 31: Remote working has attracted significant start-up innovation in several categories



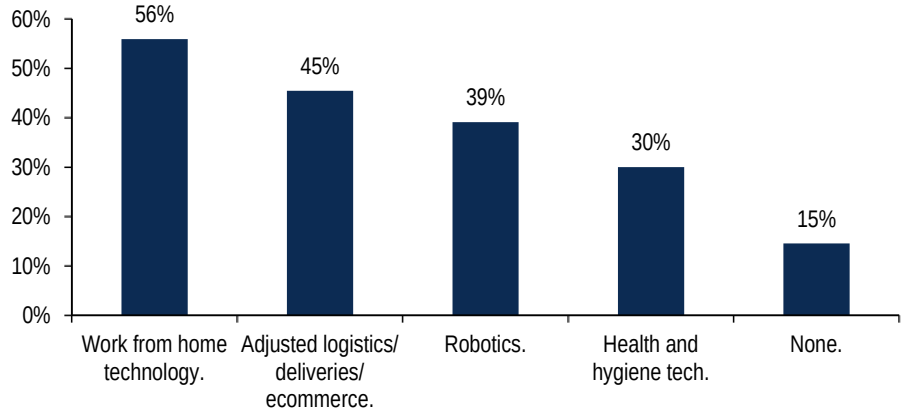
Source: CB Insights

This presents opportunities to several groups of companies facilitating remote working, including messaging, video conferencing, documentation, project management, productivity, collaboration and analytics. The chart above highlights some of the start-up innovation that this has attracted to enable this.

Our sector analysts also believe this will be important for the listed equities in their coverage: 56% think that work-from-home technologies will continue to be used after the crisis – ahead of logistics & ecommerce technologies (45%) and robotics (39%).

Chart 20: BofA Analysts believe work from home technologies will have a lasting impact

What technologies are your companies planning to continue to use following on from the Covid-19 crisis?



Source: BofA Global Research

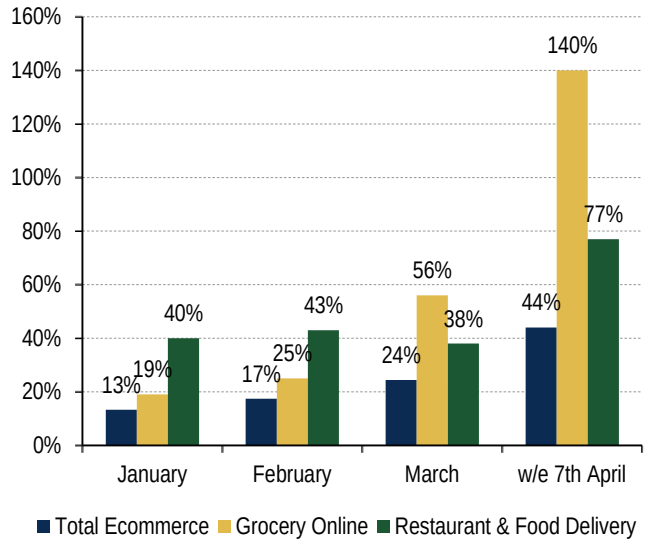
Offline to Online: Ecommerce and Logistics

The structural shift in retail from offline to online penetration has been underway for several years. Our Technology team attributes this to a combination of 1) improved delivery/shipping services, 2) higher conversion rates to online due to targeted advertising, 3) growing categories as legacy providers come online and new business models/categories emerge, and 4) new AI and machine learning technologies, enabling faster rollout and adoption of the services.

Despite the continued annual growth – projected at 19% in 2020 to US$4tn – online penetration remains relatively low at just 11% of addressable retail sales in 2019 globally (15% in the US, 28% in China). Covid-19 has driven an acceleration of ecommerce across several retail channels, which has the potential to last longer-term as customers increase their adoption of online retail. BAC Credit card data showed that US ecommerce spend rose 24% yoy in March 2020, and as high as 44% in the first week of April when the majority of states were in lockdown. Online grocery accelerated the most at 56% yoy in March and 140% in the first week of April.

Chart 21: US Ecommerce sales accelerated yoy in Jan-Apr 2020, especially Online Grocery when lockdowns were widespread

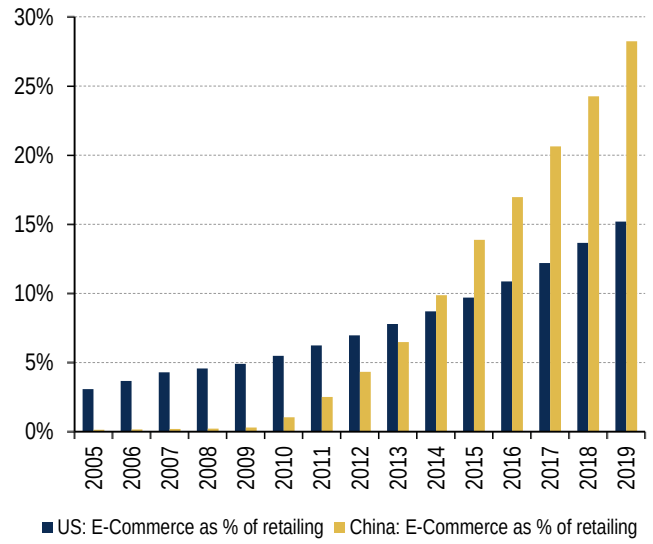
US eCommerce YoY growth % in absolute spend



Source: BAC Internal Data, BofA Global Research

Exhibit 32: eCommerce is still only 15% of retail sales in US, 28% in China

eCommerce market share, US vs China



Source: Euro monitor, BofA Global Research

While this may benefit the retailers that embrace ecommerce, it poses a risk for legacy providers and bricks & mortar stores that are slow to transition. It may also pose a wider risk to employment owing to high levels of automation among ecommerce players.

Stay at Home Experience Economy: staying in is the new going out

Stay at home as an investment theme was first flagged by our Technology team in 2018. Their thesis considered the rise of home spending categories and services resulting from a combination of convenience, demographic preference shifts and rising spending power among millennials, and improved technology such as high-speed broadband and improved logistics. In particular, tech platforms facilitating eating in, exercising, education, home improvements, video gaming/Esports, and virtual medical appointments were all flagged as beneficiaries at the expense of offline/bricks & mortar legacy service providers.

The Covid-19 pandemic could be significant in bringing this structural shift forward, and becoming more relevant to other demographic cohorts and locations outside of big cities, in our view. While Millennials & Gen Z would be more likely to have been using several of these services already, they could become more loyal or frequent users. Furthermore, the pandemic has shown rising usage of these services among new (older) customer groups – perhaps a more disruptive shift that will increase penetration of these categories post-crisis. We outline the potential beneficiaries and key trends below.

Streaming & Online Media: new subscribers here to stay

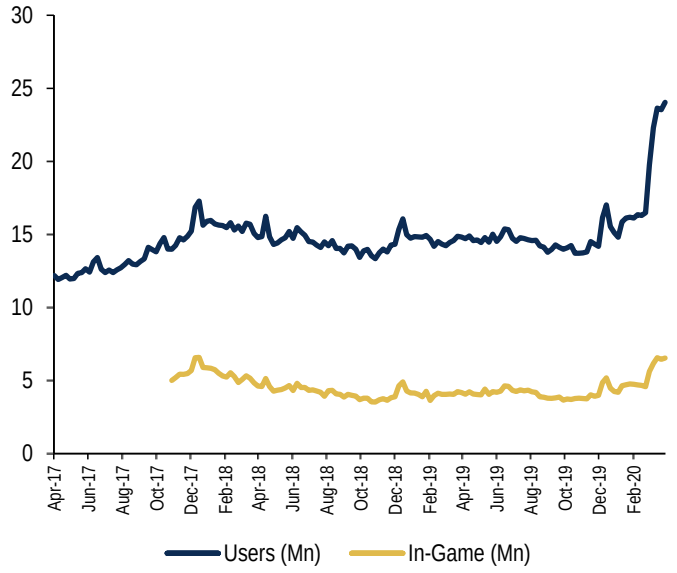
TV content streaming has risen as much as 60% during lockdown periods of Covid-19 (Nielson), with up to a 32% rise in paid TV subscriptions in the US (Recurly), and 75% of

consumers adding additional streaming subscriptions and/or connected devices on which to view the content (Nielson). Disney reported subscribers to its Disney+ service rose from 28m in February to 50m by April 2020, for example, and Netflix recorded twice the expected user growth in Q12020. This presents a significant opportunity to providers to retain this additional audience and revenue base post-crisis, provided churn rates don't increase materially: the US average churn rate of streaming services was 18% 2015-18 (Parks Associates).

Video Games & Esports: stay at home = game at home

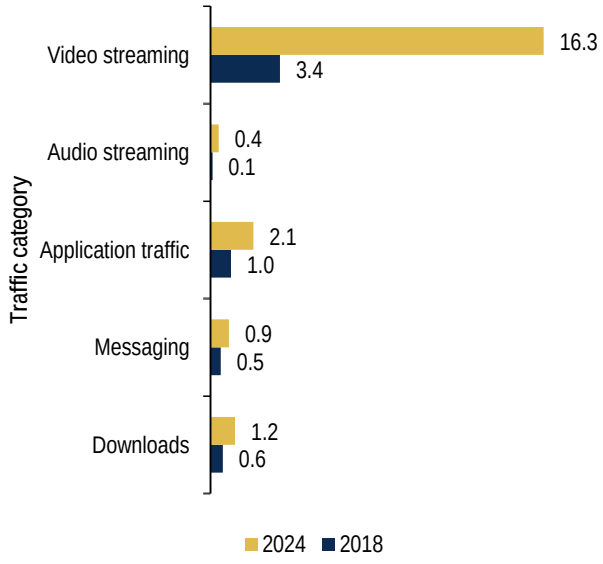
Rising participation and streaming of online video gaming has occurred during the pandemic with more people able to stay at home; streaming platform Steam saw highs of >24m concurrent users in April 2020 (vs highs of ~17m in 2019) for example. This presents a potential to monetise new users to the platform longer term, and to attract new content. Live sports in particular was quick to adopt virtual gaming during the pandemic – Formula 1 races were switched to virtual after live events were cancelled (3.2m watched the first race with ~400k concurrent viewers streaming at its peak). This demonstrates the potential for more live sports to adopt virtual gaming hybrids and tournaments following the pandemic, making Esports more attractive to a broader user base and additional sponsorship potential.

Chart 22: Exponential rise of video game streaming on Steam in Mar/Apr 2020 (more so viewers, than players)



Source: Steam, BofA Global Research

Exhibit 33: Video streaming to dominate global data consumption levels per capita by 2024 (GB/month)



Source: Ericsson, BofA Global Research

Food Delivery: lower customer acquisition costs, but retention is key long term

Technology platforms for home food delivery have surged in popularity during the pandemic (Chart 21), including grocery delivery, food delivery apps and home delivery meal kits, for example. This poses an opportunity to retain these customers post-crisis, particularly important given the usually high customer acquisition costs that would have been lowered during the crisis out of people using these platforms out of necessity.

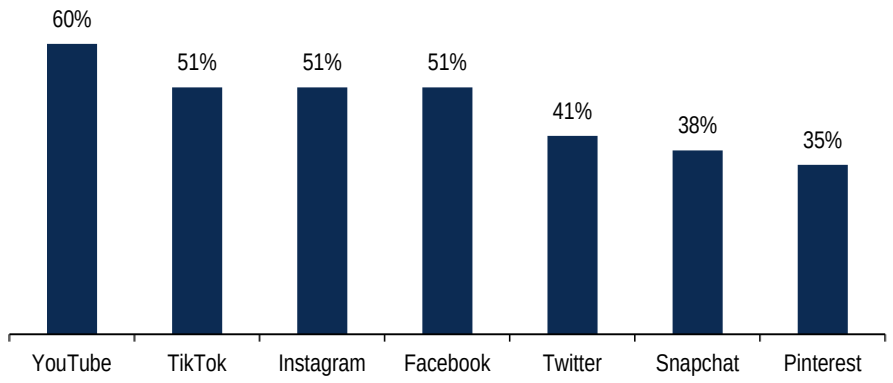
Education: the home resource explosion

With schools closed, home learning applications, courses and video content have become more popular. While children will return to school eventually, several of the learning tools adopted during the crisis may remain alongside traditional classroom learning.

Social Media: increased importance, especially video

Lockdowns and more time at home have led to higher social media use: our technology team's survey suggested an average 47% of users increased social media usage during US lockdown periods vs just 16% reporting declining usage. Video content streaming saw the biggest increase. This poses long term commercial opportunities: 47% reported they were interested or likely to buy a product on social media.

Chart 23: How has your usage changed over the past month since the US has issued shelter in place guidelines (% of respondents choosing "increased")



Source: BofA Global Research, SurveyMonkey

Exercise: Stay in. Work Out.

Exercising at home was promoted during the pandemic to maintain physical and mental fitness; this gave rise to several digitally enabled alternatives to allow people to work out at home. Several of these could retain customers and cross-sell new services post-crisis.

Telehealth: the rush to get (doctors) online

With doctors and medical services largely unavailable during the pandemic to patients with non-urgent or life-threating illnesses, virtual consultations rose significantly. UK-based Push Doctor recorded a 70% rise in consultations in the week the country entered lockdown, for example. More importantly, it saw rapid adoption from surgeries that were not previously connected to such platforms. This will have lasting implications for the supply of such services post-crisis, as a higher user base has downloaded or been made aware of the services through their healthcare providers during the pandemic.

Moonshots accelerated: from Quantum Computing to Earth observation?

Faster processing of more relevant data using supercomputers and AI could be accelerated with "Moonshot technologies" for commercial gain, including fighting future pandemics. Quantum Computing resources are being made available to researchers of Covid-19 free of charge by D-Wave, for example, and could become a crucial part of future detection of pandemics, accelerating commercial deployment more broadly. Nanosatellites & space technologies could also be deployed to improve earth observation & communications (the UK/European Space Agencies have launched funds to investigate high-tech solutions in response to the crisis, for example). This increasing demand for data and bandwidth may also accelerate the need for new communication infrastructure such as 6G, with 5G bandwidth being at capacity sooner than expected.

Future Food: crisis highlights the benefits of urban & vertical farming

A combination of lockdowns, panic-buying of food, and restrictions on travel/imports has highlighted the challenges and global nature of the food supply chain and how it can be disrupted. This could accelerate more local produce, in particular leveraging new technologies in vertical farming. Singapore in particular, which imports 90% of its food, reiterated its goal to produce 30% of its food needs locally by 2030, requiring a scaling

up of urban farming as part of the solution. The crisis could increase the awareness and need for local produce, which could be more efficient and reliable with controlled vertical farming investments.

Exhibit 34: The next 15 technologies

COMPUTING	CLIMATE ACTION	COMMUNICATIONS	NEXT GEN MATERIALS	DISTANCE
Quantum Computing	Geoengineering	6G	Nanotechnology	Hyperloop
Technological Singularity	Nuclear fusion	Nanosatellites	Graphene	Space Tourism
Behavioural biometrics for security	Mass Vertical & Greenhouse Farming	LiFi	3D bioprinting	Deep sea mining

Source: BofA Global Research

The challenges ahead: peak sharing, funding, privacy?

Not all technology services will be beneficiaries of the above structural trends. Reduced overall consumption brought on by a weaker economy, coupled with shifting consumer preferences, will pose several challenges that technology isn't immune from.

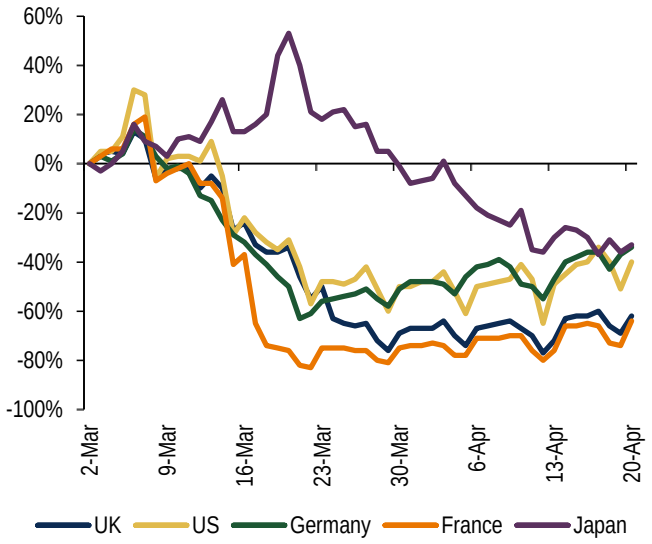
Sharing Economy facing disruption

In the short term, amid social distancing, concerns over shared space and proximity to others may persist. Sharing economy services in particular may be challenged, particularly in transportation, accommodation and co-working space, owing to heightened customer safety concerns.

Data tracking and governance: Bigger data = Bigger Brother

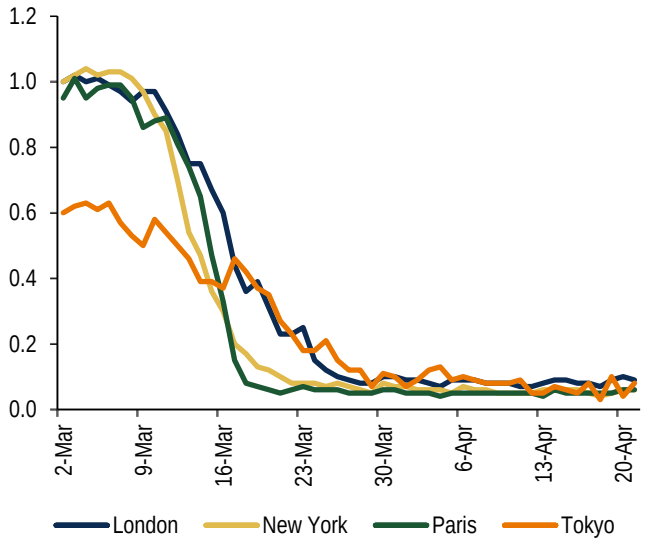
A potentially enduring feature of the current crisis is the adoption of technologies for data tracking of individuals and their movements. Several countries released tech platforms and apps that alerted citizens if they'd been near others that had contracted the virus or shown symptoms, requiring intense monitoring of their location data. Technology partnerships that would have previously been considered unthinkable (e.g. Apple & Google) were created to pool resources and data to track the spread of the virus. This demonstrated the potential longer-lasting increased monitoring of people's movements for health/pandemic related uses, but this data could also be used by companies and governments more broadly post the crisis. We found that while the data generated is rising exponentially, just 1% of it is analysed or monetised effectively. The post Covid era could benefit technology companies who can analyse and monetise such data, but adoption is likely to vary by region owing to privacy concerns and regulations. Several companies demonstrated the potential for aggregated datasets to add value to public authorities during the crisis, which could be leveraged longer term, such as mobility data.

Chart 24: Apple Mobility Trends demonstrate the downward trend in road traffic routing requests at a national level…



Source: Apple Mobility Trends Reports

Chart 25: …and Citymapper's Mobility Index showed dramatic reductions in travel routing requests at a city level across all modes of transport

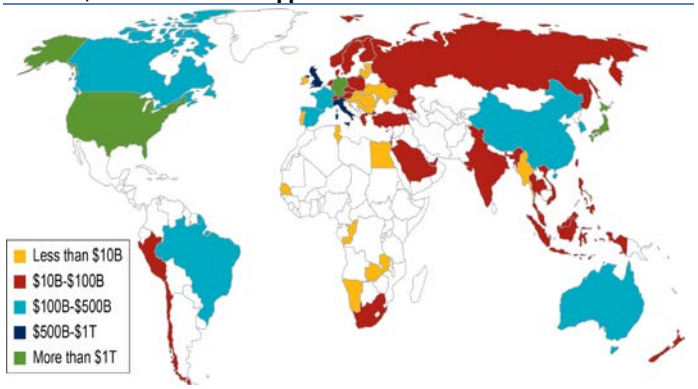


Source: Citymapper

Big Government: a new social contract

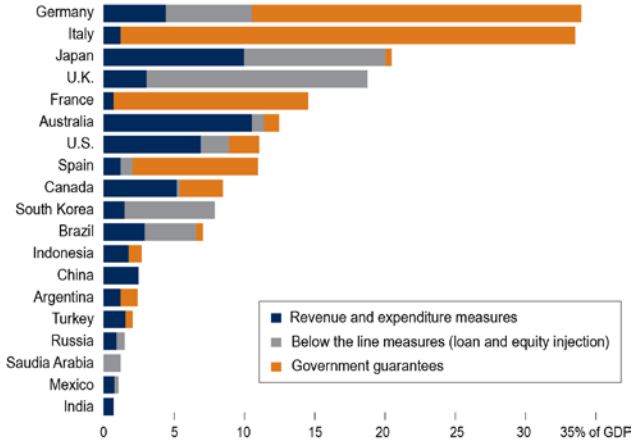
- **Did you know?** Governments have committed US$8tn in the fight against Covid-19, which is more than the GDPs of India, Brazil and the UK combined.
- **Key takeaway:** Growing surveillance, inequality and the current inadequacy of healthcare systems highlighted by the current crisis will act as a catalyst for change in politics, furthering populism trends and increasing the risk of social unrest. Governments will exert greater influence on businesses across sectors calling into question stakeholder importance, the role of privacy and how we reward labour. Also, the boom in personal safety and pandemic preparedness funded by the government will continue beyond the immediate crisis above pre-crisis levels.
- **Our survey tells us** that 33% of BofA analysts expect shareholder rights to be eroded either through government intervention or changing priorities within companies.

Exhibit 35: Surging stimulus - Governments worldwide pledge more than US$8 trillion in fiscal support



Source: Government data, Bloomberg, updated April 22, 2020

Exhibit 36: Fiscal Support - Governments are attempting to fight the economic fallout from the virus



Source: Bloomberg

Exhibit 37: Big Government trends & strategies

TRENDS	WINNERS		
Safety over Privacy	Cybersecurity	Big data & data storage	ESG
Stakeholders over Shareholders	Surveillance	Smart Cities (IoT, Sensors, Cameras)	Plastic packaging
Labour over Buybacks & Dividends	National Security	TIC (testing, inspection & certification)	Biotech & Pharma
Society over the Individual	Safety Services	Hazardous medical waste	Life Sciences

Source: BofA Global Research

Covid-19 is forcing political trigger points

The Covid-19 pandemic has brought various trigger points to the forefront, increasing the risk of social unrest and populist policies:

- **Surveillance:** the option to monitor citizens through phones and other connected devices has openly been combined with governments' abilities to control and limit behaviour. The differing approaches in various countries is hastening the debate over a government's role in data collection and who

should have access as liberties and individuals' rights to privacy are encroached upon.

- **Inequality:** is set to grow from Covid-19. Most highly paid individuals have been able to work from home, while a higher proportion of lower-paid workers have either lost their jobs or work in dangerous, exposed conditions, making Covid-19 the Great Polariser. The negative impacts for the most disadvantaged will be felt for years to come as education, healthcare, and work access, among others, are limited for those demographics.

- **Healthcare:** the inadequacy of healthcare systems and lack of preparation by governments for long-term risks have been exposed in this pandemic. Covid-19 will amplify healthcare's social role in providing a healthy workforce and accelerate other pressing global public health issues, such as drug pricing, antibiotics resistance, pandemic prevention, and funding of healthcare.

Combined, these three flash points pose a threat to current political positions, potentially forcing more social unrest and creating pressure for populist policies. We expect governments to 1) continue to use technology and surveillance, 2) come under more pressure to help workers, 3) exert more influence on companies, switching the focus from shareholders to stakeholders, and 4) improve their preparation for risks, at least for a few years.

New Big Brother Trifecta: Big Tech, Big Data, Big State

Covid-19 has enabled a relationship of usefulness and convenience to form between tech companies, data and governments. This trifecta will strengthen and grow all three partners. Over 30 countries are now openly tracking their citizens (source: OneZero). Big Tech and Big Data are the key enablers of these tracking systems. Consequently, governments are working hand-in-hand with tech companies and using personal data to control the epidemic through tracking, changing the things people see and are able to buy online, banning sales of fake coronavirus cures and adverts of facemasks, and deleting misinformation (source: Bloomberg 2020). Having experienced the usefulness of Big Tech during the crisis, we think it unlikely that governments will withdraw their services after the peak of the crisis. Instead, technology companies will continue to integrate themselves as part of the modern-day infrastructure.

Big State: Governments handed a new social mandate

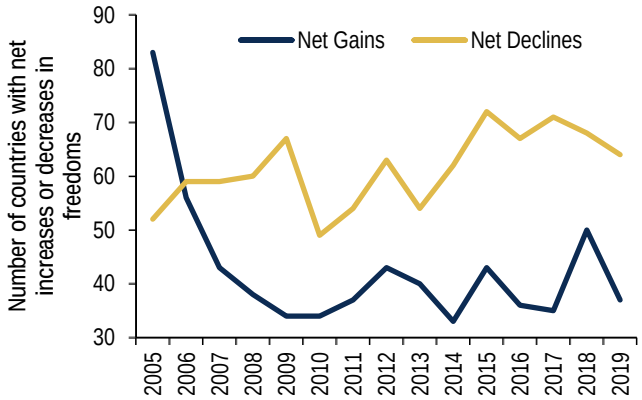
Governments could benefit from greater powers as the virus brings about an acceptance of fewer individual rights in return for societal benefits. South Korea has been praised for how it has limited the spread of Covid-19, by implementing strict lockdown measures and using personal health data to track, test, and contain suspected cases. This has led countries with more individual freedoms to impose restrictions on personal freedoms that would previously have been thought impossible. The debate going forward will be about data access and use, and whether governments can continue to use the data as a tool for organising their countries.

Exhibit 38: Over 30 countries have openly implemented tracking techniques on their citizens

Source: OneZero, Medium

Chart 26: Governments are becoming more powerful even after 14 years of democratic decline

The number of countries improving aggregate freedoms vs those declining

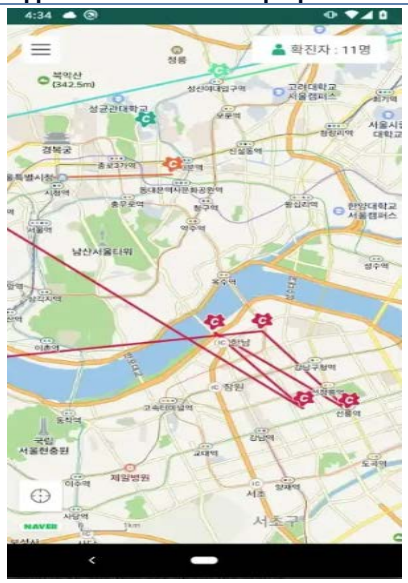


Source: Freedom House

- China is extending its use of facial recognition while Iran has encouraged people to download an app tracking their location. Israel's government is tracking the phones of citizens suspected of having Covid-19 using technology originally developed for counter-terrorism. The data is being used to notify others if they have been in contact with the virus and to enforce quarantine.

- South Korea has released personal data on Covid-19 patients that has enabled the public to track whether they have been in contact with people who have the virus. There have been privacy concerns as the data has enabled identification and shaming of individuals by the public (source: Guardian 2020).

Exhibit 39: Corona 100m app shows where infected people have travelled in South Korea



Source: Google Play, Business Insider

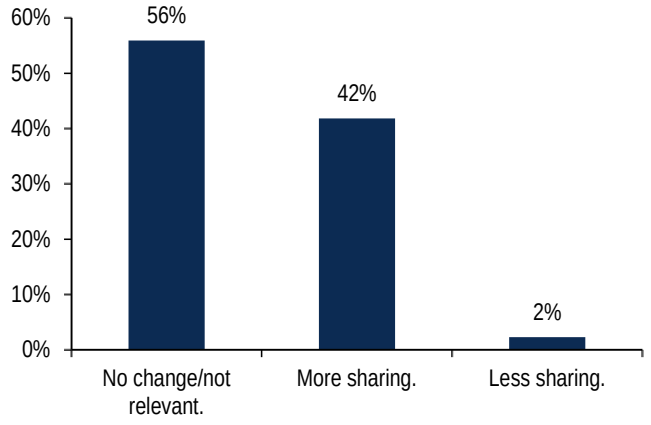
- Hong Kong and Bahrain are using electronic wristband trackers to monitor those under compulsory quarantine, including all arrivals at airports. Breaking quarantine could mean up to six months in prison (source: Quartz, MobiHealthNews).

Big Data: with more tracking comes more data

In the past seven years, the digital universe has increased tenfold to 44ZB (source: Raconteur). IoT devices are proliferating to the point that we will be interacting with a connected device once every 18 seconds by 2025 (source: IDC 2017). Combining the technological ability with a more permissive environment for tracking individuals means there will be more data available for companies and governments to use and analyse. 42% of BofA analysts expect more sharing of data with governments in a less privacy focused world.

Chart 27: 42% of analysts expect more sharing with governments

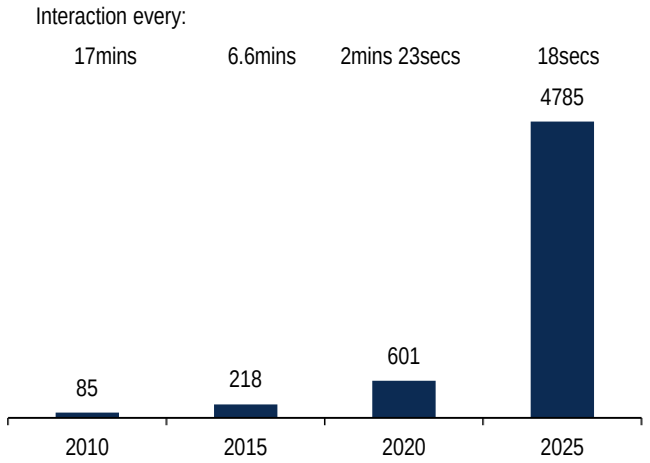
In a less privacy focused world, how will this crisis affect your companies' policy on data sharing with governments?



Source: BofA Global Research

Exhibit 40: An interaction every 18 seconds by 2025

Number of interactions/capita/day



Source: IDC 2017

Big Tech: the enablers of the new world order

This crisis has integrated technology companies as part of tomorrow's world order – not just for consumers and businesses but for governance as well. There will be even larger volumes of location, health and social data that will be analysed by governments and companies. Consequently, companies involved in surveillance, data storage, processing, and analytics are likely to be increasingly needed.

> Apple and Alphabet have joined forces to help track individuals. The companies aim to use Bluetooth to allow interoperability between various health apps across countries to make tracking more consistent, before coming out with their own contact tracing platform.

Privacy: every temperature spike, I'll be watching you

The planet is changing its view on privacy as the recording of personal data becomes ever more prevalent to enable insights and powers never seen before. Medical and personal data today is being openly tracked and used for society's benefit as part of a global effort by governments to tackle coronavirus.

A dangerous precedent?

The big question is whether personal privacy and other liberties will be sacrificed for health and safety. There are numerous cases in which rights, once given away are not easily reinstated. The Patriot Act following 9/11 saw mass surveillance of American citizens for years afterwards. The US has 35 national emergencies still in effect today dating as far back as 1979 and Israel has been in a state of emergency since 1948 (source: Brennan Center for Justice 2020). Governments now have access Further, artificial intelligence is now being used in some countries to decide who can and can't

go out. Given the well-documented instances of bias by AI, the danger is that we could unintentionally see restrictions imposed reinforcing biases in society.

> 'We may love the democratic process, but just witnessing the difference between the way that China was able to act, and the way the democratic countries were able to act, you can see that it would be attractive to many of the strong men we have in power all over the world, for them to take more power, and we may be so worried about this pandemic that we give it to them. The question isn't whether they will take it, the question is whether after the pandemic, they will ever give it back'
>
> ...' Dr. *Larry Brilliant - Chair of Skoll Foundation: Ending Pandemics fund*

Is loss of privacy the only solution? Sweden keeps calm and carries on

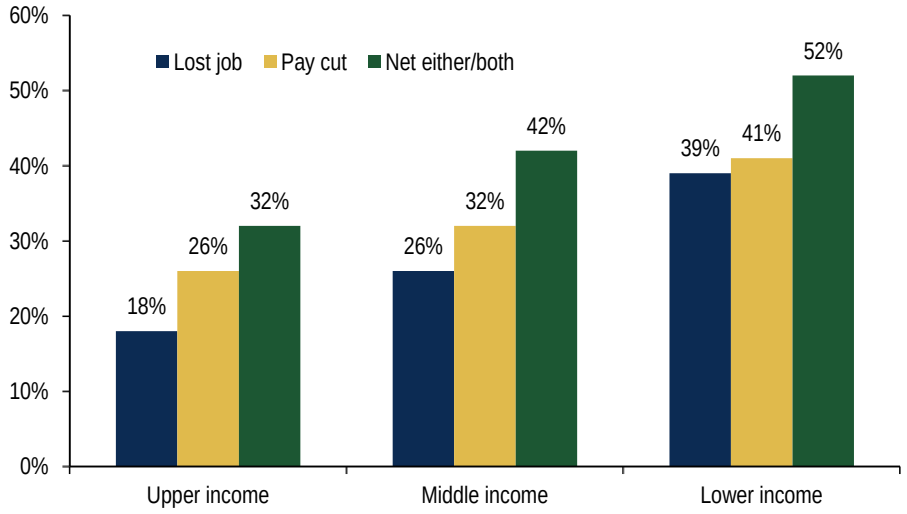
However, not all countries have taken the same route of limiting privacy. Sweden, for instance, has not forbidden activities or tracked its citizens, but instead has provided guidelines and handed over the responsibility to its own people to behave sensibly. The government has stated the ability to sustain restrictions and the potential to reach herd immunity quickly as part of the justification for its actions.

The Great Polariser: gap grows between haves & have-nots

Covid-19 has further exposed inequalities in society pressuring not only governments but companies in terms of their behaviour and responsibility to their employees. Despite claims by many that Covid-19 has been a Great Leveller, with anyone susceptible and all feeling the costs of lockdown, the reality is very different. Not only are older demographics and those with underlying health conditions more affected, but the way we are sharing the burden of protection is also unequal. Those that are able to work from home are typically higher earners, while manual labour and lower wage earners are more likely to be either losing jobs or having to work in dangerous, exposed conditions. The US has already experienced protests about lockdown, and the pressures exerted on parts of society are likely to increase the risk of social unrest.

Chart 28: Low income workers disproportionately hit by Covid-19

% saying themselves or someone in their household impacted from the Covid-19 pandemic



Source: Pew Research, survey conducted April 7-12 2020 n=4,917

6.7% of global working hours are set to be lost in Q2 2020 – equivalent of 195 million full-time jobs. 37.5% of global workers are in the four most hurt sectors – food & accommodation, retail & wholesale, business services & administration, and manufacturing (source: ILO 2020)

Covid-19 will have lasting negative implications for the most disadvantaged
The consequences of this crisis will last much longer for those already in more precarious and difficult positions. Access to education is almost exclusively available to those with technology and screens at home. In the UK, half of children at private (fee-paying) schools are attending online classes every day, double their counterparts attending state schools (source: Sutton Trust). These kind of impacts will have lasting consequences – researchers found that college-educated families saw almost no impact from the Great Recession while less educated families saw large negative results, significantly increasing inequality across income distribution (source: Garfinkel et al, Children of the Great Recession, Columbia University).

The rising gap between haves and have-nots is resulting in growing political pressure. Elizabeth Warren and Alexandra Ocasio-Cortez have proposed legislation to block M&A deals, while US politicians across the political spectrum have questioned the appropriateness of various large organisations receiving federal aid.

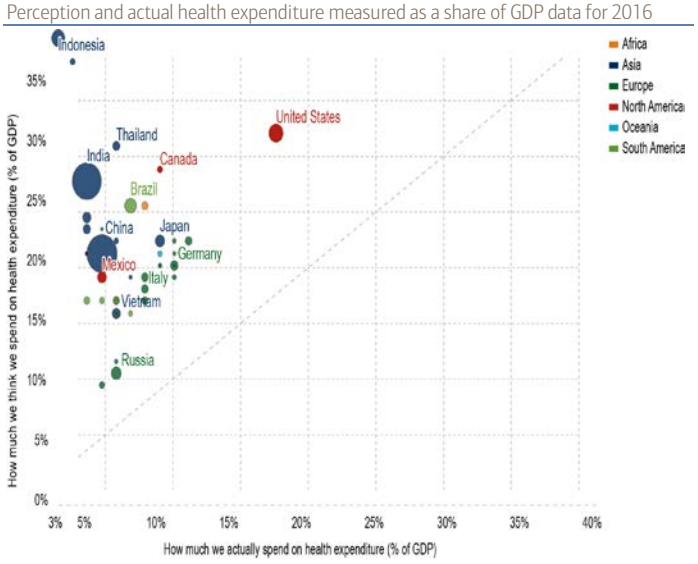
Social, inequality issues growing in importance: Highly valued organisations have faced a backlash for their behaviour in this crisis: Harvard University recently returned $8.7mn in federal aid after political pressure, while Disney has faced negative media attention for maintaining its executive bonus schemes while cutting pay for 100,000 workers.

Healthcare: Covid-19 exposing underperformance

This crisis has shown a mismatch of funding, expectations, and reality in the realm of healthcare. We spend 10% of GDP globally on healthcare but waste 20-40% of this (source: WHO). The US is the number one healthcare spender and yet has the largest number of Covid-19 deaths. Governments' pandemic preparations were inadequate (source: Global Health Security Index). The realities exposed to the public by Covid-19 have highlighted the instability of the healthcare system – by 2024, healthcare spend will be 20% of GDP in the US (source: US CMS 2015). Despite such spending, healthcare still acts as an inequality divider, with low-income households globally 4-6x more likely to report unmet needs for medical and dental care (source: OECD).

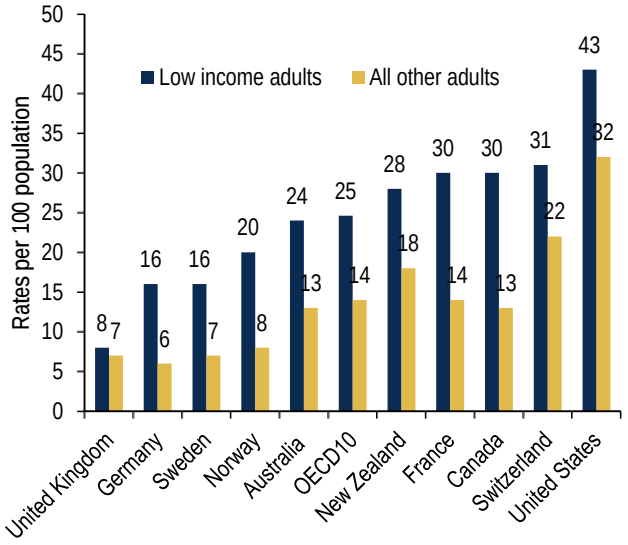
Exhibit 41: How much we think we spend on healthcare vs. how much we actually do

Perception and actual health expenditure measured as a share of GDP data for 2016



Source: Ipsos MORI Perils of Perception 2016

Chart 29: Unmet care needs due to cost, by income level, 2016



Source: OECD, Commonwealth Fund International Health Policy Survey 2016

Higher levels of spending on pandemic preparation needed

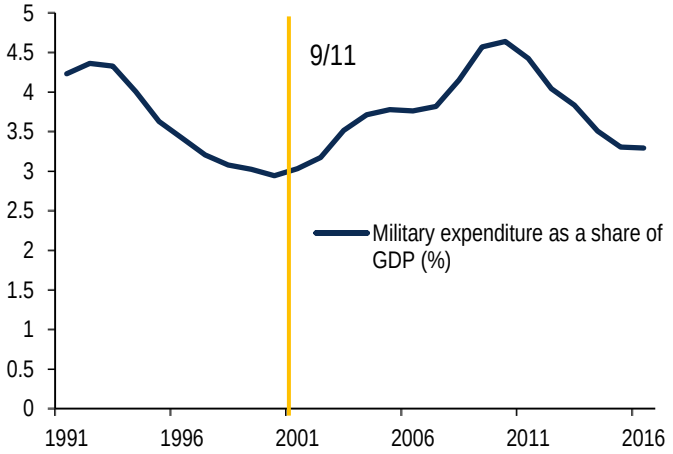
After the current pandemic peak, countries will be unable to return to previous funding levels for pandemic preparation. By their very nature, pandemics are characterised by 'cycles of panic followed by neglect' (source: Lancet 2018). Before the Covid-19 crisis, no country was deemed prepared for a pandemic or epidemic, meaning there will be large scope and great need to improve and better manage preparations and stockpiles:

- Only 5% of countries had sufficient funding in national budgets for preparedness and only one country, Liberia, had released a specific funding description for the shortcomings in its action plans and assessments (source: Global Health Security Index).
- Less than 50% of countries had publicly shown that they owned stockpiles or had agreements with other countries, and less than 10% had developed procedures for allocating these supplies (source: Global Health Security Index).
- 30% of BofA analysts surveyed stated that the companies in their sector coverage were preparing for future pandemics and other risks by buying protective, hygiene or safety gear.

Personal safety boom: every crisis has its spending legacy

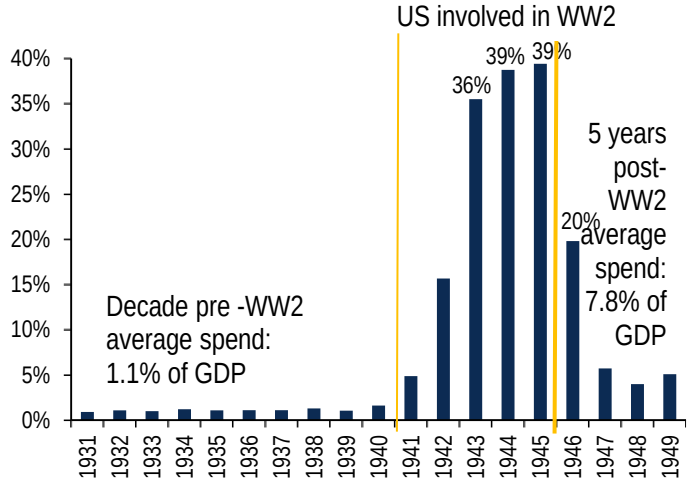
We expect safety, hygiene and healthcare spending to remain elevated after the peak of the crisis. Following any calamity and disaster, the monetary value spent by countries on goods and services to protect them does not return to previous levels and regulations are implemented to ensure this. Homeland security & defence spending in the US as a share of GDP has not returned to pre-9/11 levels (source: Our World in Data). Similarly, military spending for the US remained elevated for years post World War II.

Chart 30: US defence spending as a share of GDP



Source: Our World in Data

Chart 31: US defence spending as a share of GDP



Source: Our World in Data

The severe acute respiratory syndrome (SARS) pandemic of 2003 that killed close to 800 people also left a legacy. The World Health Organisation (WHO) improved its guidelines for detecting, notifying and responding to outbreaks, while countries such as the US created plans to deal with pandemics.

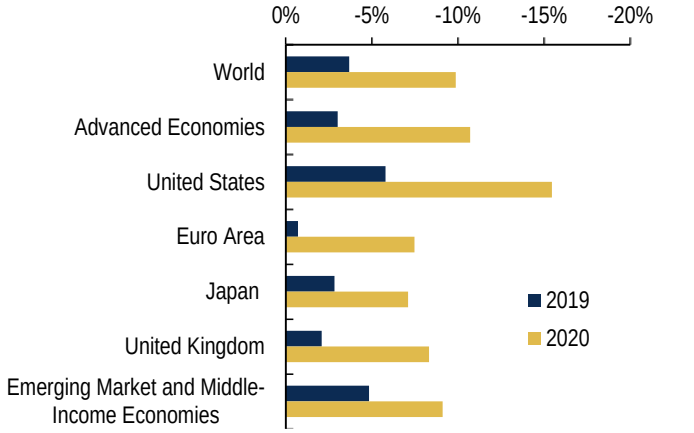
Governments just got bigger as pressure to step up grows

Governments are adopting a 'hands on' approach: fiscal stimulus, greater regulation and more surveillance mean they have increased control. Higher deficits, social spending and fiscal stimulus could become *the* government mantra of the next decade. Countries have resoundingly chosen to help and protect communities, including the most vulnerable in society. Consequently, schools of thought that have been the subject of debate and interest over the past decade are, in effect, being implemented: Modern Monetary Theory; radical money printing; the return of Keynesian economics; and fiscal over monetary stimulus.

Provided we don't see runaway inflation as a result of these policies, countries may continue to use these economic mechanisms to ease the pain of the ensuing recession. Longer term, a willingness to spend to prevent pain for workers could mean greater openness to the concept of universal basic income and the expansion of welfare states.

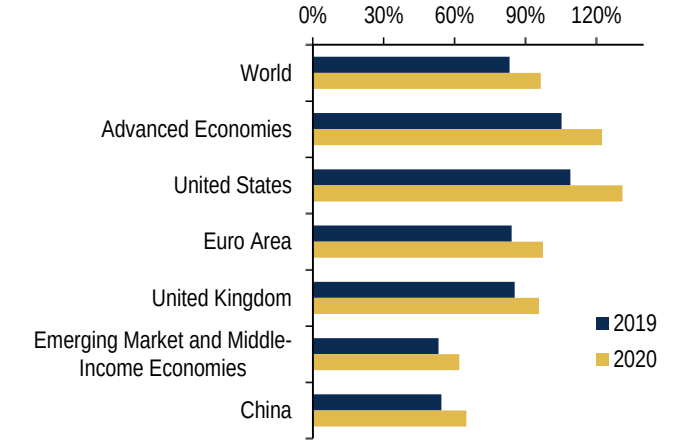
Businesses are likely to see further scrutiny to act more in the interest of all stakeholders (employees, society, customers, etc) rather than a sole focus on shareholder returns as governments provide aid and back loans.

Chart 32: Government fiscal deficits
As a share of GDP, 2019, 2020



Source: IMF, Fiscal Monitor, April 2020

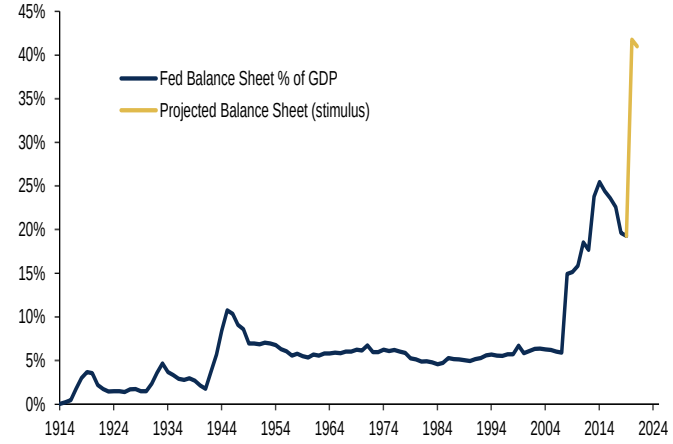
Chart 33: Government debt
As a share of GDP, 2019, 2020



Source: IMF, Fiscal Monitor, April 2020

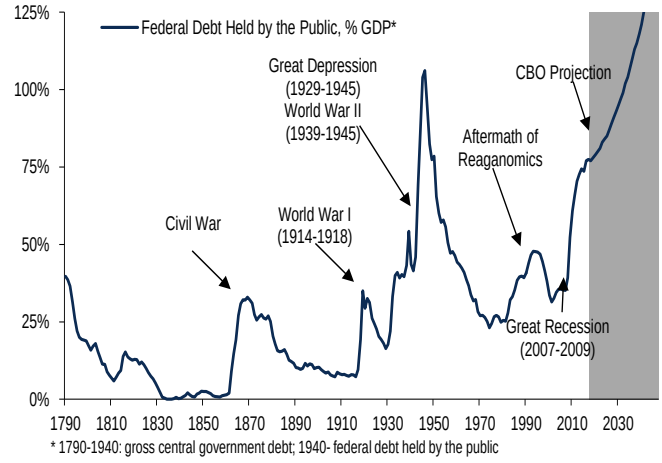
Global government debt as a share of GDP will increase 13.1% to 96.4% in 2020 (source: IMF 2020)

Exhibit 42: US Federal Reserve Balance sheet since 1914



Source: BofA Global Investment Strategy, BofA Global Research, Bloomberg, Haver, Global Financial Data, Federal Reserve Board.

Exhibit 43: US Federal debt as % GDP



Source: BofA Global Investment Strategy, Reinhart, Camen M. and Kenneth S. Rogoff, "From Financial Crash to Debt Crisis," NBER Working Paper 15795, March 2010, Haver.

The rise of stakeholders versus shareholder

This crisis has resulted in an acknowledgement that a company's responsibilities and purpose go beyond providing returns to the shareholder. This is not a new trend. The growing ESG focus by asset managers and the 181 signatories, including BlackRock and JP Morgan, of Business Roundtable that "share a fundamental commitment to all our stakeholders" are evidence that this trend is also entering the financial industry (source: Bloomberg). The current crisis has shown material examples of that change in priority to other stakeholders:

- The UK's largest banks, HSBC, RBS, Barclays and Lloyds, have stopped dividends and buybacks after financial regulators pushed them to preserve

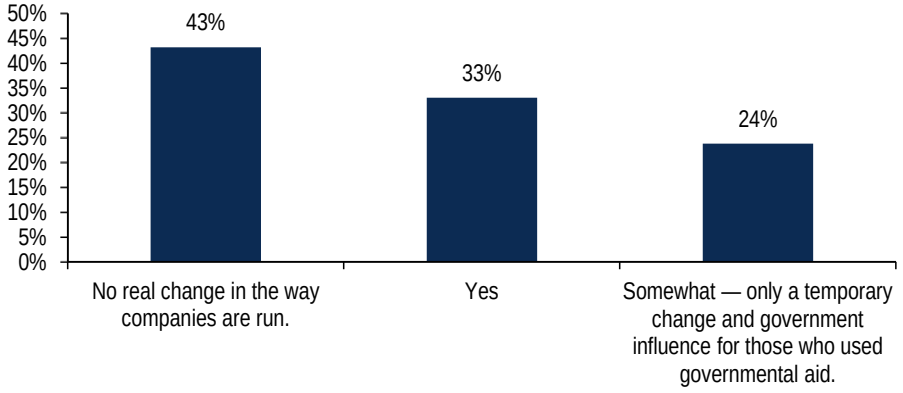
more capital given the "unique role that banks need to play in supporting the wider economy" (source: Bank of England Prudential Regulation Authority 2020). Similarly, the AFEP (French Association of Private Enterprises) has instructed its members, such as Michelin, to cut dividends when taking any form of state support.

- Industry has been requested to change its factories to increase production of ventilators and other vital products. GM, for instance, was compelled to produce ventilators extending the DPA (Defence Production Act) beyond its typical use for military procurement.

- 33% of BofA analysts expect shareholder rights to be eroded either through government intervention or changing priorities within companies. A further 24% expect temporary change to the rights of shareholders in some sectors as governments earn influence over business in exchange for the aid handed out.

Chart 34: A third of analysts expect permanent change to shareholder rights

Are shareholder rights/voice being eroded?



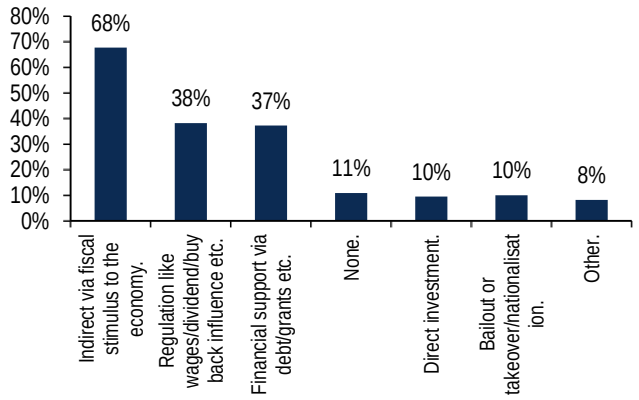
Source: BofA Global Research

Financial support = long-term governmental influence in business

The financial support that governments are providing means that their influence will not disappear after the crisis. The US, France and the UK have suggested taking equity stakes in companies that receive their support, such as the airline industry. These are likely to influence the development of these businesses, similar to the impact of equity stakes in banks such as Lloyds, RBS, and Commerzbank after the financial crisis. Over the next 2-5 years, half of BofA analysts expect the current crisis to result in overall deleveraging, while a third expects fewer buybacks and dividends.

Chart 35: Almost everyone expects government intervention

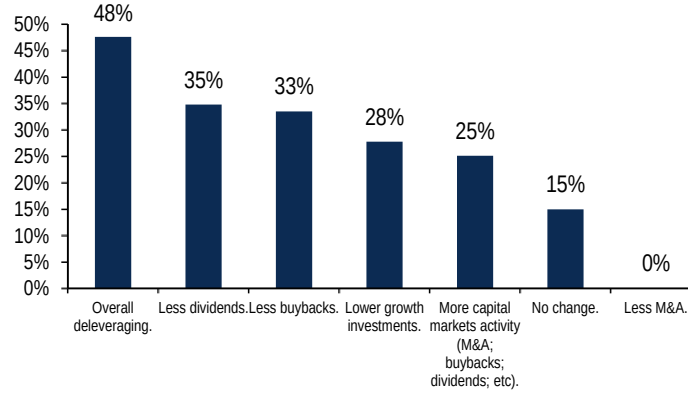
What kind of government intervention are you expecting in your sector?



Source: BofA Global Research

Chart 36: Half of analysts expect deleveraging for the next 2-5 years

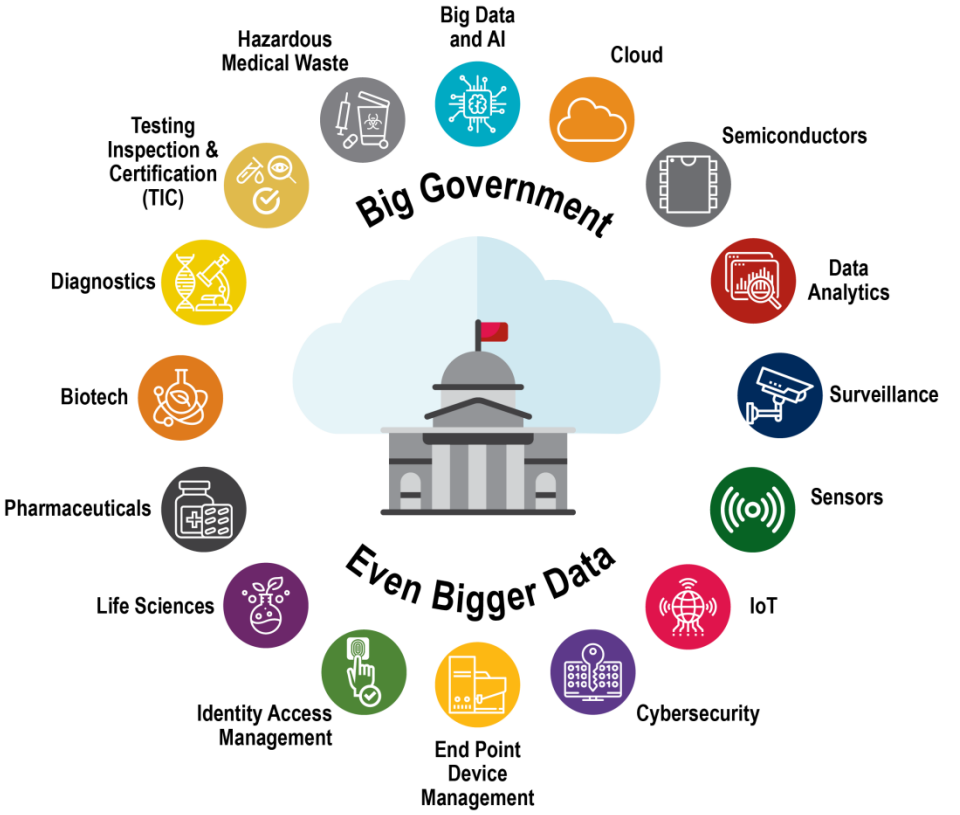
In the next 2-5 years, how do you expect the current crisis to impact capital structure?



Source: BofA Global Research

Big Government-exposed sectors: Big Data, Surveillance, Life sciences, TIC

Exhibit 44: Big Government, even Bigger Data exposed sectors



Source: BofA Global Research

- **Big data and AI:** Cloud, data storage, semiconductors, telecom equipment providers and data analytics companies will be necessary to store, process, transport and analyse the larger volumes of data resulting from the crisis.

- **Surveillance:** Companies that enable surveillance and data gathering, such as cameras, sensors and IoT producers, are likely to experience continued demand to expand networks as companies and governments increase dependence on them.

- **Cybersecurity:** As the world moves online at a greater pace, the risks relating to the online system also increase. Companies have seen some of the fastest expansion of their networks as working from home involves a much larger number of personal-employee devices and network systems. The pace of change and increase in business exposure to the internet, new devices, and larger networks will create more cyber vulnerabilities to be exploited but also protected.

- **Life Sciences:** Lab equipment, diagnostics, food and consumer product safety, among others, are clearly necessities in a world where viruses can spread easily. While a vaccine or herd immunity are not achieved, the risk of second, third and further waves of Covid-19 outbreak means high volumes of testing will be needed long after the current peak has declined.

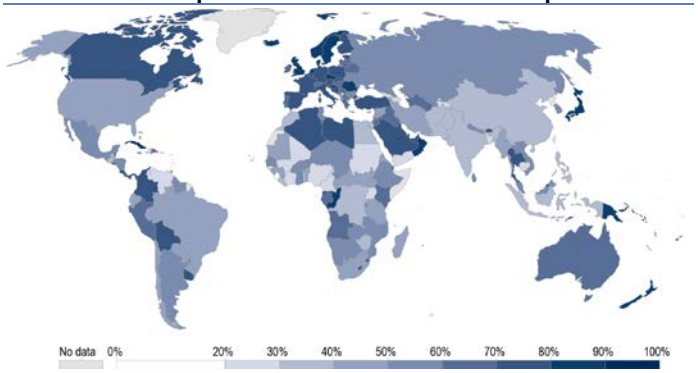
- **Biotech and pharmaceutical sectors** have previously been excluded by ESG investors, given their use of animal testing and other issues. However, their key roles in providing vaccines and other support may result in a change of attitude.

- **Testing Inspection & Certification (TIC):** Covid-19 has highlighted the inherent risks within our globalised supply chains and interconnected world. Similarly to the increased regulation and transformation that the financial industry experienced post the 2008 financial crisis, companies will need to better prepare for risks and may need to prove better compliance relating to health and environmental factors. To begin preparing needs understanding and assessment of risks and companies that provide testing, inspection and certification services will be key enablers. Food and animal surveillance could be deemed more necessary – most diseases are transmitted from animals (source: Lancet). Further, hazardous medical waste is likely to receive greater scrutiny and care in order to prevent a relapse of the disease in the autumn or years after.

Health: is the new wealth and ESG focus

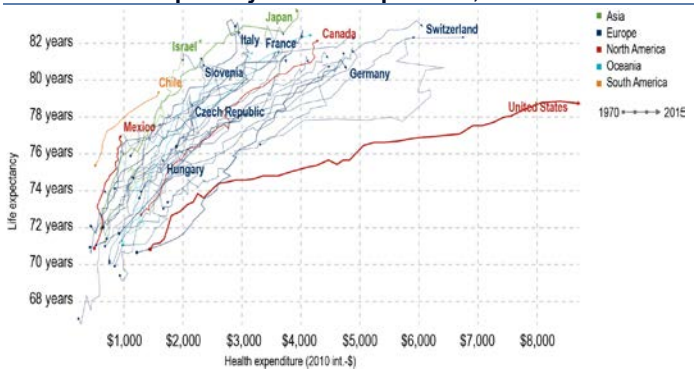
- **Did you know?** Nursing is one of the fastest-growing professions in the US, and one of the least likely to be automated by robots but it is one of the least well-paid.
- **Key takeaway:** Healthcare will likely be the most important ESG sector in the coming years. Covid-19 will amplify the importance of its Social role and accelerate other pressing global public health issues, such as drug pricing, antibiotics resistance, pandemic prevention, universal vaccines and so forth.
- **Our survey tells us** that 2/3 of analysts surveyed flag that employee healthcare was already or will become more of an important ESG factor for their company coverage

Exhibit 45: Public expenditure as % of total healthcare expenditure



Source: World Bank + WDI, Our World in Data

Exhibit 46: Life expectancy vs. health expenditure, 1970 to 2015



Source: Our World in Data

Exhibit 47: Healthcare Trends & Strategies

TRENDS	WINNERS		LOSERS
Volume to value healthcare	TeleHealth	Life Sciences	Healthcare Data Privacy
Outcomes based healthcare	Surveillance	CROs	Private Healthcare insurer model
Prevention Care	Universal Healthcare Model		
AI, Big Data, Digitisation			

Source: BofA Global Research

Our societal welfare, economic or otherwise, is built on having a healthy and thus productive population. The pivotal significance of healthcare and pharmaceutical products for society makes the industry highly important to stakeholder expectations as evidenced by Covid-19. For stakeholders, a comprehensive ESG framework not only calls for strong environmental initiatives, but also businesses that embrace its wider social impact, diversity and inclusion. Although the pharmaceutical industry in recent times has been plagued by scandals which have eroded public trust e.g. governance, product safety, opioids misuse, drug pricing etc. Covid-19 gives the sector a shot at redemption as it becomes the key pillar to prevent future pandemics and will likely become one of the most important ESG sectors in the coming years.

Social: the "S" pillar of ESG will gain traction

We believe the consequences of coronavirus will result in growing investor focus on companies' Social factors. We expect investors to consider more qualitative indicators as

a gauge of long-term competitiveness (human capital) and operational integrity (business continuity). These indicators include among others:

- **Employee Health Benefits** (e.g., paid sick leave, health and well-being programs, short-time work, telemedicine)
- **Emergency Response** / **Business Continuity** (e.g., telecommuting, distributed management, backup working office sites)
- **Supply Chain Controls** (e.g., quality and safety management, local v global dependence)

Why does "S" matter? Companies allocating resources to the Covid-19 crisis are likely to foster employee and community goodwill to enhance brand and reputation. Companies with a record of good employer/employee relations have markedly outperformed peers during the coronavirus crisis. Overall there's been a sea-change – from corporates focusing solely on shareholders to a broader focus on stakeholders, including employees, customers, suppliers and communities. Companies around the world have stepped up their efforts to fight the virus and demonstrated how the private sector is augmenting the public sector response to Covid-19.

Overall our BofA survey of analysts flag that the 'S' of ESG has been the #1 most influential factor for their companies during the crisis, underpinning the social importance of stronger healthcare systems for the future. 2/3 of our analysts highlight that their companies will see higher costs on employee benefits e.g. healthcare, hygiene, safety, insurance after coronavirus. 1/2 believe that public health systems will see a larger allocation in national budgets with 40% believing there will be more data sharing with government agencies.

Public Health = National Wealth

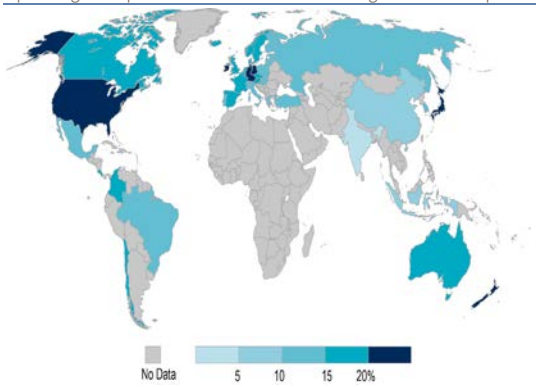
Public health systems and pandemics haven't always been a major focus for ESG investors. However, this is changing with global supply chain issues and the holistic interplay between ensuring access to medicines and protecting antibiotic effectiveness and fighting deforestation. The latter is inextricably linked to the environment and the social need for strong public health in the event of future outbreaks. For example, deforestation is usually seen through the lens of global warming, but it also carries with it a public health risk. For instance, the encroachment on endangered species, and the hunting and killing of wild animals can result in the release of viruses previously contained in their ecosystem.

Exhibit 48: ESG and Healthcare

Source: Bank of America

Exhibit 49: Public Funding for Health

Spending from public sources as share of total government expenditure



Source: OECD 2017 (or nearest year)

Universal healthcare

Universal healthcare is a system that provides quality medical services to all citizens. The federal government offers it to everyone regardless of their ability to pay. Most

universal healthcare is funded by general income taxes or payroll taxes. However, the US is the only developed country that doesn't have universal healthcare. But its health delivery system does have specific components, such as Medicare, Medicaid, and the Department of Veterans Affairs, that provide universal healthcare to specific populations. Overall, there are three types of universal healthcare model: 1) single payer (UK, Spain and Cuba); 2) mandatory social health insurance (Germany, France, Belgium, Japan, Switzerland); and 3) national health insurance (Canada, Taiwan and South Korea).

Table 4: Pros & Cons of Universal Healthcare

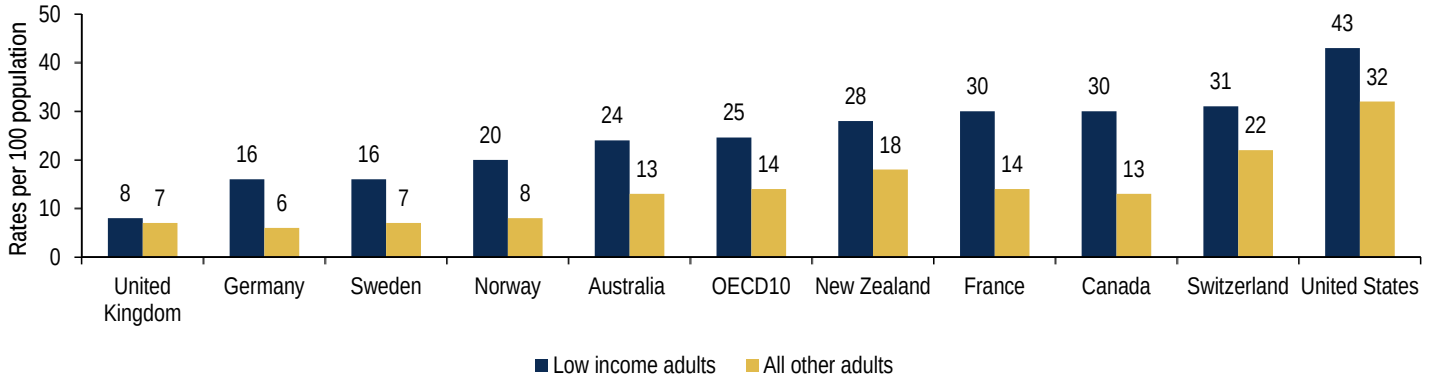
Universal Healthcare	
Pros	Cons
Equality - ensures everyone has access to basic service, essential for living standards.	**Efficiency for private sector** - Private sector has incentives to be efficient.
Positive externalities - Good health for whole population increases labour productivity.	**Alternative** - Gives those who can afford it greater choice for choosing how they use healthcare.
Adverse selection - In free market, the unhealthy will be most willing to buy insurance - pushing up premiums and making expensive.	**Demand keeps rising** - Public sector struggling to keep up with rising demand due to ageing population, and increased expectations.
Merit good - people may underestimate benefits of getting check-up or getting treatment.	**Not limited** - With limited budget, public healthcare may have to ration services.
Public service - Healthcare is not like most private goods. Profit incentive isn't needed, and consumers struggle to choose between different doctors.	**Bureaucracy of government** - Public healthcare bodies may have to suffer from high bureaucracy costs.
Lowers health care **costs** for an economy	Forces **healthy people** to pay for others' medical care
Forces hospitals & doctors to provide same **standard of care** at low cost	Without **financial incentive**, people may not be as careful with their health
Eliminates administrative costs by eliminating need to deal with **health insurance**	Most universal health systems report long wait times for **elective procedures**

Source: The Balance, Economics Help

US Affordable Care Act (ACA)

The US healthcare system still has significant unmet needs. Globally, low-income households are 4-6x more likely to report unmet needs for medical and dental care. Nearly half of Americans with below-average income have forgone doctor visits or treatments in the past year due to cost (source: OECD).

Chart 37: Unmet care needs due to cost, by income level, 2016



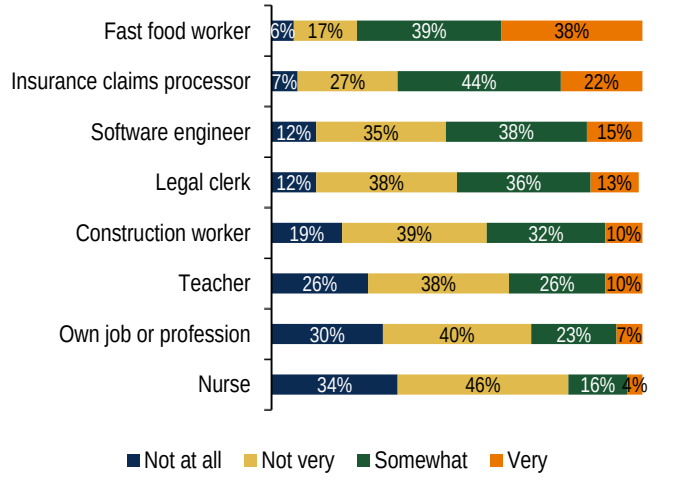
Source: OECD, Commonwealth Fund International Health Policy Survey 2016

Nursing: one of fastest-growing professions, hard to automate, least well-paid

In terms of the specific jobs evaluated in the Pew Research survey, a sizeable majority of Americans think that nursing is least at risk of automation. Just 4% of Americans think it is very likely that nurses will be replaced by robots or computers over the span of their lifetimes, while 34% think this outcome is not at all likely.

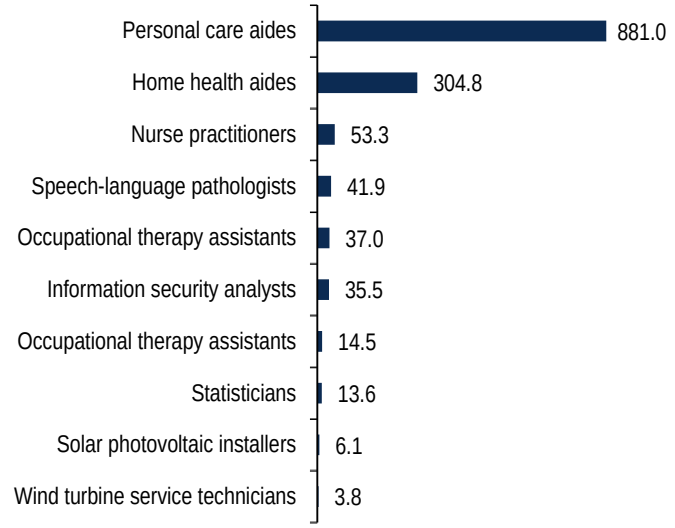
Chart 38: Americans view certain professions as being at greater risk of automation than others

% of U.S. adults who say it is __ likely that the following jobs will be replaced by robots or computers in their lifetimes



Source: Pew Research Center, Survey conducted between May 1-15 2017 "Automation in everyday life" Note: Data for 'own job or profession' is based on those who are currently employed

Chart 39: Employment change (in thousands) projected in fastest growing occupations between 2018-2028



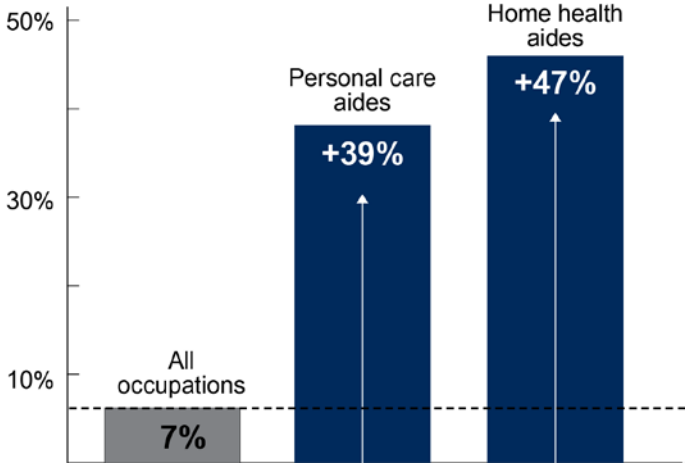
Source: Bureau of Labor Statistics, BofA Global Research

Social care jobs require empathy

However, jobs that require emotional and social skills are valued less in the labour market. Historically home care workers are hard to find and not everyone is willing to deal with difficult patients for low pay and very few employment benefits compared to other jobs.

Exhibit 50: A skyrocketing need for home care workers

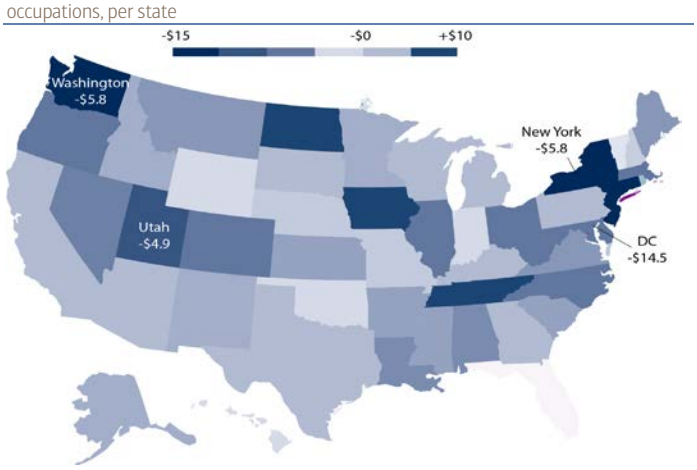
% change in employment, projected 2016-2026



Source: Bureau of Labor Statistics

Exhibit 51: Home health aides earn less than the average worker

Difference between median hourly wages for home health aides and all other occupations, per state



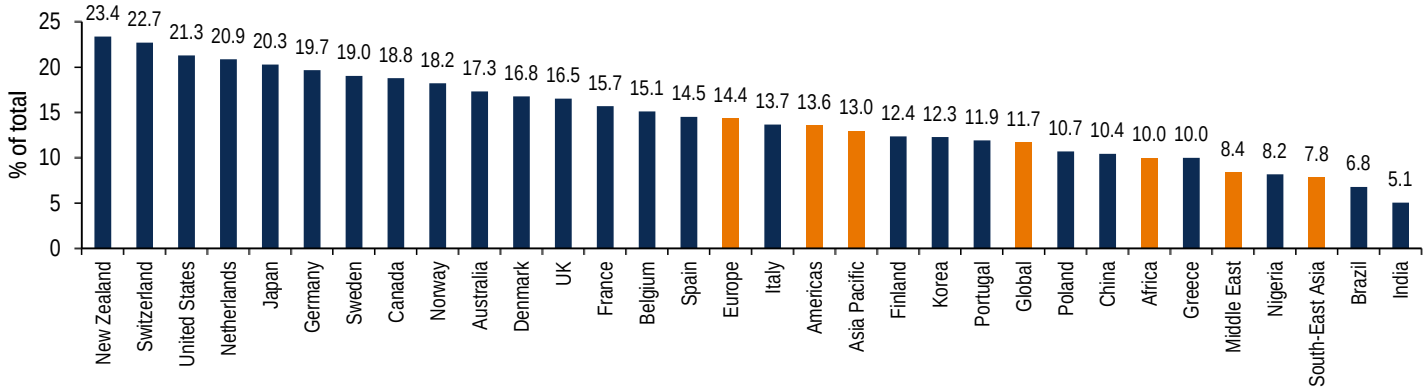
Source: Bureau of Labor Statistics, May 2016

Healthcare spending: c.10% of GDP – is that enough?

US$7.2tn or 10% of global GDP spent on health in 2015 – WHO

Globally on average around 1/8th of *government* expenditure is dedicated to healthcare. The US, Netherlands, Switzerland and New Zealand spend above 20%, while Greece and Turkey spend around 10% (source: OECD 2015). India and Brazil spend as little as 5% and 7%, respectively (source: WHO).

Chart 40: Health expenditure as share of total government expenditure, 2014

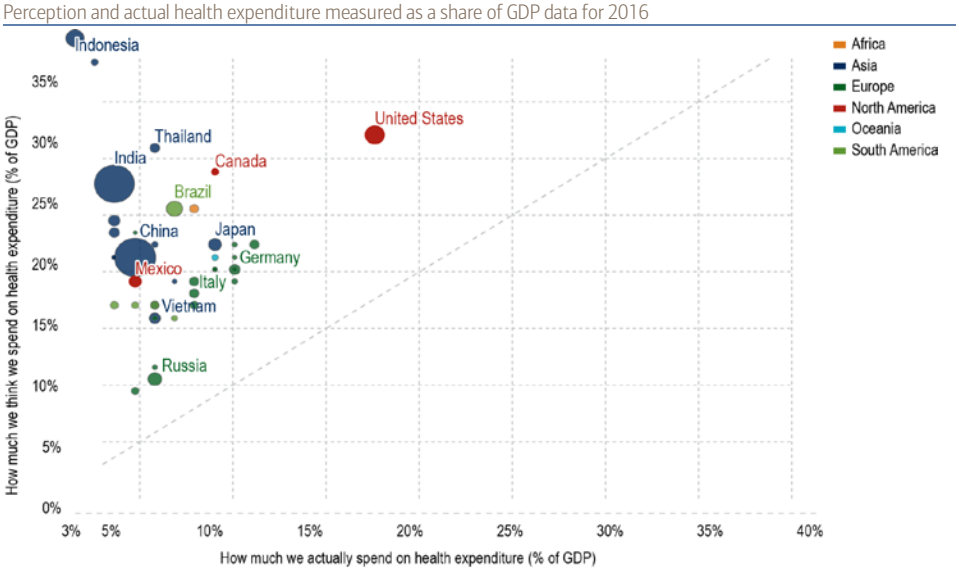


Source: WHO

In the chart below (vertical axis), we see the average that survey respondents guess is spent on health every year, as a share of GDP. The horizontal axis shows estimated actual expenditure (also as a share of GDP). All countries in the survey lie above a hypothetical parity diagonal, meaning that people everywhere think they spend more on healthcare than they actually do.

Exhibit 52: How much we think we spend on healthcare vs. how much we actually do

Perception and actual health expenditure measured as a share of GDP data for 2016

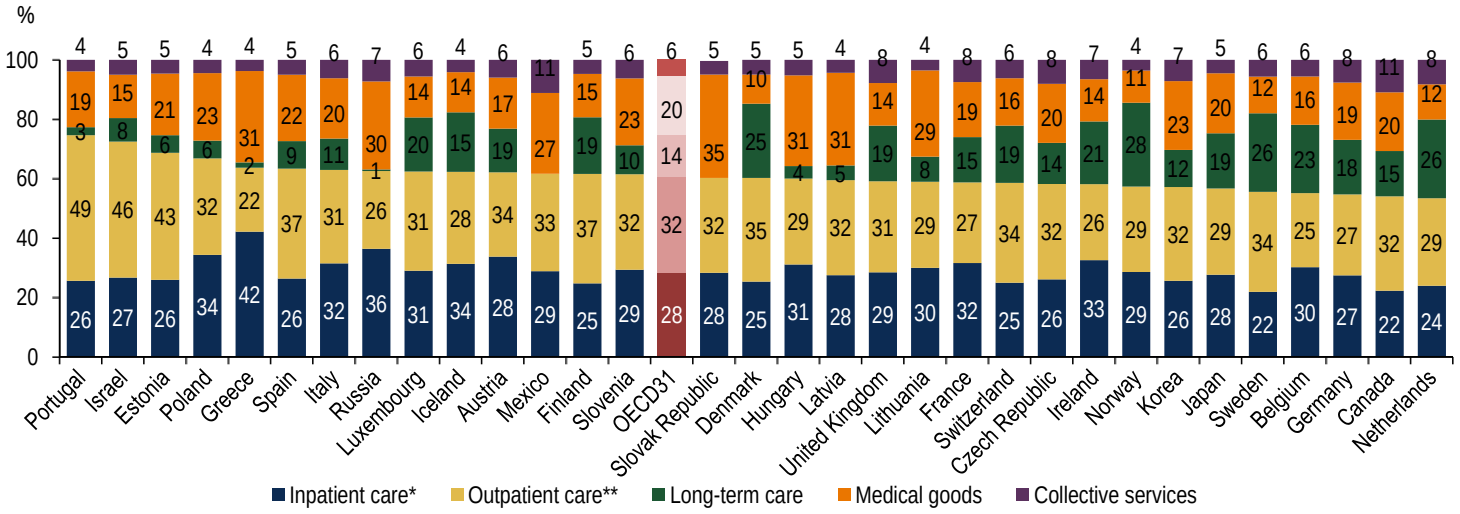


Source: Ipsos MORI Perils of Perception 2016

Where does the spending go?

Spending on inpatient and outpatient care accounts for two-thirds of all healthcare spend in OECD countries. A further 20% is on medical goods, primarily pharmaceuticals, 12% is on long-term care, and 6% is on collective services such as public health, prevention, and administrative services (source: OECD 2015).

Chart 41: Health expenditure by type of service, 2017 (or nearest year)

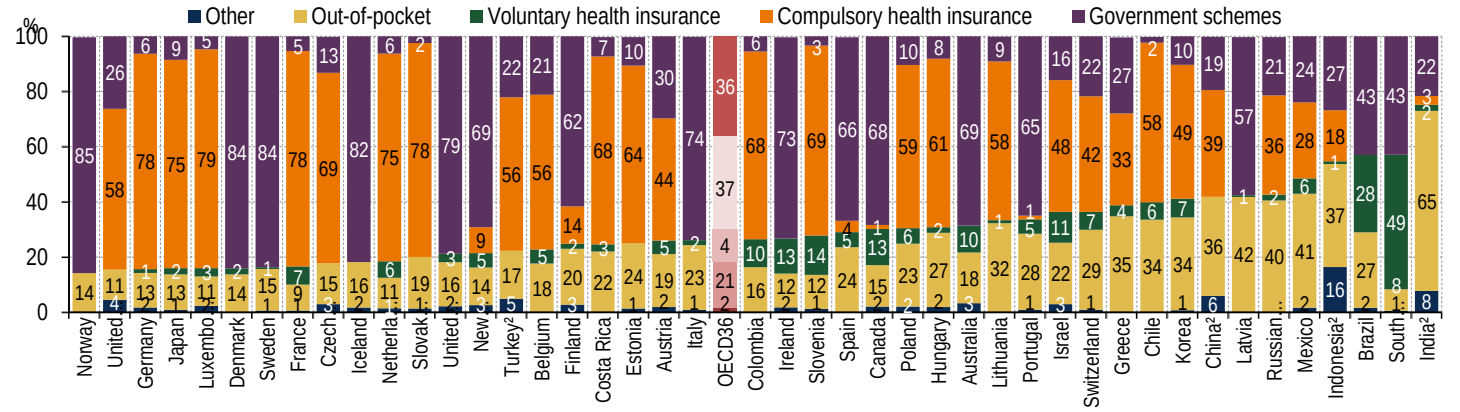


Source: OECD Health Statistics 2019
Note: Countries are ranked by curative-rehabilitative care as a share of current expenditure on health.
* Refers to curative-rehabilitative care in inpatient and day care settings. ** Includes home care and ancillary services.

Who pays for the healthcare system?

Healthcare is financed by a mix of public and private spending. Across the OECD, nearly three-quarters (73%) of spending is publicly financed, with governments in Denmark, Sweden, and the UK accounting for over 80%. In the developed world, only the US has a public share at less than 50%, as private insurance tends to play a greater role (source: OECD 2015). Globally, public spending accounts for around 58% of the total, with the remainder funded privately (source: WHO).

Chart 42: Health expenditure by type of financing, 2017 (or nearest year)

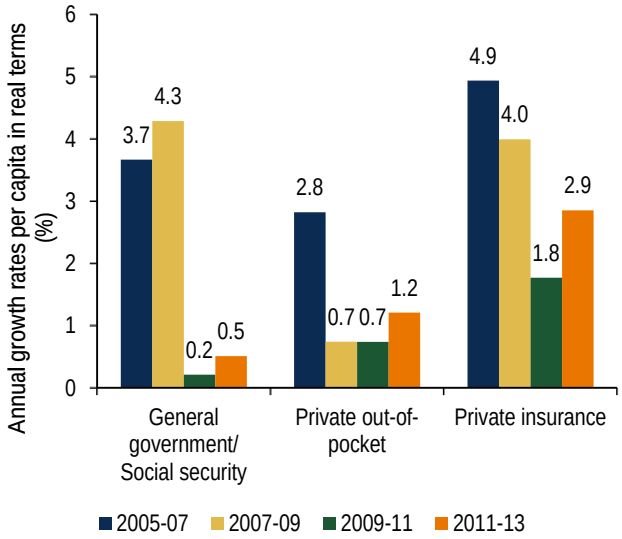


Source: OECD Health Statistics 2019

Globally, public spending is falling and private spending is growing

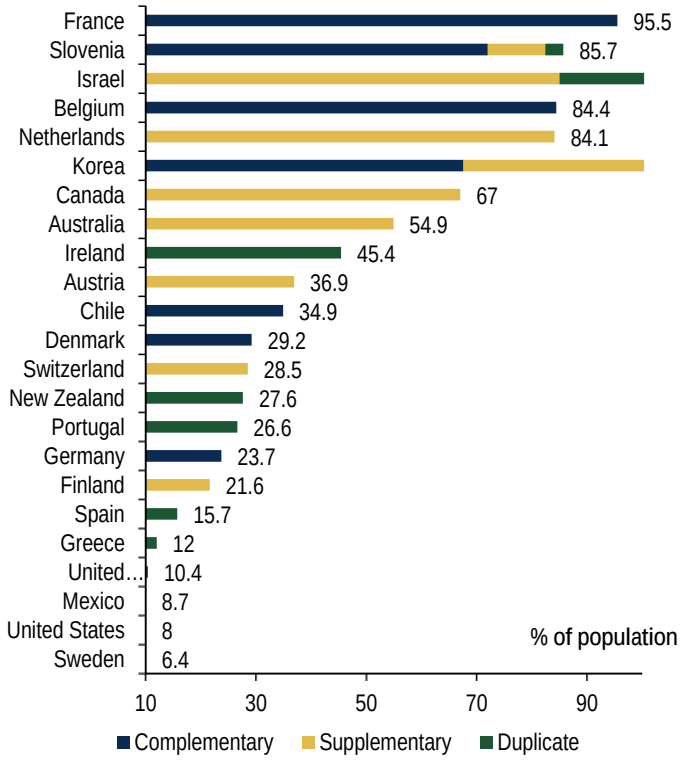
Public healthcare spending growth has been tepid since the great recession. However, financing by private healthcare insurance has been expanding at 3% pa. In most cases, this tends to be complementary or supplementary coverage (source: OECD).

Chart 43: Growth of health spending by type, OECD average



Source: OECD

Chart 44: Private health insurance coverage by type, 2017 (nearest year)

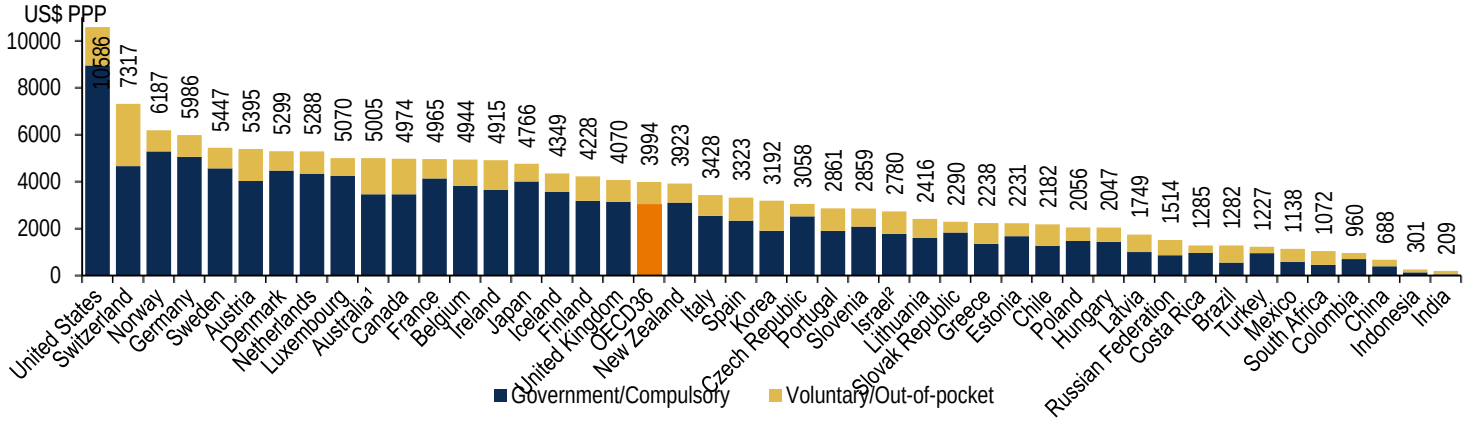


Source: OECD

America First: US #1 healthcare spender, #1 coronavirus cases/deaths

The US is the world's largest healthcare market by nearly every metric including total spending (US$3.2tn in 2015), per capita spending (US$10,586 in 2018), or as a percentage of GDP (17.5% in 2014) (source: US CMS). Growth in healthcare spending has also outpaced GDP by 2-2.3% pa since the 1950s (source: RAND 2014). Of this, around US$1.4tn was funded by federal, state and local governments, with the rest by corporates, individuals and other private sources (source: US CMS).

Chart 45: Health expenditure per capita, 2018 (or nearest year)



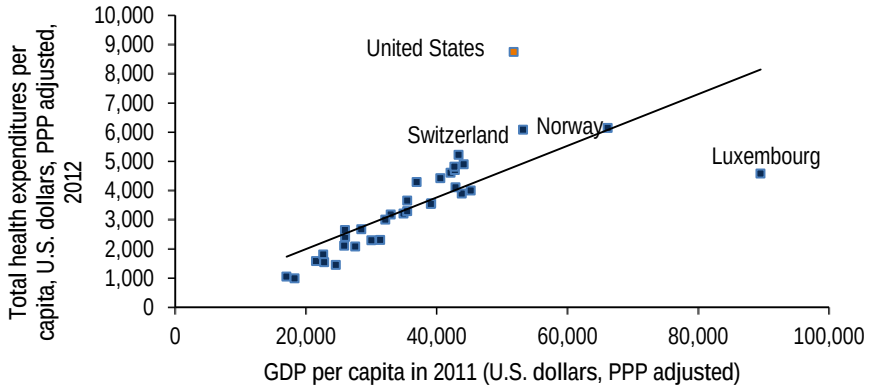
Source: OECD Health Statistics 2019, WHO Global Health Expenditure Database

US$3tn of annual spend in the US, 40% of global total

Per capita spend in the US is 3x the OECD average, 10x the global average

Healthcare could account for 20% of US GDP by middle of this decade (source: CMS)

Chart 46: US spends a disproportionate amount on health relative to the size of its wealth

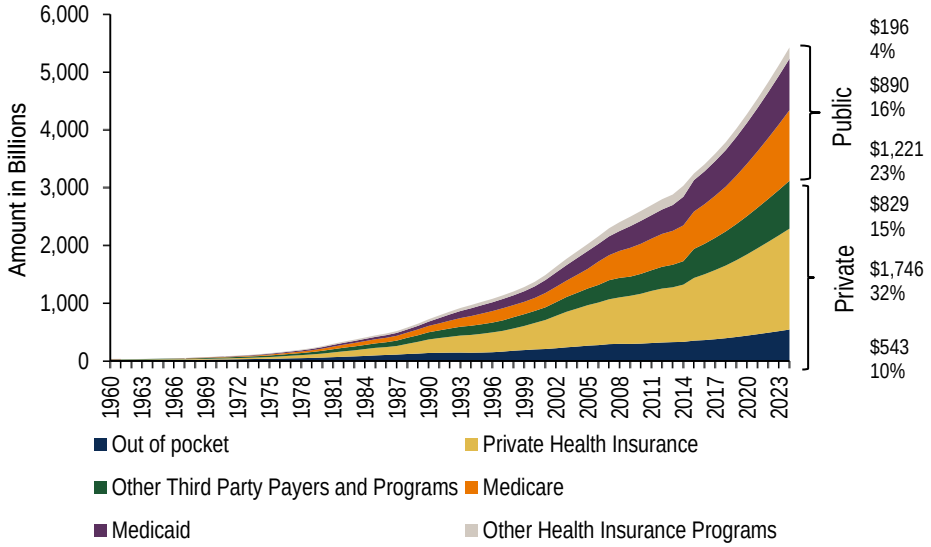


Source: Kaiser Family Foundation analysis of 2013; OECD

US – $5.4tn by 2024, 20% of US GDP

Healthcare spending is expected to continue to outpace GDP growth by 1.1% annually, rising from 17.4% of GDP to 19.6% by 2024E. It will rise at one of the fastest rates within the developed world at 5.8% pa and reach US$5.4tn by 2024E. This is projected to be funded by the public sector and private health insurance. On the back of coverage expansion from the Affordable Care Act (ACA), public financing is expected to expand from 43% of total expenditure to 47% by 2024E (source: US CMS 2015).

Chart 47: National health expenditures by source of funds: calendar years 2008-24



Source: CMS; Centers for Medicare & Medicaid Services; Office of the Actuary

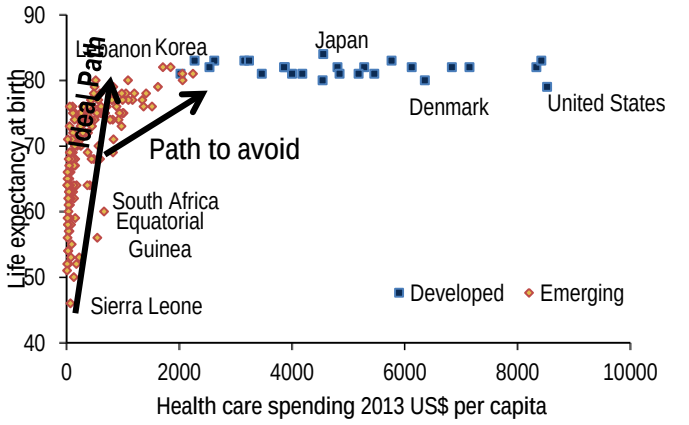
Healthcare costs: 20-40% of spend is wasted

It is estimated that 20-40% of healthcare spending is wasted, translating into US$1.5-3tn of inefficient use (source: WHO). IMS Health estimates that the US healthcare system could save as much as US$213bn annually if medicines were used more efficiently and appropriately (source: WHO, IMS Health).

From volume-to-value-based healthcare, spending does not equal outcome

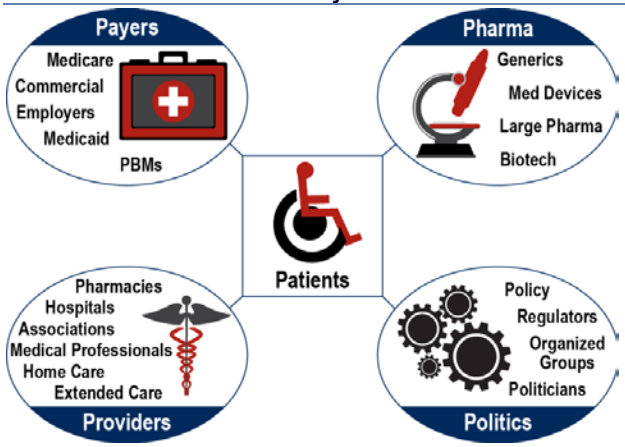
While there is a strong correlation between healthcare spend and outcome, the highest spenders do not have the highest life expectancies or the lowest rates of ill health. Of 166 countries, Japan had the top healthcare outcome, and the oldest population, while Singapore and South Korea had similar outcomes at lower cost. The US, by contrast, spent US$9,523/capita in 2014, but ranked #33 on the healthcare outcomes index, behind Lebanon and Costa Rica (source: EIU 2014, CMS).

Chart 48: Health outcome versus health spending



Source: WHO, Economist Intelligence Unit

Exhibit 53: The US Healthcare ecosystem



Source: Academy of Managed Care Pharmacy

Business model/incentive changes: from "sick care" to "prevention care"

We expect a dramatic transformation of the global healthcare system in the coming decades. Developed markets will move away from siloed budgeting, where drug spending is managed separately from other healthcare costs. Key solutions include: 1) value-based healthcare – linking spending directly to healthcare outcome; 2) Big Data – harnessing technology for disease management, providing analytics, personalised care, mobile health; and 3) a more mobile medical workforce.

US healthcare value chain

In the United States, similar to other regions, the government plays a major role in the healthcare ecosystem. The CMS administers Medicare and Medicaid. It is the single-largest payer in the US, and accounts for one-third of all healthcare expenditures. In addition to Medicare and Medicaid, commercial payers (including insurance companies) and employers help decide which technologies are eligible for payment, the clinical circumstances, and utilisation policies (source: RAND). Payers then have agreements with providers of services (hospitals, medicals professionals, etc.) and goods (medicine, medtech devices and so forth).

Third parties negotiate cost of medicines

In the US, there are also third-party administrators that help negotiate costs. Pharmacy benefit managers (PBMs) help negotiate discounts and rebates between drug manufacturers and payers – insurance companies and government. Managed care organisations (MCOs) help administer health insurance for the commercial segment as well as Medicare and Medicaid.

Big Data & AI: technology at the heart of the solution

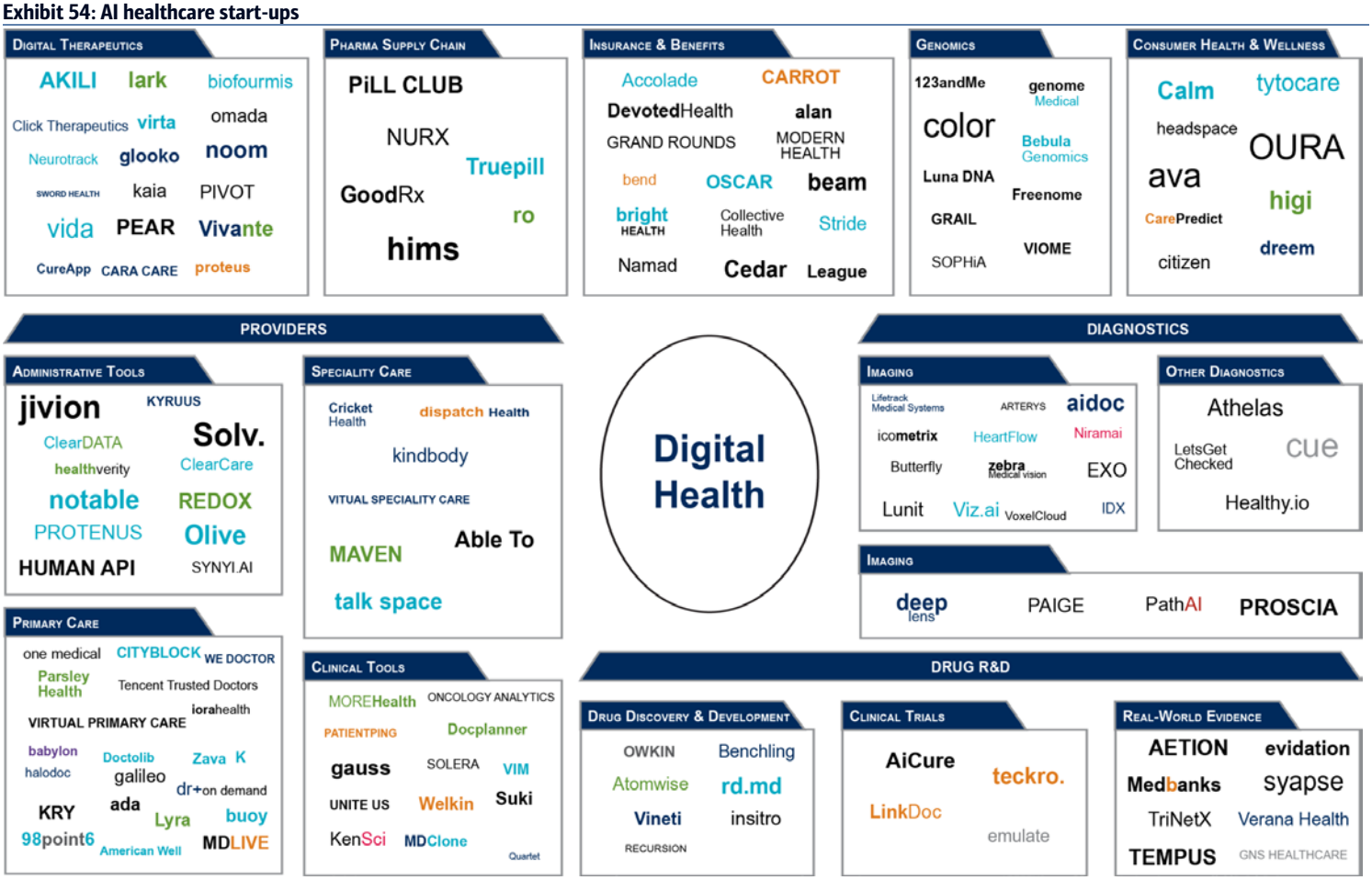
1/3 of the world's data resides in the healthcare industry – Ponemon Institute

The explosion of easily assessable data and inputs has also sped up scientific research and development – medical knowledge is projected to double every 73 days by 2020 versus every 3.5Y in 2010, 7Y in 1980, and 50Y in 1950 (source: ACCA, KPCB). The combination of declining costs for genome sequencing, the advent of proteomics, the growth of real-time monitoring, and digitisation of healthcare records is generating a wave of granular healthcare data. This means that molecular, genetic and behavioural data can be combined to give a holistic view of the patient. Big Data has the potential not only to bring down the cost of healthcare, but also to enable precision medicine, promote wellness and prevention, and increase overall quality of life (source: UN, New England Journal of Medicine 2017).

Health Data: extending human vitality

Big Data, AI, and the IoT ecosystem are enabling much of this. They are becoming ubiquitous in everyday life and healthcare is an area where we see tremendous growth. In the US, healthcare already accounts for c18% of GDP and 10% of median household income in out-of-pocket costs. Big Data utilisation could not only bring down costs, but also help bring better treatment through targeted treatment and predictive analytics (source: IMS Health 2015). Health data is expected to grow from 500 petabytes in 2012 to 25,000 petabytes by 2020 (source: Rock Health).

Exhibit 54: AI healthcare start-ups

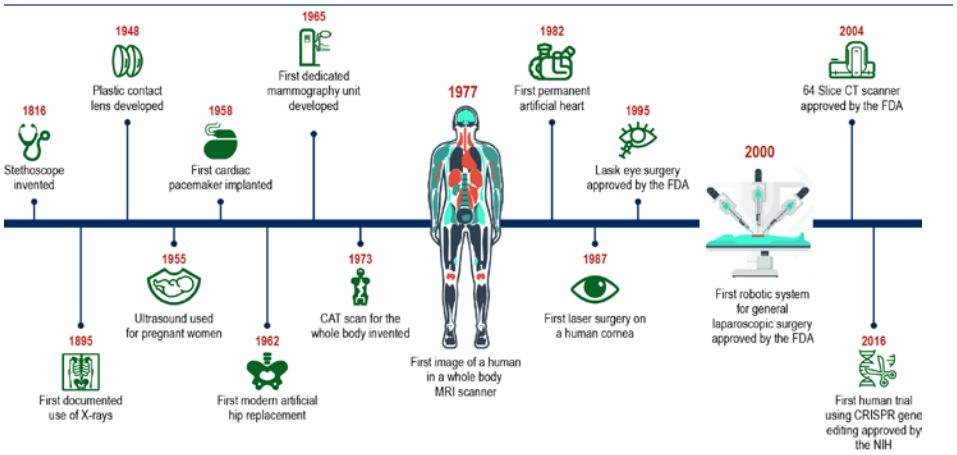


Source: CB Insights

HealthTech: tech innovation comes to healthcare

Health technology is increasingly permeating all aspects of consumer life. Real-life health information can be connected, while offering providers and payers new ways to control costs. Healthcare technology is still in its infancy in many cases, but researchers will have exponentially growing volumes of data to use as input, and they can harness the positive effects of network learning to apply it.

Exhibit 55: Health innovation timeline



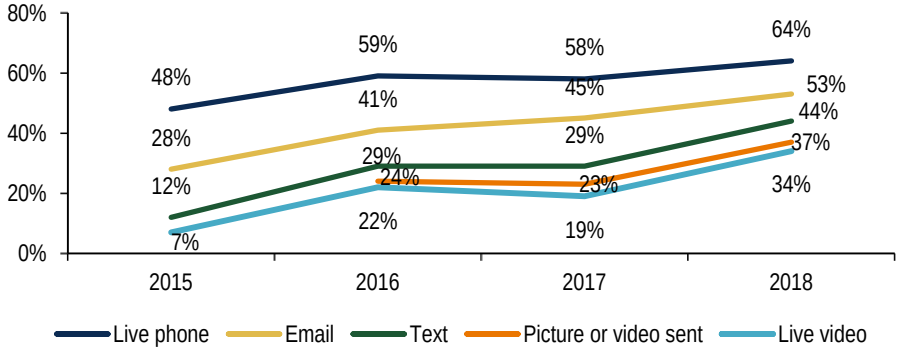
Source: Visual Capitalist

Telemedicine/Telehealth: expanding and democratising access to healthcare

Telehealth is the delivery of health-related services and information via ICT technologies. It can be as simple as two health professionals discussing a case over the telephone or as sophisticated as robotic surgery between facilities at different geographical locations. It expands and builds on telemedicine (which narrowly focuses on the curative aspect) and encompasses preventative and curative aspects. One of the most popular areas of usage is home monitoring of conditions by patients

Chart 49: Telemedicine Adoption by Channel

2015 – 2018



Source: Rock Health

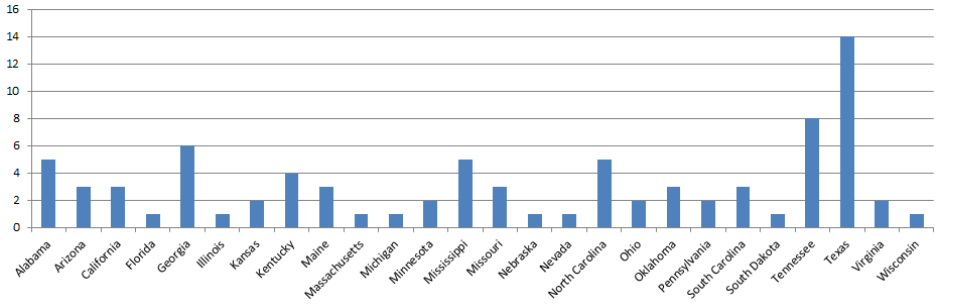
Adopters of telehealth report high satisfaction

Today, nearly one in two people have used, or plan to use, some form of telemedicine, whether by email, text or video. Moreover, the client satisfaction of adopters is overwhelmingly positive (70%+). This suggests that getting patients to make their first virtual visit is the primary barrier to long-term replacement of in-office visits and Covid 19 will speed up this adoption up in the long term (source: Rock Health)

Rural opportunity: telemedicine a solution for hospital closures

Rural markets face a number of unique challenges where it is difficult to recruit and retain talent in more remote areas. People often live far from rural facilities, meaning they would have to incur the cost of travel as well as treatment, which creates a barrier to care. Markets are often dependent on one large employer, creating concentration risk. About 4.4% of US rural hospitals have closed since 2010 (83 in total). Advances in technology, such as telemedicine, could address some of these concerns.

Exhibit 56: Number of rural hospital closures by state since 2010



Source: Becker's Hospital Review

Wellness: mending the mind

Wellness is a state of complete physical, mental and social wellbeing. It goes beyond mere freedom from disease or infirmity and emphasises the proactive maintenance and improvement of health and wellbeing. The National Institute of Wellness (NIW) defines Wellness "as an active process through which people become aware of, and make choices toward, a more successful existence".

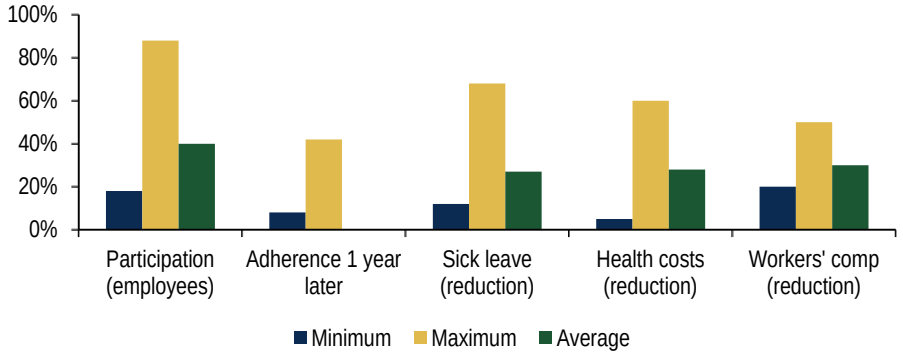
Exhibit 57: Evolution of Wellness

Source: Global Wellness Institute

> Every **US$1** spent on a wellness programs sees medical expenses fall by more than **US$3** – NCBI

Furthermore, a meta-analysis of the literature on costs and savings associated with workplace wellness programs found that medical costs fall by about US$3.27 for every US$1 spent on wellness programs, and that absenteeism costs fall by about US$2.73 for every US$1 spent (source: NCBI, Baicker 2010).

Chart 50: Impact of wellness program participation on employee costs

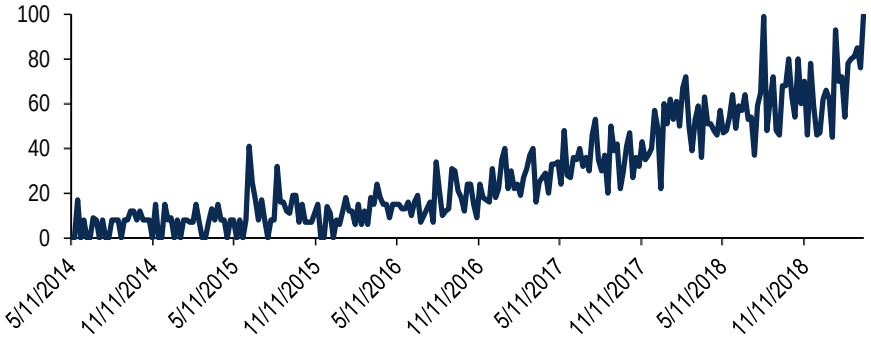


Source: NCBI, Baicker

Mental Health: digital growth in mindfulness/meditation mobile apps

The continued de-stigmatisation of mental health in the workplace will also be crucial for better human wellness with the help of support systems through work and technology. A fifth of US adults have a mental or emotional disorder according to Peterson-Kaiser health analytics. And from looking at Google Trends search data, the query "mental health services near me" hit an all-time high in 2018, implying demand for more accessible and on-demand services. As a result, a new wave of behavioural, digital health companies is emerging, offering cost-effective, scalable ways to reach affected people in this space (source: Rock Health). Overall 91% of people agree that we need to adopt a more tolerant approach to people with mental health problems at work (source: Euromonitor)

Chart 51: On demand Google Searches for "mental health services near me" in past 5Y



Source: Google Trends

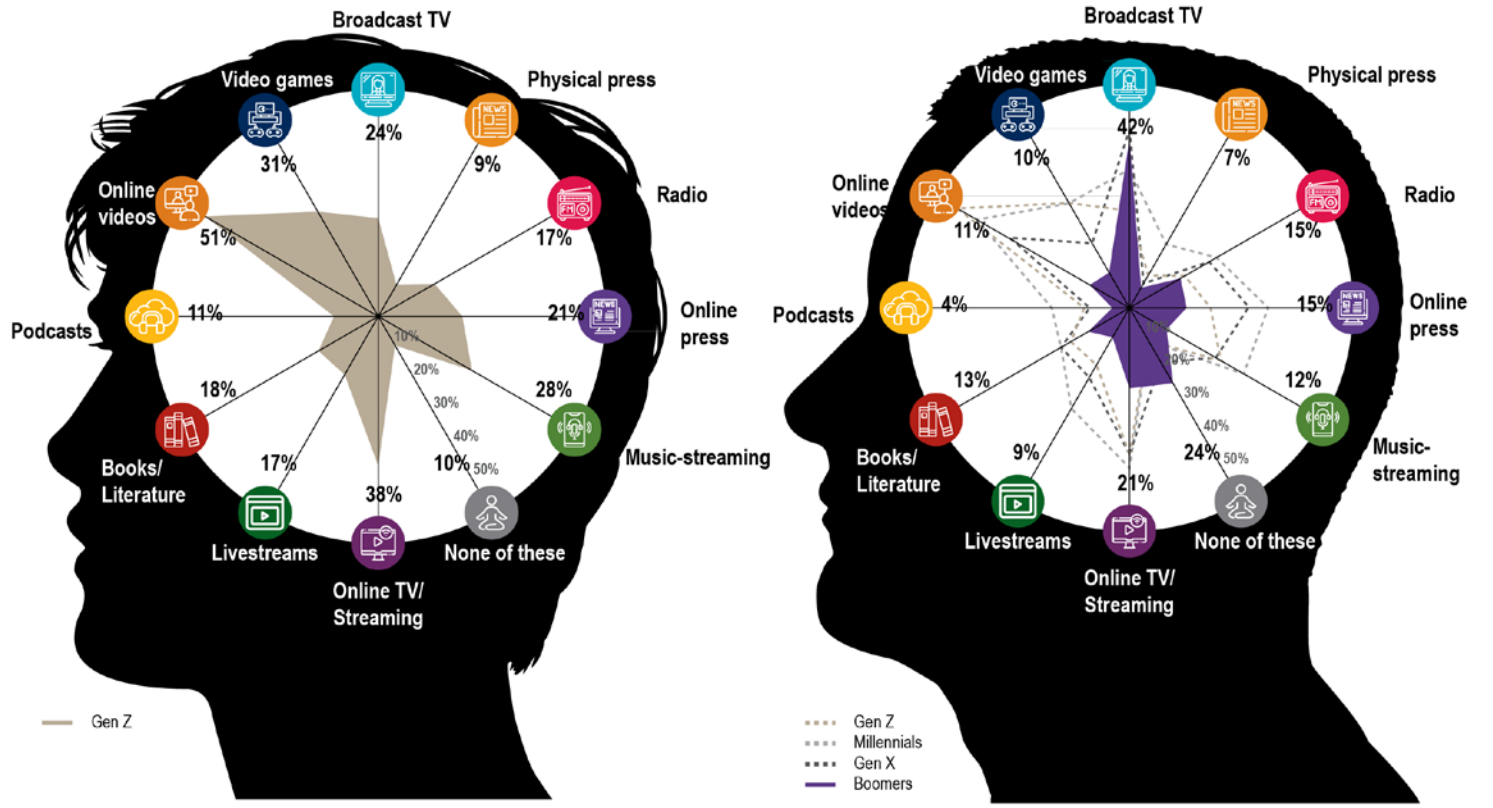
Workplace Wellness: only 10% penetration as a US$48bn market

Globally, less than 10% of the workforce benefits from workplace wellness initiatives, primarily those who live in the world's wealthiest economies or work for large or multinational companies. The majority of workers globally are more concerned with meeting basic needs, such as earning a living wage, job stability, workplace safety, and access to basic healthcare. This societal cost is estimated to be a 10-15% hit to global economic output (factoring in the medical costs and productivity losses caused by chronic diseases, work-related stress, injuries and illnesses, and disengagement).

The New Consumer: Gen Z leads the way

- **Did you know?** Fortnite is now more popular than football, according to Google searches.
- **Key takeaway:** Demographic long-term trends such as digitization, online entertainment and personalized healthcare have been accelerated, while the She-conomy, millennials, and bottom billions consumers will struggle for economic growth.
- **Our survey tells us** that half of relevant analysts expect social distancing to have a lasting impact on their sector coverage.

Exhibit 58: Living in different worlds – the consumption patterns of Gen Z vs Baby Boomers



Source: Visual Capitalist

Exhibit 59: The New Consumer Trends & Strategies

TRENDS	WINNERS		LOSERS	
Gen Z Leads the way	eSports	ESG	Millennials	Bricks and Mortars
The Great Polariser	Social Media	Preventative Healthcare	Baby Boomers	Old Media
Millennials Double Downgrade	eCommerce	Experience Economy	Lower Skilled, Lower Paid Workers	Transportation
Boomer Declining Influence	Insurance	New Media	Bottom Billions	Traditional Advertising
	Baby Boom	Future Food	Inequality	Fast Fashion Agriculture

Source: BofA Global Research

Consumers have changed for the long term. All generations have now gone digital, consumers' health awareness has been raised, and incomes are set to be depressed for many. These abrupt changes to consumers could have long-lasting impacts on sectors. Gen Z's importance will rise as it acts as a barometer for how consumer sectors are impacted by trends such as digitisation, which ripple across other generations.

Gen Z's finest hour: lead indicator for other generations

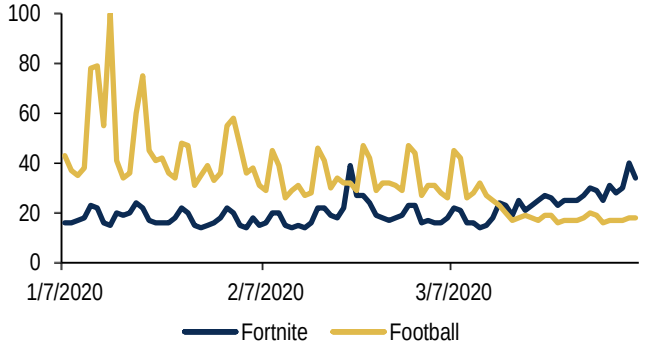
As the first real digital natives, Gen Z are better prepared to face this crisis than other generations – others will need to learn from them. This generation already spent an average of seven hours a day online pre-crisis – the remote contact, online interaction, and high digital integration that businesses and older generations are having to learn were already the norm for Gen Z (source: Global Web Index). Post Covid-19, we expect new activities and ways of doing things such as eSports, social media, and social ecommerce to retain their new users.

What to do when there's nothing on? New players are finding eSports

The eSports sector, which was already seeing an upswing before Covid-19, will see longer-term gains as new players discover one of the few remaining available sports during lockdown. After the outbreak, Steam broke its daily active user (DAU) record, reaching 7.3mn at the end of March. Animal Crossing also saw its sales record of 1.88mn broken in just three days. Meanwhile, Twitch, Amazon's gaming service, saw a 105% increase from December to April, reaching around 2.5mn concurrent users with the maximum number of users at over 4mn a day (source: Twitch Tracker).

Chart 52: Fortnite is now more popular than football

Google trend popularity of search queries, 7th Jan 2020- 7th April 2020



Source: Google Trends

Exhibit 60: Number of concurrent viewer for Amazon's Twitch gaming platform doubles in 4 months

Concurrent viewers in Twitch aggregated by month

Source: Twitch

Two types of player are expected to participate: 1) Gen Z, who are already 45% more likely than other generations to have watched an eSports tournament; and 2) traditional sports followers as traditional athletes transition to purely online alternatives in place of their cancelled races (source: Global Web Index).

F1 launched a new F1 eSports Virtual Grand Prix series within 5 days of pausing live racing, which enables fans to continue watching F1 races virtually during the Covid-19 crisis (source: Formula One).

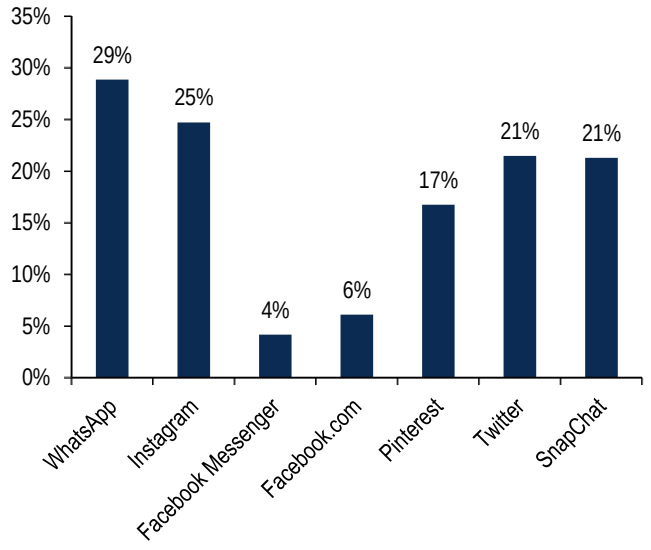
'It's no secret that Formula 1 has an aging audience. And so it's through initiatives like in digital and in Esports that we're able to create propositions to help address that. The central thesis around us going into Esports was to see how we could tap into a new audience that is more digitally enabled, in a language they understand.....' **Dr Julian Tan, Head of Digital & Esports, F1**

Social media: delaying the decline in growth

The lockdown and need for social interaction are driving Gen Z and others to spend more time on social platforms. In later stages of the pandemic, social media engagement increased by 61% over normal usage rates, and WhatsApp, Facebook and Instagram have all experienced a 40%+ increase in usage from under-35-year-olds (source: Kantar).

Chart 53: More time spent on social media during Covid-19 outbreak

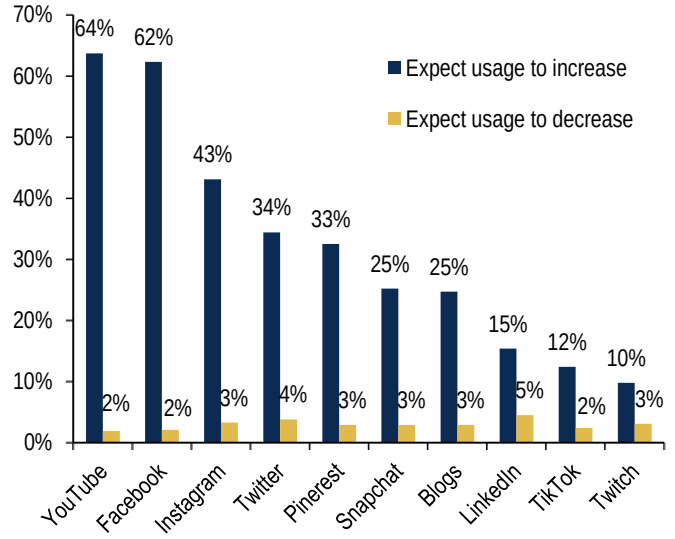
Mobile minutes increase from Fen 2020 to March 2020



Source: BofA Global Research, Comscore

Chart 54: Most users expect social media usage to increase

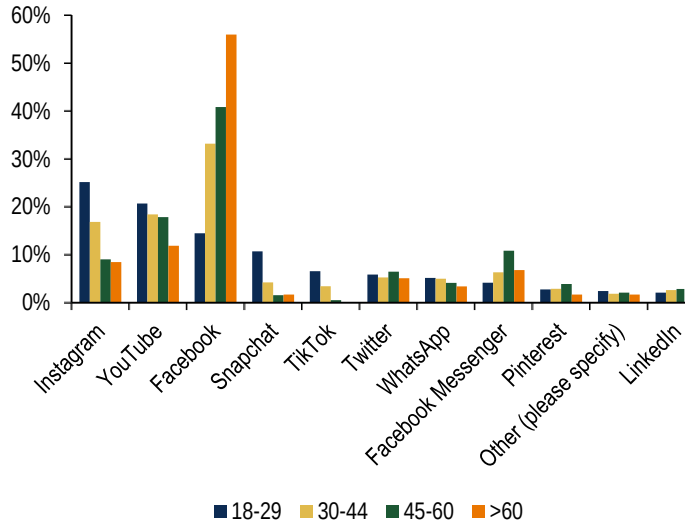
% of social media users who expect to change social media usage in the US after Covid-19, N=425



Source: Statista

This rise in social media usage is expected to continue. When asked about usage over half of those surveyed expected to increase their use of Youtube and Facebook, the two most popular networking sites, beyond Covid-19. Continued use of online activities extends beyond social media. In a survey of BofA fundamental research analysts, over half expected to continue to use many of the online activities such as virtual work, streaming, and food delivery beyond the lockdown period.

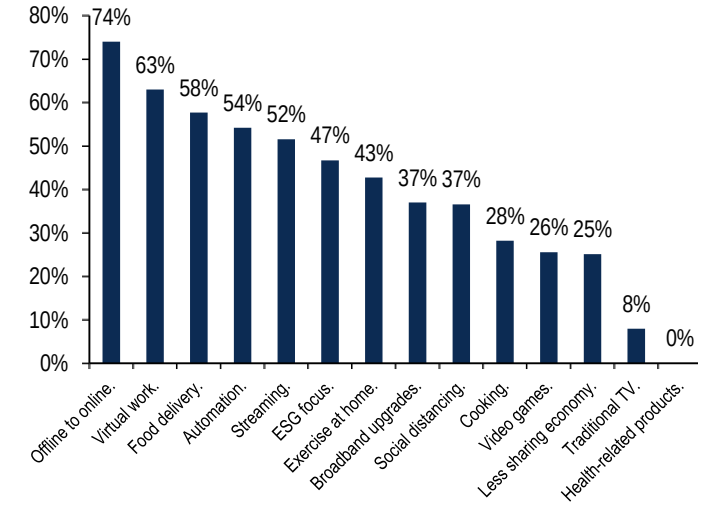
Chart 55: If you were only allowed to use just one social networking site, which site would you choose?



Source: BofA Global Research, SurveyMonkey

Chart 56: Virtual work, food delivery, and streaming are some of top picks for post-Covid for analysts

Which of these trends do you expect to continue to use after Covid-19?*



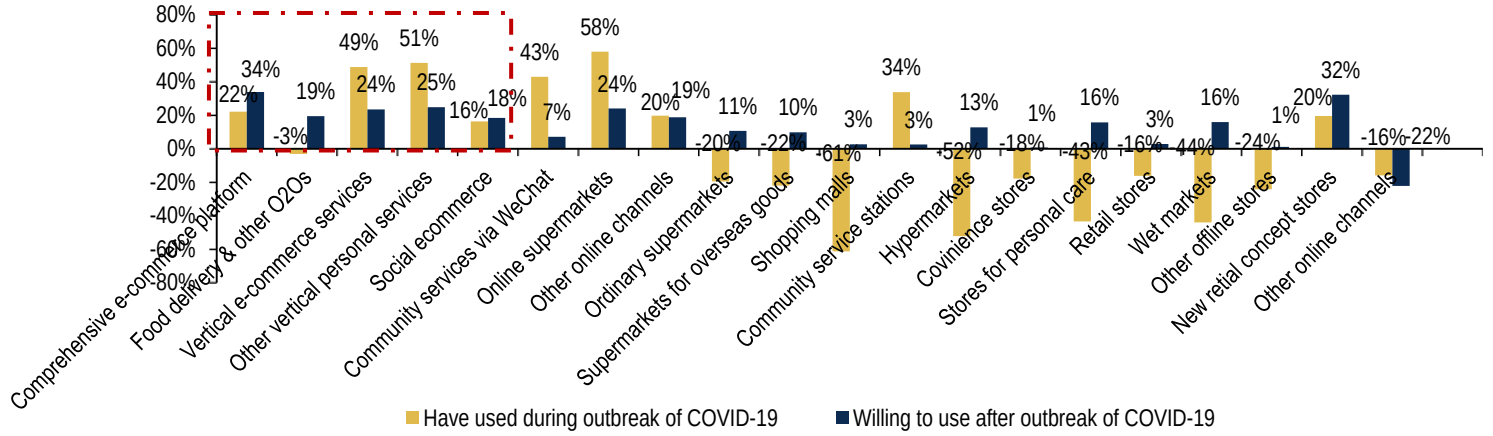
Source: BofA Global Research *Analysts were able to select more than one response

Covid-19 brings new consumers to the online world, but will they stick around?

While a peak in online activities is no surprise when there is nothing else to do in lockdown, the big question is whether these consumers will keep buying online. In China, individuals increased their online consumption from comprehensive e-commerce (+20%) to groceries (+60%) during the outbreak. More importantly, consumers expressed greater willingness to buy online after the lockdown ends: 33.9% said they would continue to buy from eCommerce platforms, 19.4% to use food delivery, and 24% to buy online groceries (source: CTR Market Research).

Chart 57: Consumers still willing to purchase online even after Covid-19

Consumption channels shift during/after Covid-19

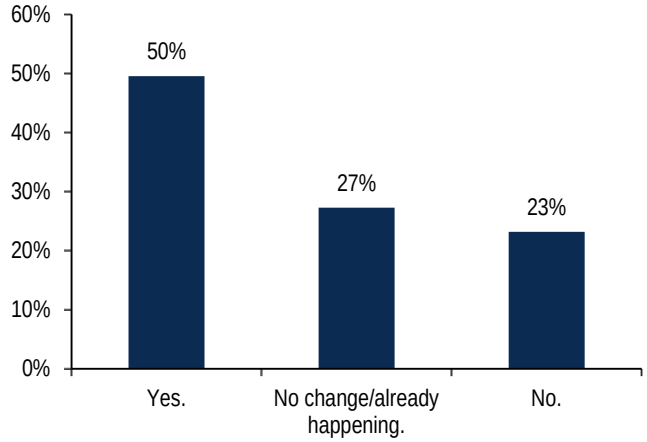


Source: CTR
*Sample size = 10,000, 2020 March in China

Half of relevant research analysts also think that Covid-19's social distancing norms will have lasting implications for their sectors, and that eCommerce's share of the distribution channel will accelerate beyond today's growth rate.

Chart 58: Half of analysts expect ecommerce to accelerate post-Covid

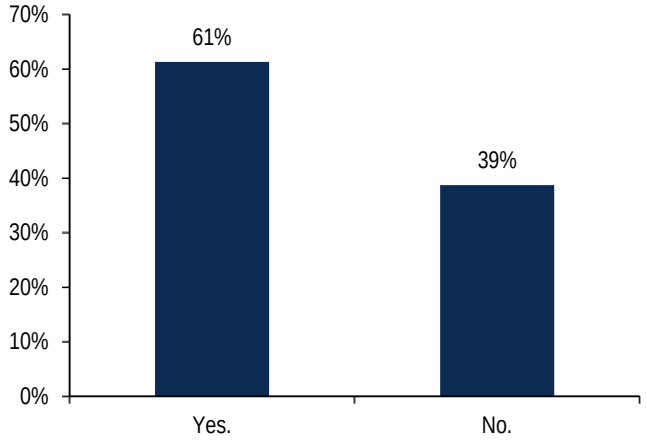
Post corona crisis, will this crisis accelerate the change in distribution channels to your customers from offline to online?



Source: BofA Global Research

Chart 59: 61% of relevant analysts think social distancing will have lasting effects on their sector

Do you think that social distancing norms will have a lasting implication on your sector?



Source: BofA Global Research

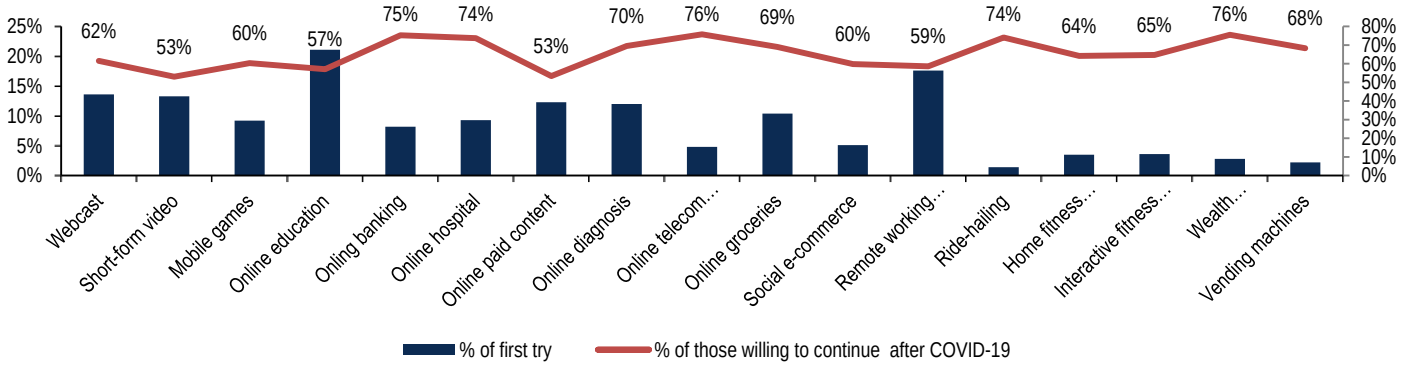
High potential consumer retention from new consumers for Gen Z activities

In a survey of 10,000 individuals in China, 10-25% of consumers said they were using various online services (beyond just shopping) for the first time. Older individuals and

other consumers who previously interacted offline have been a difficult group to access for online businesses, given the social and technological obstacles.Covid-19 has changed this. Further, a large share has indicated a willingness to continue using these channels. For instance, 17.6% of respondents had only tried remote working for the first time this year, while 59.6% expressed an interest in continuing to work this way post Covid-19. These findings are consistent across many of the online services, e.g. online education (21% first try vs. 57% willing to continue), short-form video (13% first try vs. 53% willing to continue) and online groceries (10% first try vs. 69% willing to continue) (source: CTR 2020).

Chart 60: Consumers who first tried online services will continue post Covid-19

Online consumptions will continue after Covid-19



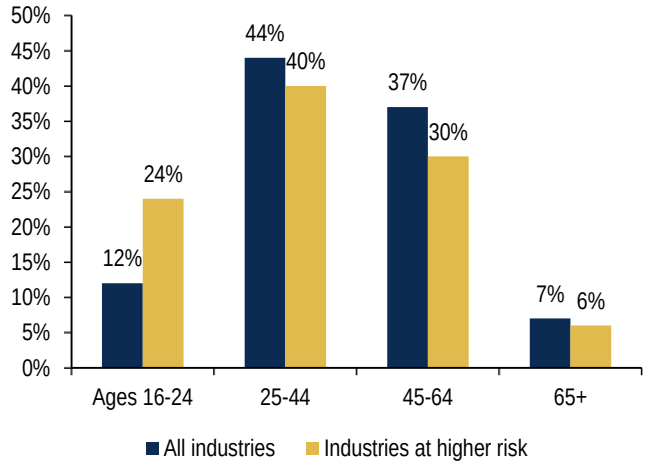
Source: CTR,
*Sample size = 10,000, 2020 March in China

Recessions hit low earners and the inexperienced

However, Gen Z is likely to be hardest hit when it comes to experiencing this recession as a lack of work experience and outsized exposure to vulnerable industries holds them back. Millennials and their experience with the financial crisis have proven that a generation can see a meaningful decade-long reduction in earning potential compared with previous generations. For example, household incomes for millennials were lower than Gen X's at the same age, with a 4% decrease for the college-educated, 10% decrease for those with some college education, and 11% decrease for high school education (source: Pew Research Center).

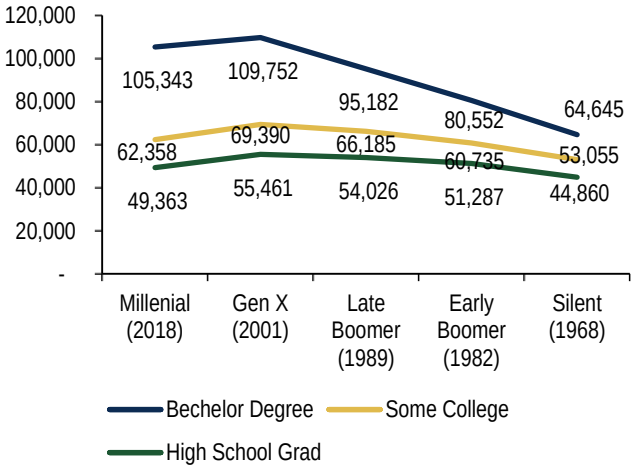
Chart 61: Gen Z are over-represented in at-risk industries while millennials make up the largest share of affected workers

Share of US workers overall and in-higher risk industries by age group, 2019



Source: Pew Research Center

Chart 62: Millennials earning potential failed to lift off after the financial crisis



Source: Pew Research Center

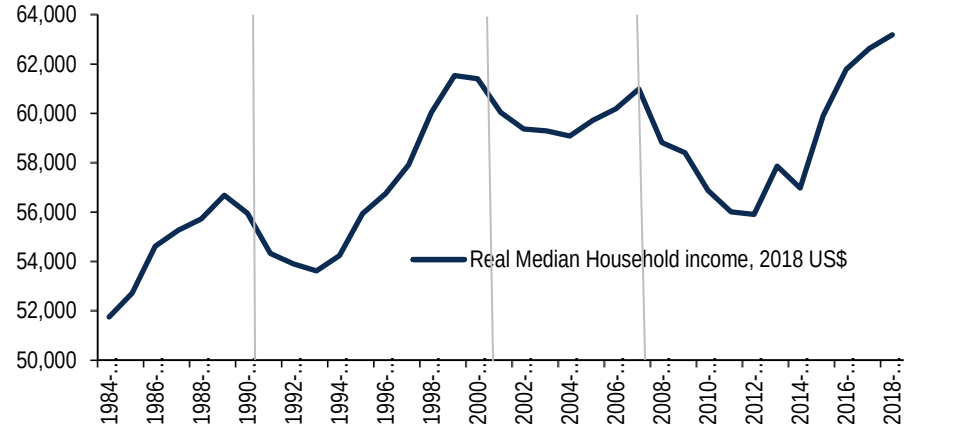
Double downgrade for Millennials

Millennials were the first modern generation to be worse off than the previous generation in terms of earning power, seeing their earnings growth potential in their 20s stagnate. The ensuing economic recession will again impact the earning potential of millennials entering their 30s, given that they make up the largest share of the population in high-risk industries: 40% of high-risk industry jobs are held by 25-44 year olds.

> 'The difference with this crisis to the financial crisis of 2008 for Millennials is that it's not just impacting them financially, but socially…this will forever change the way they look at their financial and job security, and frankly what they prioritise as important in life' ***Matt Britton, CEO Suzy***

Chart 63: Real income takes years to return after recessions

Real median household income in the US



Source: FRED

Real Estate: the new bricks and mortar

Our US REITs team highlight that although Covid-19's lasting impact on each REIT property type is too soon to quantify, there is one thing that will be certain - change is definitely coming to the real estate sector. Big picture, they expect REITs with exposure to technology to be well positioned, but those with exposure to lodging, office, commercial real estate and malls to face significant challenges.

Peak Urbanization? Tech are beneficiaries, cities are challenged?

The criteria used to gauge how well REIT sectors are positioned are 1) the ability to adapt to social distancing & 2) future demand trends as a result of Covid-19. Data Centers, Life Sciences & Telco Towers are well positioned to adapt + new/stable strong demand. Industrial, Manufactured Housing, Self-Storage & Single Family Rentals are similar to the previous group but recession will weigh on results. Healthcare, Multifamily & Shopping Centers will find it harder to adapt but demand is need-based, a long-term positive. Hotel/Lodging, Office, Malls & Triple Nets are challenged on ability to adapt + risk of permanent damage during Covid-19 to tenants & customer demand.

Tech: well positioned on ability to adapt & new and secular demand drivers

Data Centers & Telco Towers: Easy to adapt. Higher to stable demand long-term from an increase in work from home (WFH), data streaming and online shopping.

Industrial, Storage, Rental: long-term beneficiaries but near-term headwinds
Industrial: Easy to adapt. Higher demand long-term from an increase in e-commerce adoption, higher inventories and re-shoring manufacturing to the US.

Storage: Already adapting to social distancing + boost in demand from Covid-19 with longer-term benefits from aging Millennials renting SF homes & WFH increasing.

Single Family Rentals: Single Family Rentals (SFR) rentals have been increasing over the past 5 years in the US & Covid-19 will accelerate this trend. Aging Millennials now facing 2nd recession will choose to rent.

Shopping Centers, Multifamily: mixed adaptation, n-t issues but sticky demand
Shopping Centers: Will adapt with more buy online pickup in store & grocery even more important to serve locals. Big box will gain market share as department stores close.

Multifamily: Adaptation more difficult but people need a roof. Millennials will prefer rentals but closer to office. WFH will increase demand but accelerate move away from big cities.

Offices, Hotels, Malls: challenging adaptation & headwinds clouding the future
Office/Commercial Real Estate: Adaptation issues + long-term risk of elevated adoption of WFH. As a result, corporates decreasing space needs especially in high density markets.

Hotel/Lodging: Expect weaker short/medium-term consumer/corporate/group demand as travel concerns remain, teleconferencing proves successful resulting in travel/conference budget cuts.

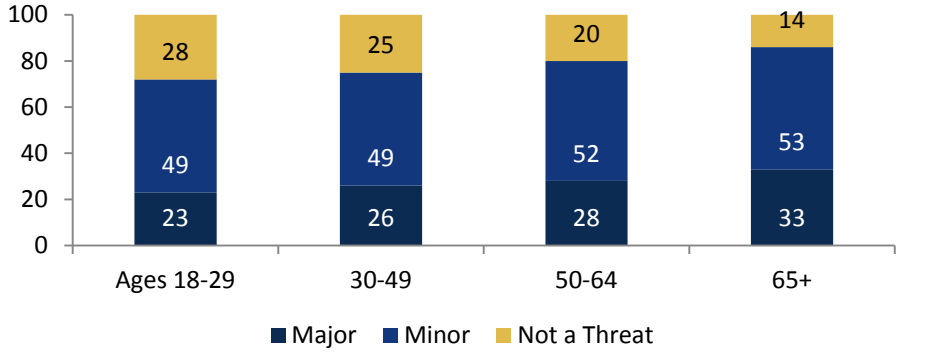
Malls: Difficult to adapt especially with experiential anchors. Lack of visibility on survival of tenants. Expect acceleration in e-commerce penetration as a direct result of Covid.

Baby Boomer influence declines prematurely

Countries have taken strong action to stem the health impact of Covid-19; however, at-risk individuals are unlikely to be able to resume their old behaviours straight after the crisis, especially while no vaccine is available. Concerns over a return of the virus could see individuals most at risk, in particular older generations, who will need to exercise more caution over their activities.

Casinos and cruise liners: rocky seas for Baby Boomer leisure industries
Cruise liners, casinos and any other large group leisure industry popular with Baby Boomers could struggle to see revenues rebound to pre-Covid-19 levels. Given that older generations are a higher-risk demographic, they are the most likely to have their actions curbed in the event of a resurgence of the virus. According to Pew Research Center, 86% of people aged 65 or older regard Covid-19 a threat to their personal health, including 33% that consider it a major threat (sample size = 11,028).

Chart 64: Old people are most concerned with their personal health during Covid-19 crisis
% surveyed said Covid-19 is a ___ threat to their personal health

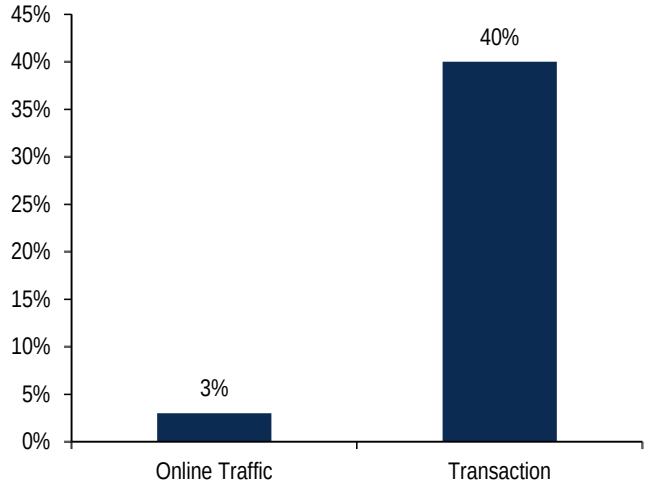


Source: Pew Research Center
*Sample size = 11,028, survey conducted 10-16 March 2020

Life insurance & preventative healthcare: demand could grow

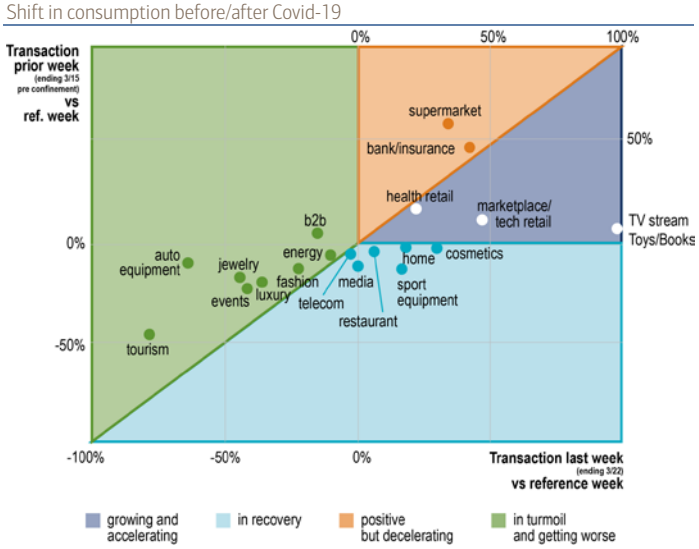
In contrast, confronted with our own mortality through this crisis, individuals may become more interested in planning for the future. Insurance companies in Thailand, for instance, have seen millions of people buying policies (source: Nikkei Asian Review 2020). Further, while online traffic to insurance and banking services has increased only 3%, there has been a higher propensity to buy those industries' services, with a 40% increase in people undergoing a transaction on the website in the three months to 23 March 2020 (source: Content Square 2020).

Chart 65: Covid-19 outbreak led to a 40% increase in transactions of bank/insurance products online



Source: Content Square

Exhibit 61: Consumer-health products – one of the few growing spaces
Shift in consumption before/after Covid-19



Source: Contentsquare

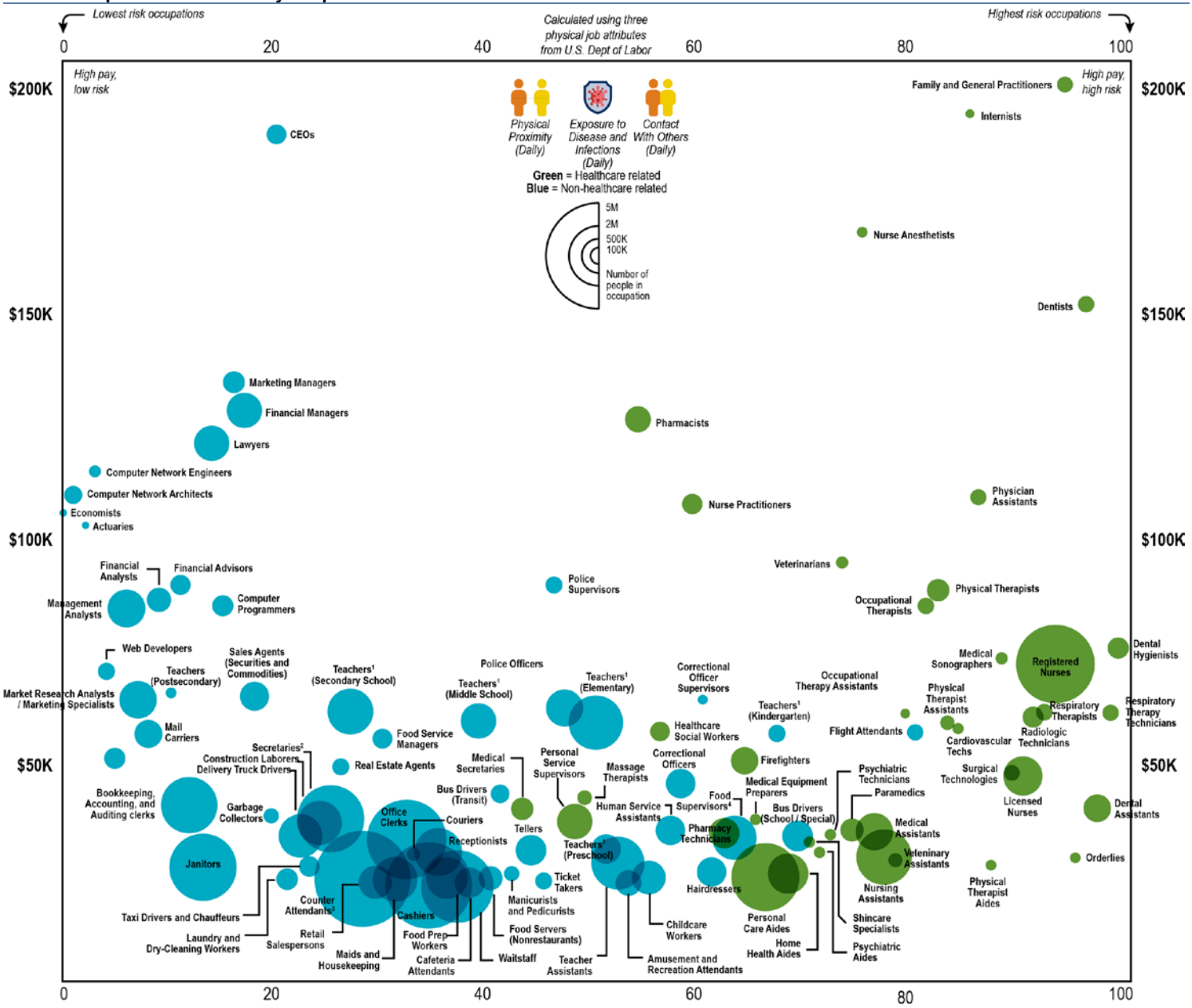
Covid-19 has already grown demand for consumer-health products, including OTC medicines, diet supplements, hand wash, etc. Consumers are increasingly focusing on preventative care to boost their health and immune systems. Many influencers on social media sites have also transitioned to health and personal care products away from make-up, potentially ushering in more natural, health-focused trends for consumers.

Inequality: Covid is not the Great Leveller, but the Great Polariser

Covid-19 is set to further expose inequalities in society. Despite claims by many that Covid-19 has been a Great Leveller, with anyone susceptible and all feeling the costs of lockdown, the reality is very different. Not only are older demographics and those with underlying health conditions more affected, but the way we are sharing the burden of

protection is also unequal. Those that are able to work from home are typically higher earners, while manual labour and lower wage earners are more likely to be either losing jobs or having to work in dangerous, exposed conditions.

Exhibit 62: Exposure to Covid risks by occupation & income in the US

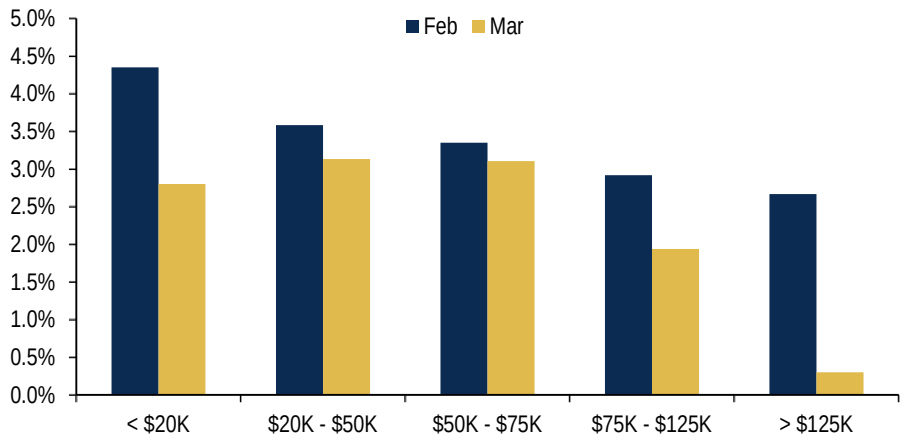


Source: US Department of Labor, Visual Capitalist

Lower-income groups drive spending when belt-tightening occurs

Spending growth has significantly fallen for higher-income groups, given that they have a higher share of non-essential expenditure compared with lower-income groups where a larger proportion of expenditure is essential goods. Budget retail is therefore less likely to experience disruption to revenue.

Chart 66: BAC internal data spending growth by income group (retail sales ex auto & gas, SA, % yoy)



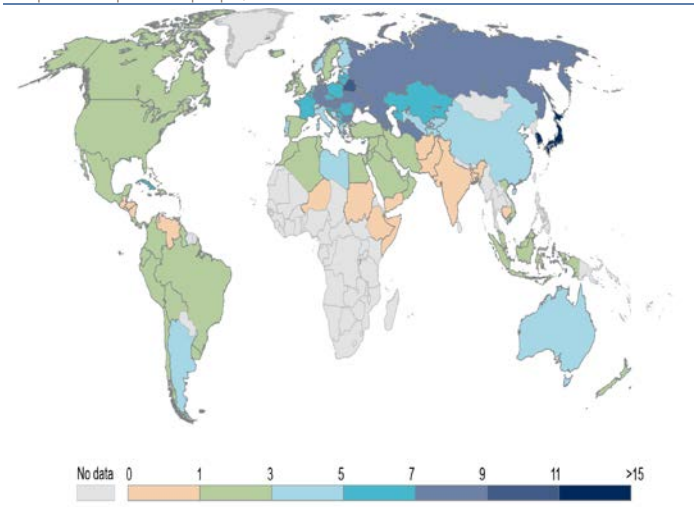
Source: BAC internal data

Bottom Billions' march into the Middle Class slows down

The transition of individuals out of poverty and into the middle class (>$10/day) will slow as developing markets fail to escape recession owing to the Covid-19 crisis. The past couple of decades have seen a continual transition of people out of poverty and into the middle class (>$10/day) as the developing markets, where this transition has been happening, have seen rapid economic expansion. However, the lockdown and consequent job losses and lower earnings will also hit these countries. While developing countries tend to have younger demographics, the lack of healthcare infrastructure will also increase the impact of Covid-19.

Exhibit 63: Inequality of medical resources globally – hospital beds

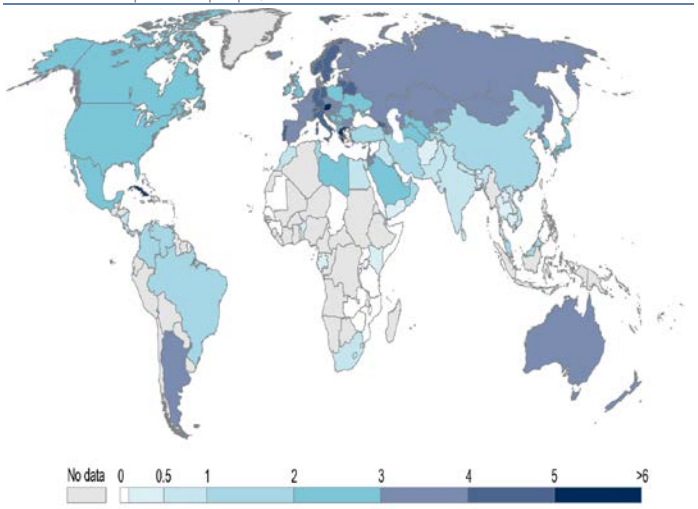
Hospital beds per 1000 people, 2018



Source: OurWorldinData, WHO via World Bank

Exhibit 64: Inequality of medical resources – medical doctors

Medical doctors per 1000 people, 2016



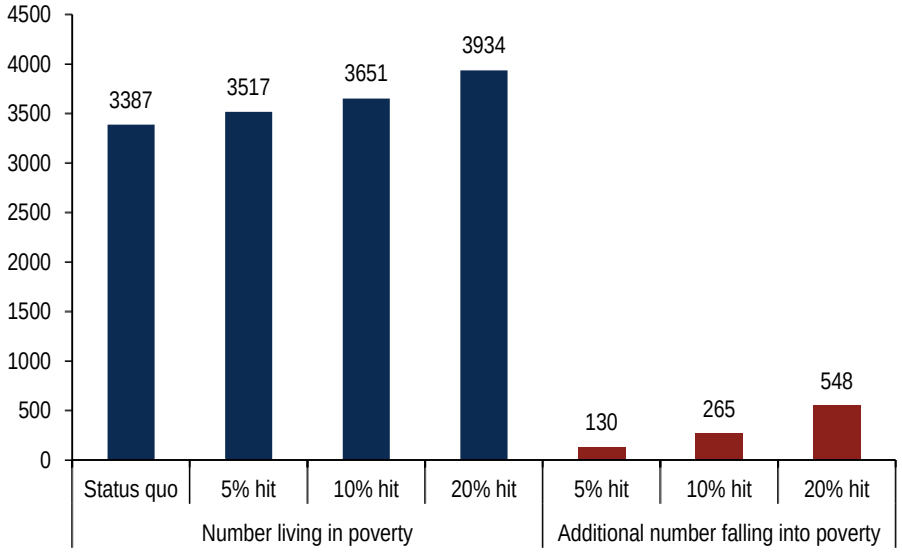
Source: OurWorldinData, WHO via World Bank

20% cut to income could force half a billion into poverty

The impact of Covid-19 extends beyond the current health crisis. The global economy will contract, affecting not just developed markets, but developing countries too – unlike the financial crisis. A 20% contraction of income and consumption could push 524 million people into poverty, surviving on less than US$5.50 a day. Even assuming a 10% contraction would result in an additional 249mn people living in poverty (source: UNU, Sumner et al 2020).

Chart 67: Over half a billion people could enter poverty if incomes contract by 20%

Number of people below the US$5.50/day poverty line given 5%, 10% , 20% cut to economy (millions)



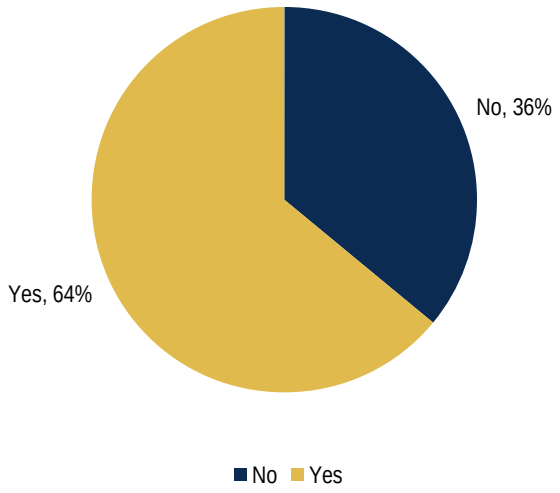
Source: Sumner et al UNU-Wider 2020

ESG: still the key theme, but focus shifts to S and G

Over half of investors believe Covid-19 will further drive ESG (Environmental, Social & Governance) investments; however, we expect such investments to increasingly focus on the Social & Governance angles over the Environmental angle (source: Responsible Investors). The focus of governments, which have been a driving force for climate action through subsidies and fines, is no longer climate change – climate-related events such as COP26, originally planned for December 2020, have already been delayed. In contrast, investors have continued to invest in ESG, with positive inflows every week into such funds throughout the bear market.

Chart 68: ESG issue acts as a key point post Covid-19

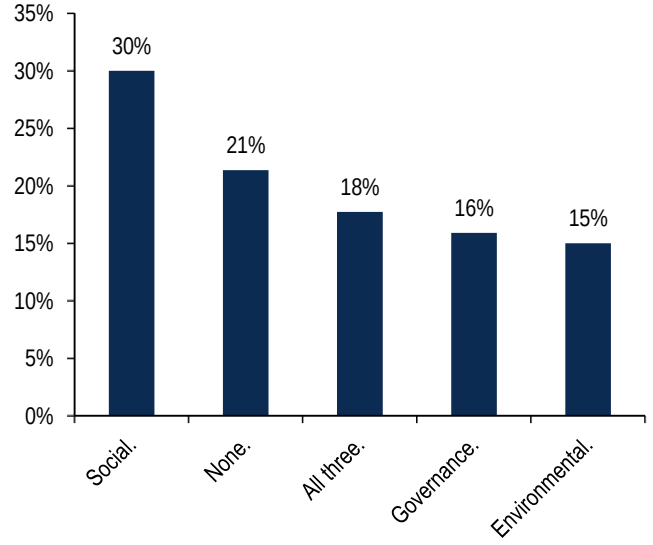
Question: Is Covid-19 a tipping point for ESG investments?



Source: Responsible Investor (N>300, 2020)

Chart 69: Social is the hot ESG topic

On ESG, which has been the most influential for your companies in this crisis?



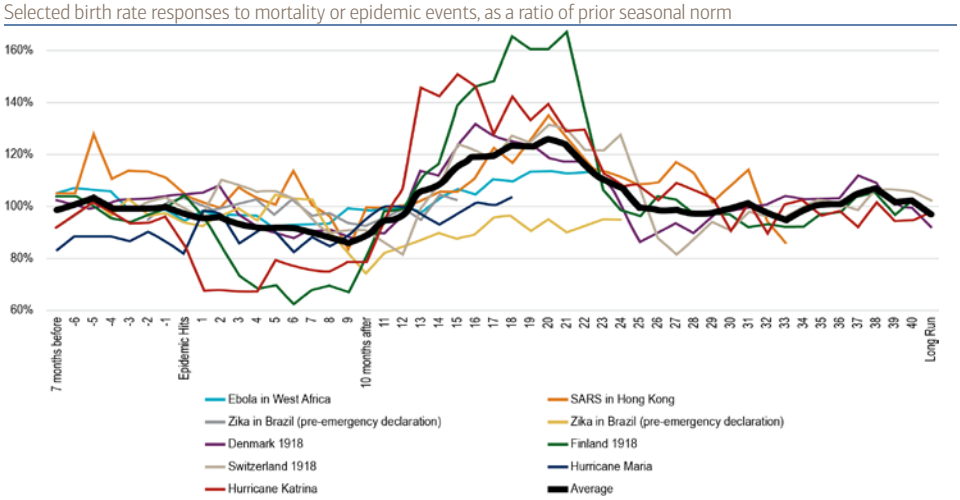
Source: BofA Global Research

The "Quaranteens": the next baby boom

Despite the coming recession post Covid-19, we expect a baby boom. High mortality events, such as famines, earthquakes and disease, all predictably reduce fertility nine months later (source: ScienceDirect). However, after that, fertility rates tend to rebound. Although the "collateral survivors" mostly determine the reduced birth rate in the first 9 months, the loss of children and family members also plays an important role in the recovery of fertility, as they can aggravate "mortality replacement" (source: Institute for Family Studies). According to the research, Covid-19 could lead to an increase in fertility rate ranges from 0.3% to 40% in 4 years' time.

Exhibit 65: Fertility rate tends to increase 10 months after pandemics end

Selected birth rate responses to mortality or epidemic events, as a ratio of prior seasonal norm



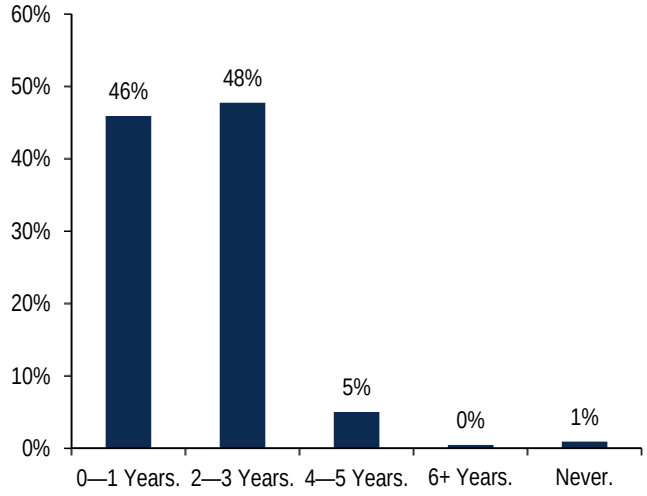
Source: Institute for Family Studies

When will sales return to normal?

Over half of analysts think it will take at least 2-3+ years for revenues to recover to pre-Covid levels. Banks, energy, capital goods, transportation, and aerospace & defence analysts overwhelmingly think that revenues will take 2-3 years to recover, while healthcare, tech, consumer staples and telcos expect 0-1 years.

Chart 70: Over half of analysts think that it will take at least 2-3 years for revenues to recover

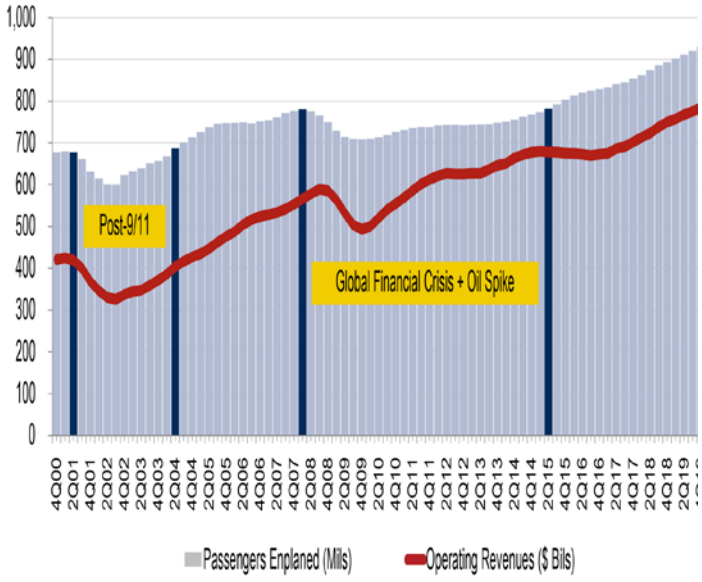
When do you expect sales levels to normalize to pre-Covid levels for your companies?



Source: BofA Global Research

Exhibit 66: The airline industry has previously taken years to recover

Four-quarter rolling passenger volume and operating revenues



Source: Airlines for America

Appendix

Our analyst survey in detail

In this report we highlight the high level view on top global megatrends. However, to better understand what post-Covid thematic trends BofA fundamental analysts are valuing in their work at a grassroots level and how they are incorporating these long term megatrends into their own analysis, we surveyed fundamental research analysts at Bank of America across the globe. The survey specifically focused on the implications of the coronavirus pandemic after the peak declines:

Top 10 results: permanent change from a temporary crisis

1) **Revenue recovery to take years:** Over half of analysts think it will take at least 2-3+ years for revenues to recover to pre-Covid levels. Banks, energy, capital goods, transportation, and aerospace & defence analysts overwhelmingly thought that revenues would take 2-3 years to recover, while healthcare, tech, consumer staples and telcos expected 0-1 years.

2) **Capital structure changes for the long run:** Only 15% of analysts expect no changes to their sector's capital structure. Instead, nearly half expect deleveraging, and a third expects fewer buybacks and dividends over the next 2-5 years.

3) **Supply chain change:** 37% of analysts with relevant coverage have officially seen, or are expecting, changes to supply chains through either reshoring or diversification.

4) **Beneficiaries & challenged:** BofA fundamental analysts expect the Beneficiaries to be – tech, healthcare, eCommerce; and the Challenged – air travel, hotels, bricks & mortar retail.

5) **Climate change still on top:** Half of analysts still expect climate-friendly investments to increase post Covid, while only a quarter expect them to decline.

6) **Robots & Automation:** 43% of analysts with relevant coverage have already seen, or expect, changes to or acceleration of automation and robotics plans.

7) **Top trends to continue post-Covid:** A majority of BofA fundamental analysts expect to keep using the following trends: offline to online, virtual work, food delivery, automation, and streaming.

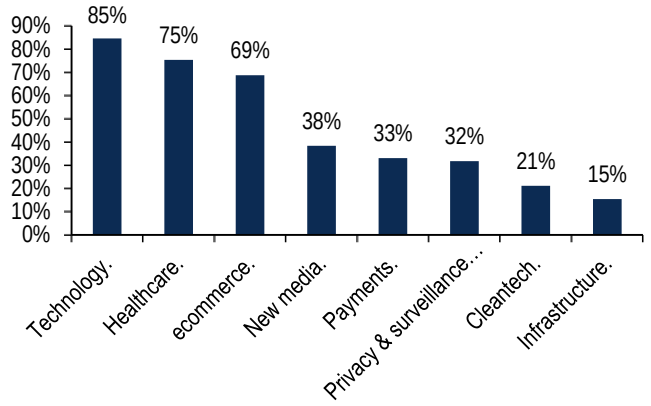
8) **Consumer caution:** When asked about their own behaviour, over half of fundamental analysts expected to be more cautious about using shared goods post-crisis, 36% expect online to become their default, and a third will travel less.

9) **Preparing for the next disaster:** Beyond building cash, companies are preparing for the future black swan or pandemic by building back-up sites and diversifying supply chains.

10) **The next Black Swan?** Social unrest and Covid 2.0?

Chart 71: Mid-term winners: Tech, healthcare & eCommerce

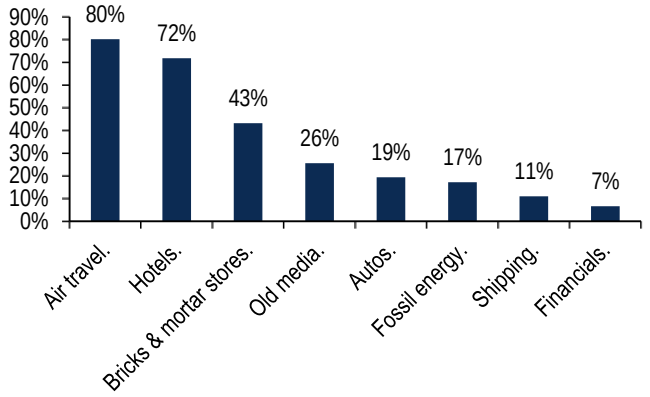
Which sectors could be the biggest winners mid-term from developments spurred by the pandemic?*



Source: BofA Global Research *Analysts were able to select more than one response

Chart 72: Midterm Challenged: Air travel, hotels, bricks & mortars

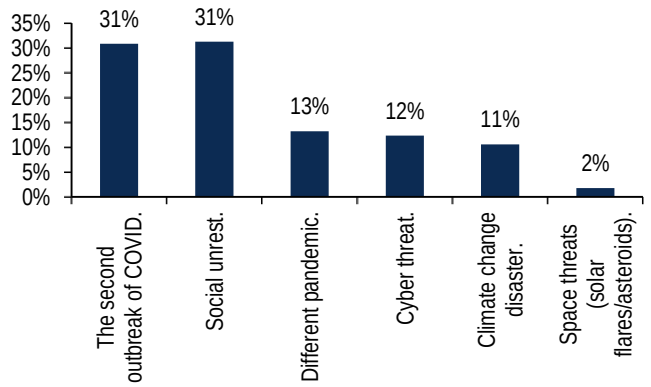
Which sectors could be the biggest Challenged mid-term from developments spurred by the pandemic?*



Source: BofA Global Research*Analysts were able to select more than one response

Chart 73: The Next Black Swan: Social unrest & Covid 2.0

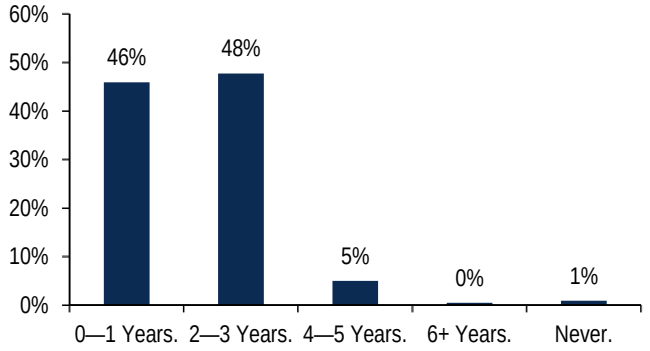
What do you consider to be the next black swan?



Source: BofA Global Research

Chart 74: Over half of analysts think that it will take at least 2-3 years for revenues to recover

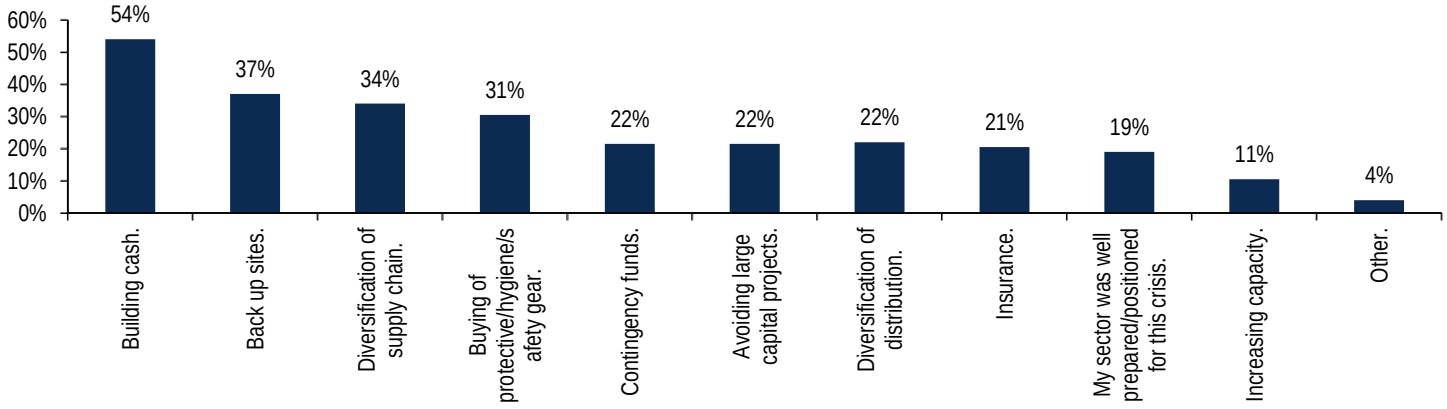
When do you expect sales levels to normalise to pre-Covid levels for your companies?



Source: BofA Global Research

Chart 75: Beyond building cash, companies are preparing back up site, diversification of supply chains,

How are your companies preparing for future black swan & pandemics risks?*

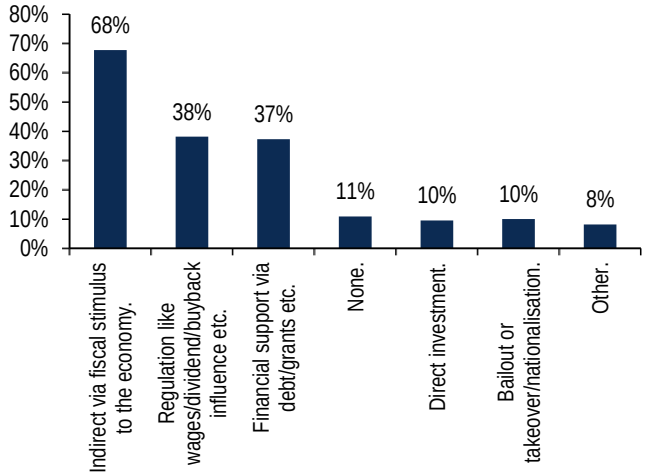


Source: BofA Global Research *Analysts were able to select more than one response

Big Government, even Bigger Data

Chart 76: Almost everyone expects government intervention

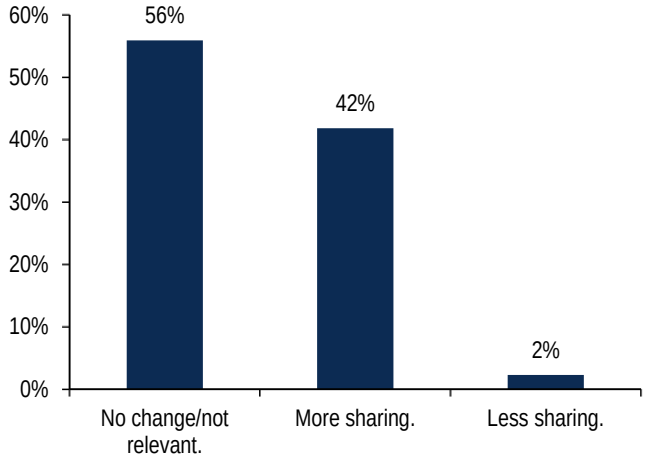
What kind of government intervention are you expecting in your sector?*



Source: BofA Global Research *Analysts were able to select more than one response

Chart 77: 42% of analysts expect more sharing with governments

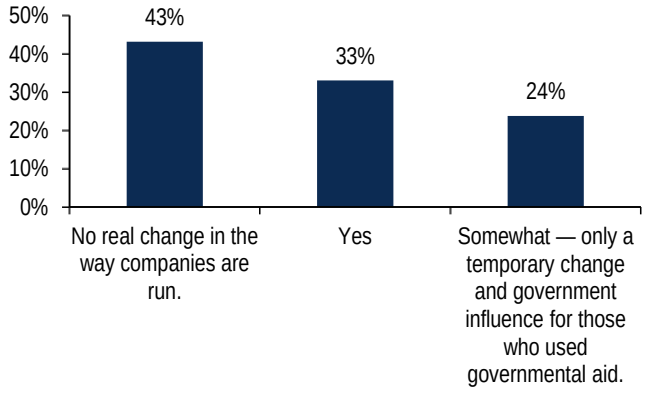
In a less privacy focused world, how will this crisis affect your companies' policy on data sharing with governments?



Source: BofA Global Research

Chart 78: A third of analysts expect permanent change to shareholder rights

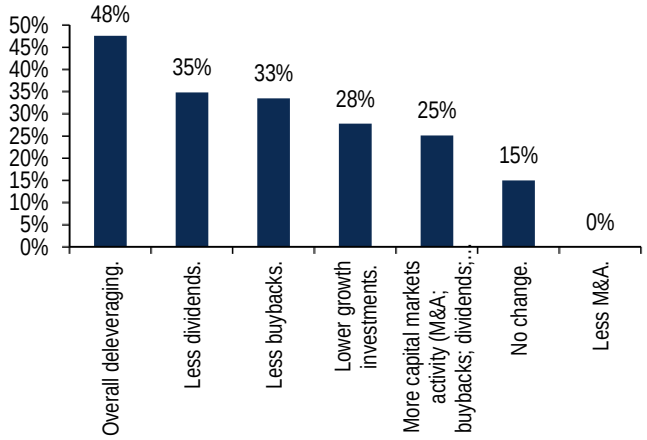
Are shareholder rights/voice being eroded?



Source: BofA Global Research

Chart 79: Half expect deleveraging for the next 2-5 years

In the next 2-5 years, how do you expect the current crisis to impact capital structure?*

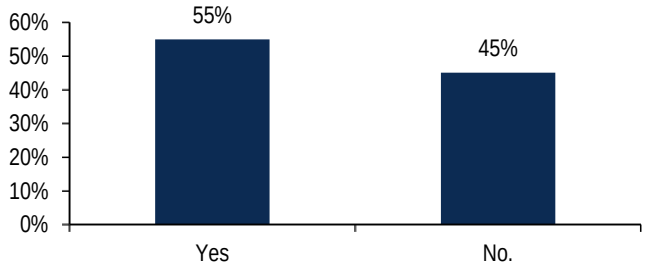


Source: BofA Global Research *Analysts were able to select more than one response

Peak Globalisation

Chart 80: Over half of analysts expect greater scrutiny of supply chains

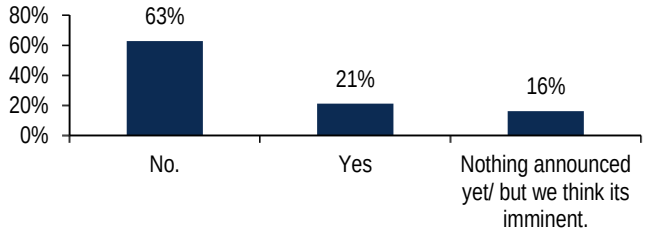
Do you think companies in your coverage group are likely to face greater scrutiny around their international supply chains?



Source: BofA Global Research

Chart 81: 37% of analysts have seen or expect supply chain plans to be affected by Covid

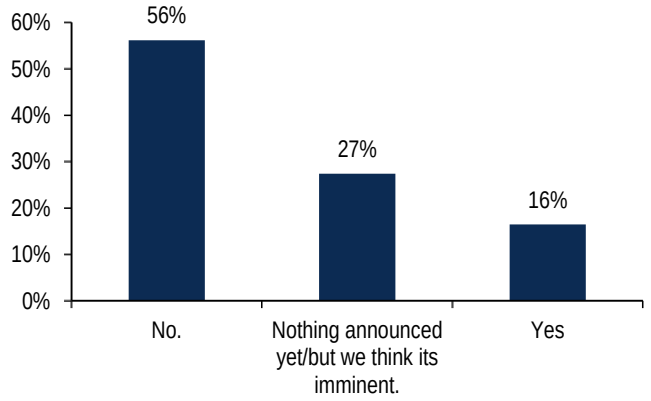
Has the Covid-19 pandemic affected plans for re-shoring supply chains for companies in your coverage group?



Source: BofA Global Research

Chart 82: 43% of analysts have seen or expect robotic/automation plans to be affected by Covid

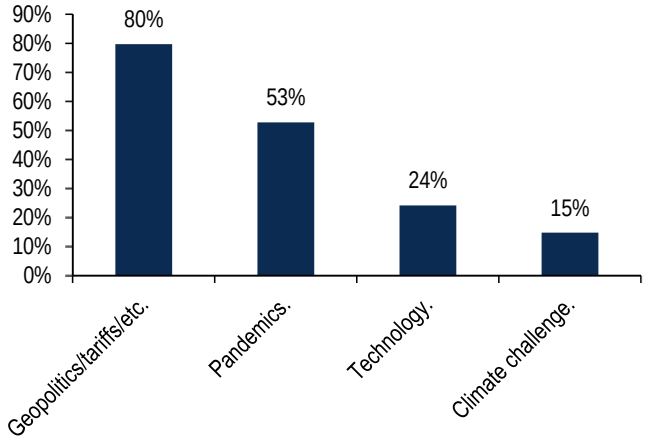
Has the Covid-19 pandemic affected plans for deploying robotics or automated processes for companies in your coverage group?



Source: BofA Global Research

Chart 83: Geopolitics most impactful in globalisation trend

What will be the key driver(s) for decline in globalisation?*

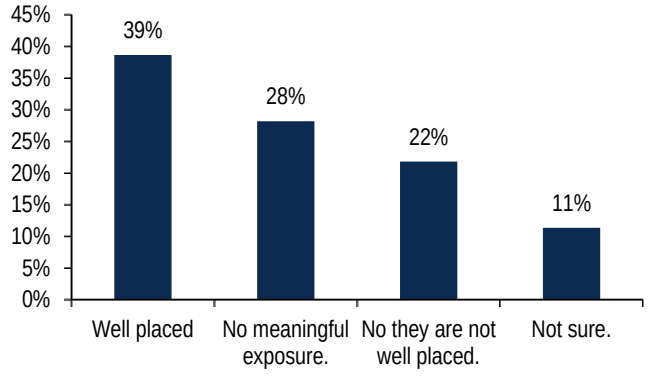


Source: BofA Global Research

Climate Change

Chart 84: 39% of analysts think their coverage is well placed for long term risks

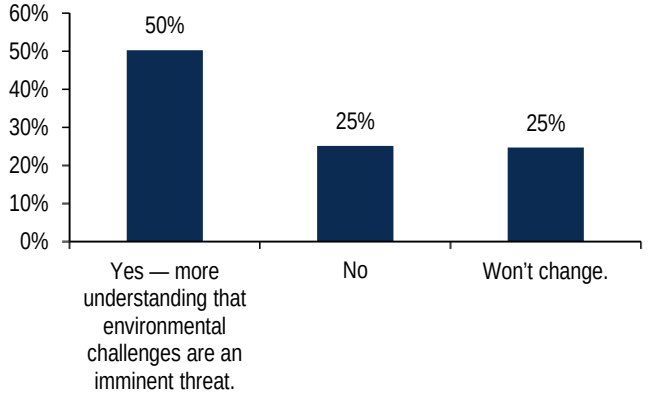
Are companies in your sector well placed to benefit from a change in focus towards long term risks & societal issues such as climate change, sustainability & social net?



Source: BofA Global Research

Chart 85: Half of analysts expect climate friendly investments to increase post-Covid

Do you think post-crisis climate friendly investments will increase?

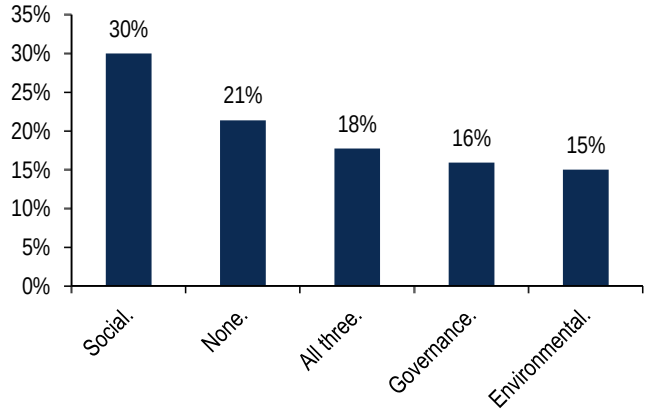


Source: BofA Global Research

Healthcare

Chart 86: Social is the hot ESG topic

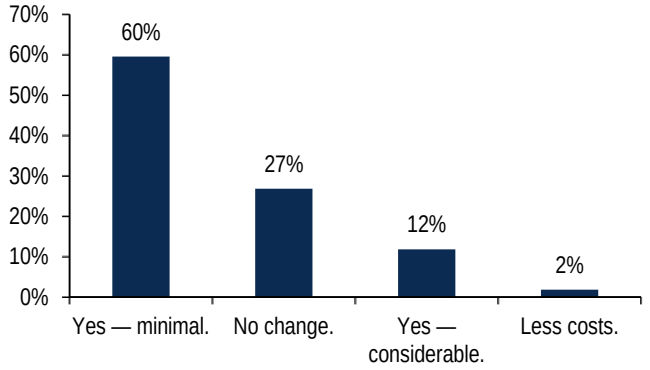
On ESG, which has been the most influential for your companies in this crisis?



Source: BofA Global Research

Chart 87: 72% of analysts expect an increase in employee benefit costs

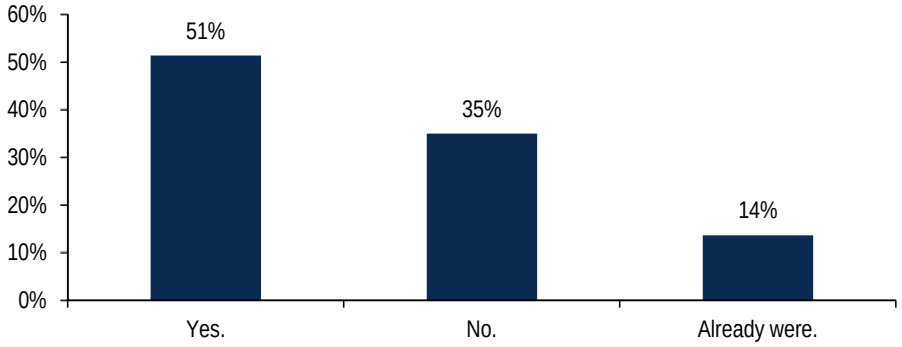
Do you think your company will see higher costs on employee benefits (e.g. healthcare, hygiene, safety, insurance)?



Source: BofA Global Research

Chart 88: Over half of analysts expect employee healthcare to become a more important ESG factor

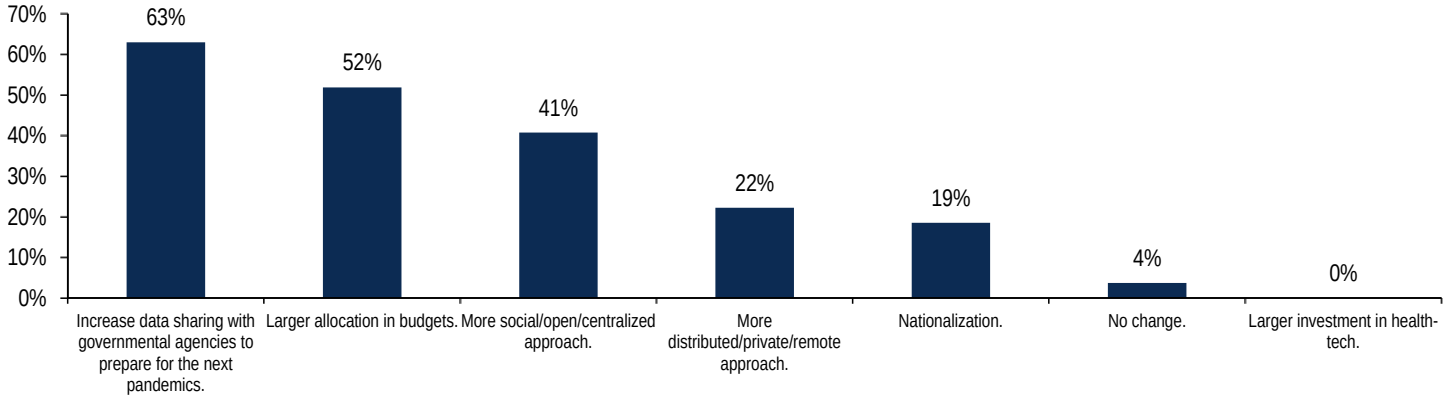
Do you think employee healthcare will become more of an ESG factor for your sector?



Source: BofA Global Research

Chart 89: Healthcare: More data sharing, share of budgets and open approach expected according to relevant analysts

How will the healthcare concept/ approach/ perception change post Covid?*

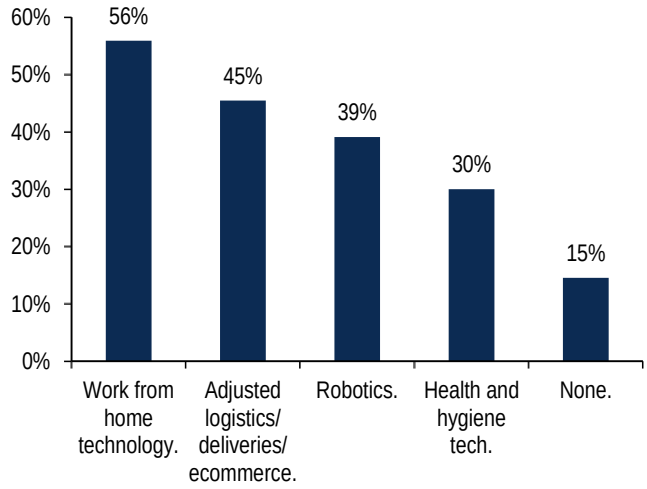


Source: BofA Global Research *Analysts were able to select more than one response

Technology

Chart 90: Over half of analysts expect WFH to continue post Covid

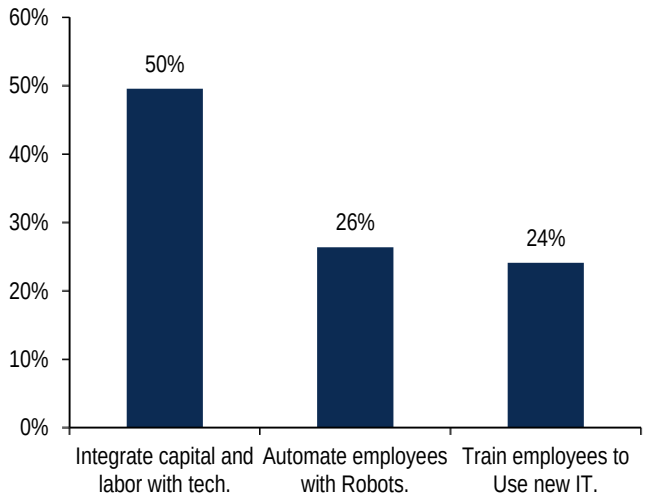
What technologies are your companies planning to continue to use following on from the Covid-19 crisis?*



Source: BofA Global Research *Analysts were able to select more than one response

Chart 91: Half of analysts are seeing capex spent on integrating tech with labour and capital

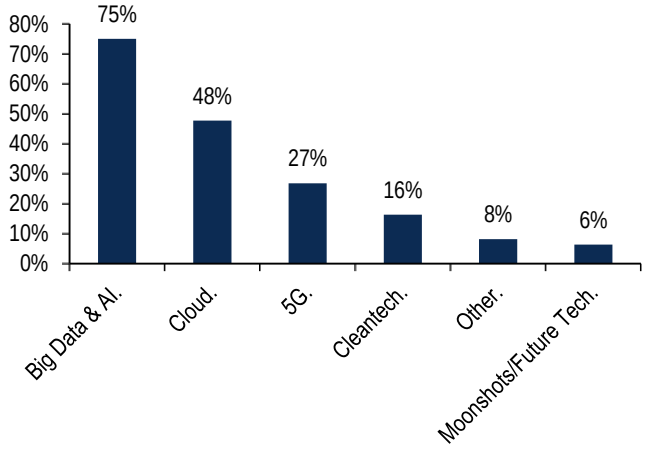
Which is the focus area that your companies are spending their tech budgets?



Source: BofA Global Research

Chart 92: Everyone needs Big Data & AI

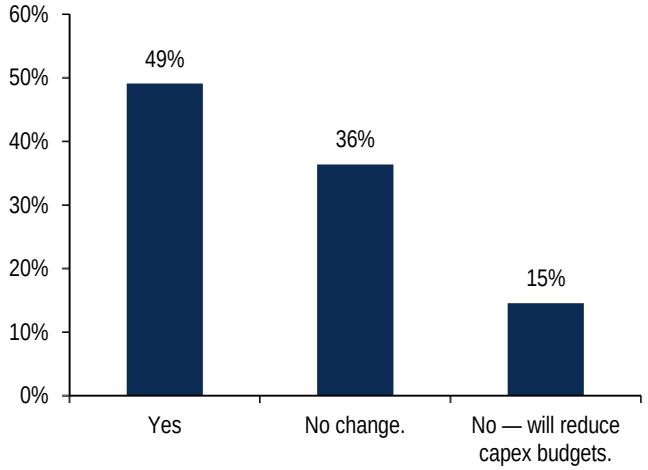
Which of these technologies are the most important for your company post-coronavirus?*



Source: BofA Global Research *Analysts were able to select more than one response

Chart 93: Tech remains a spending priority for almost all

Are your companies planning to increase capex spending on tech?

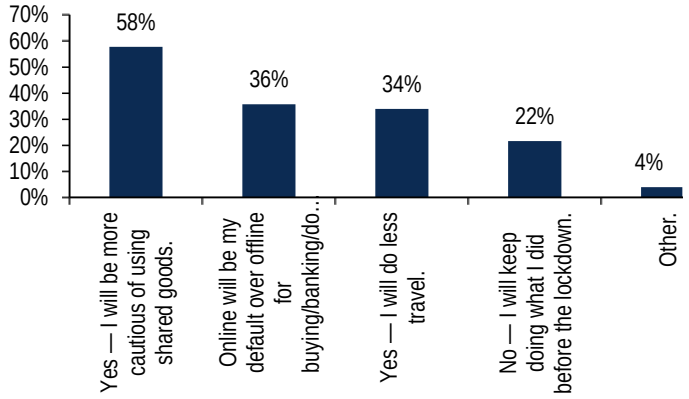


Source: BofA Global Research

The New Consumer

Chart 94: Over half of analysts expect to be more cautious of shared goods post-Covid

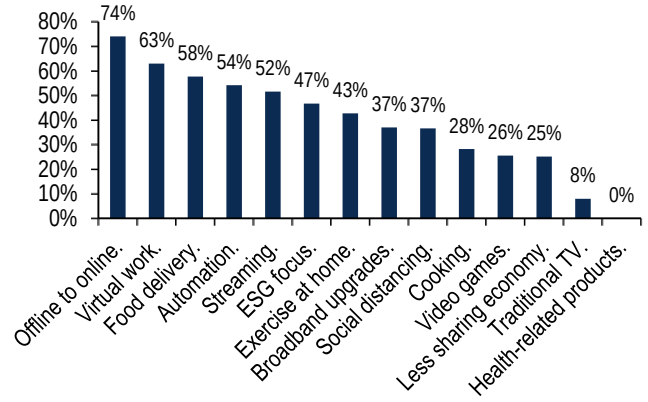
Do you plan to change your behaviour after lockdown?*



Source: BofA Global Research*Analysts were able to select more than one response

Chart 95: Virtual work, food delivery, and streaming are some of top picks for post-Covid for analysts

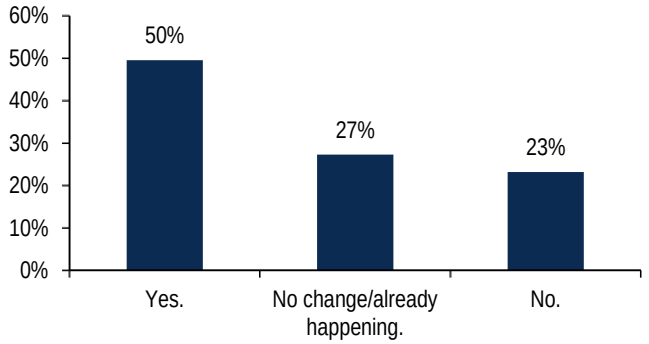
Which of these trends do you expect to continue to use after Covid-19?*



Source: BofA Global Research *Analysts were able to select more than one response

Chart 96: Half of analysts expect ecommerce to accelerate post-Covid

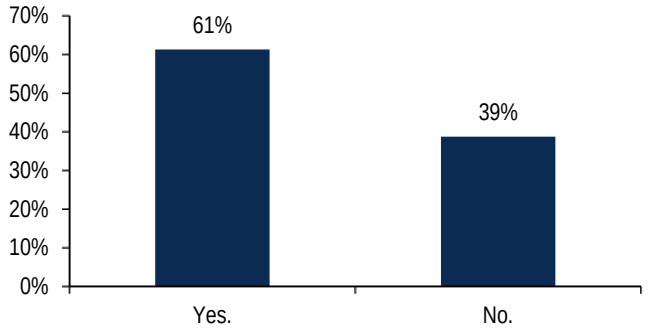
Post corona crisis, will this crisis accelerate the change in distribution channels to your customers from offline to online?



Source: BofA Global Research

Chart 97: 61% of relevant analysts think social distancing will have lasting effects on their sector

Do you think that social distancing norms will have a lasting implication on your sector?



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