

THREE FRAMES OF REFERENCE

Three frames of reference

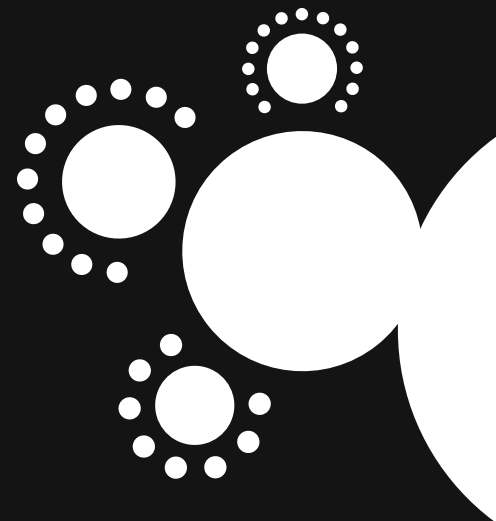
There has been a great deal of speculation about the change COVID-19 will bring. Some of the changes are obvious and short-lived. However it is almost certain that many will be long-lasting and hard to predict. It's important to note that major change doesn't always require the majority to agree – sometimes significant minority is all that it takes to cause structural shifts.

At KPMG New Zealand we are thinking about the future under three frames of reference:
Societal, Economic and Technological.

1. SOCIETAL

2. ECONOMY, TRADE AND BUSINESS

3. TECHNOLOGY



1. SOCIETAL

History tells us that as a result of previous pandemics and events of global significance, societal changes become some of the most impactful and seismic changes in generations.

- The Black Death in Europe saw sweeping reform around health and hygiene, the implementation and investment in sanitation and waste, and arguably the end of the feudal system in Europe.
- The Spanish Flu in 1918 triggered the creation of social security and universal health-care systems still in operation today. However, the Flu and the economic depression that followed, arguably led to a wave of nationalism, authoritarianism, and a second World War.
- World War II saw the single biggest shift ever in female participation in the workforce.
- 9/11 fundamentally changed the way that we travelled and the way that we think about security and terrorism.
- SARS in Asia has had significant ramifications since 2003. Many individuals continued to wear face masks in public, and it was one of the original catalysts for e-commerce and its uptake in China.



With COVID-19's global reach and impact on every aspect of our lives and livelihoods, it will arguably be the single biggest disruptor to face our generation. So, how will it impact us? How will we respond? And what lessons can we learn?

Purpose, consideration and intent

We will see a significant number of people become more considered in who they socialise with, how they socialise, what they purchase and who they purchase from. We expect to see people making more purposeful decisions, aligned to their values and beliefs. People will seek out organisations with clearly-stated purposes that are aligned with social good.

We saw this increasing pre-COVID-19, with conversations about sustainability, climate change, plastic waste and many other issues but the speed of this shift will increase. Having experienced forms of lockdown and limitations on their lives that they once took for granted, people will have a greater appreciation of interactions and things that they have missed and will therefore be more intentional.

Inequality

COVID-19 has globally demonstrated the widening socioeconomic gaps within our societies, and the impact that crises such as this have on the vulnerable and those in minorities. The next few years will only amplify this further as unemployment rises and the associated knock on implications take hold. More people will be forced into poverty and be unable to afford the basics needed for survival such as food, clothing and shelter.

This is amplified by recent, rightful focus on the systemic inequalities people of colour experience, in light of the Black Lives Matter movement. Building a greater understanding of these issues is a responsibility for all of society, and organisations, and will undoubtedly positively impact future decision making and actions.

The culmination of both the Black Lives Matter movement and the COVID-19 'be kind spirit' has shifted societal views, putting a spotlight on the unacceptable inequalities that exist and pressuring governments and corporates to intervene. We will all need to take accountability for the roles that we have to play within our own communities to address these issues.

Health

Societies' and governments' views around health and wellbeing, and healthcare systems in general will be amplified and significantly changed. As a society we will demand more investment into healthcare systems, to ensure resilience in the event of future pandemics. Our approach to essential workers, medical professionals and ways that we train, respect and remunerate them, are likely to become prominent topics for debate in coming years. We are also likely to see further government intervention as we look to disincentivise poor health choices (sugar, tobacco and alcohol) that add significant cost to our health service. Consumers will ultimately make better, more informed decisions about their own personal health in the future.

The COVID-19 'be kind spirit' is likely to find inequality unacceptable and force governments to intervene.





Nationalistic tendencies

Some societies are likely to continue to pivot towards nationalistic tendencies, such as buying and holidaying locally and relocating supply to local. Globalisation has come under fire and, recently fundamental flaws in the system have been exposed through the pace of the spread of COVID-19. The ongoing trade wars between the US and China are one of the best examples of this. From a New Zealand perspective there are many benefits that come from global trade and collaboration. In particular we need to avoid getting caught in the trap of taking sides in this US/China dispute, and bring the best of New Zealand to both. Governments will need to play bigger roles in regulating and protecting national interests in areas such as food insecurity and future vaccine development programmes.

That said, the global nature of the crisis could see greater global collaboration and connectedness in addressing global solutions. Scientists, doctors, researchers and Big Pharma are researching potential vaccines and learning from one another. Data scientists and engineers are collaborating to use Big Data to make more informed global decisions and point medical professionals in the right directions.

Individuals have connected digitally with one another around the world to cope and get through the period of lockdown and isolation. This global cooperation and connectivity could impact science, medicine, art and education, and may well lay the foundation of post-crisis collaborations.

Data privacy and big government

The amount of government intervention that we have seen around the world is unprecedented and the role of government consequentially will increase as they potentially take stakes in private sector enterprises, regulate further to drive resilience and look to shore up economies. In addition to this intervention, we will demand protection from future economic shocks and future pandemics, and our appetite for privacy will be tested. Fundamental privacy choices will need to be debated and decided on in order to allow governments to legislate and plan for the future.

How much of our privacy we will be willing to give up in exchange for protection and safety, will be a key societal question of our generation.

Consumerism

The pandemic will bring concerns about the sustainability and fragility of our economic system into sharp focus, intensifying critiques of hyper-consumption lifestyles, irresponsible business practices, and unsustainable business models. Will COVID-19 mark the beginning of the end for “extreme consumerism”?



Climate change and sustainability

Climate change, pervasive environmental degradation, chronic social inequalities, the proliferation of acute social injustices, declining trust and confidence in major institutions and – now – the COVID-19 crisis, are forcing us to reconsider what kind of world we want to live in, what and who we value, whose opinions we listen to, how we govern, and how we view ‘facts.’

Our social, political and economic structures are having to move hard and fast to keep up. With disruption, however, comes opportunity to do things differently – to dramatically reshape and improve the trajectory of our world.

Conversations and focus on sustainability, climate change, plastic waste and pollution will increase.

Urbanisation

Urbanisation has in the recent past been a significant global trend that has seen individuals migrate to urban areas. The lure of jobs, technology, infrastructure and other social benefits has seen this trend increase significantly in recent years. Whilst this trend is unlikely to disappear, the pace of the movement may well decline in a post-COVID-19 world. People's ability to work remotely, affordability of housing, their appetites to commute and spend time on busy public transport may see significant change in the coming years. This will have knock on implications for our cities and certain sectors within the economy. If we see a general decline in office workers in business districts, what structural impacts will be felt by the retail and hospitality sectors in the future?

KEY SOCIETAL QUESTIONS
THAT WE NEED TO ASK:

How do we bridge the socio-economic gaps that have been laid bare during the COVID-19 crisis?

What will New Zealand's approach to data privacy and security need to look like?

What are the purposes of our organisations?

How do we ensure that we support local businesses and promote them locally, but also maintain a license to operate in our key export markets?

What does our health service need to look like to be more resilient in the future?

How do we ensure that all of our planning is underpinned by a commitment to reducing emissions and sustainability?

How do we avoid the worst aspects of nationalism that other societies have seen emerge during periods of great economic upheaval?

RESET



2 – ECONOMY, TRADE AND BUSINESS



The scale of the economic impact of COVID-19 is unprecedented. Globally, almost without exception, business activity has plummeted. Unlike previous global recessions, including the Global Financial Crisis, countries are experiencing both demand and supply shocks due to lockdowns. Put simply, there is no existing playbook for policy makers to craft their response.

In the fog of COVID-19, governments and central banks have had to scramble to support their economies and ensure financial system stability. Fiscal buffering has become the international norm. As a consequence, national debt – already dangerously high in many countries – has further ramped up while quantitative easing (effectively printing money) has become necessary due to the ineffectiveness of cutting interest rates (with rates already low or negative following the GFC). On the supply side the lifeblood of global trade, international supply chains, has been disrupted, and some nations have retrenched into various degrees of isolationism including, at the extreme, xenophobia.

Fiscally prudent, household spend-thrifts

New Zealand entered the pandemic in a better economic and fiscal position than most. Pre-COVID-19, our government debt was less than 20% of GDP. This was at the very low end of the OECD. The Government's fiscal position was sound, built by prudent economic management by multiple governments over a number of years. Metrics such as unemployment and interest rates were at historic lows. However, that is not the complete picture of New Zealand's pre-COVID-19 economic performance.

It hid some less flattering economic indicators, including high household debt, increasing income inequality and housing unaffordability in many centres, and the long term problem of low labour productivity. In relation to the latter, output per head has lagged behind most other developed countries, including Australia, for decades. For business, the easy solution has been to simply employ more people, rather than looking at whether they are getting the best out of their existing workforce, and at investing in technology.

In effect, the strength of the Government's fiscal position has consistently masked weaknesses in the household and business sectors. The response to COVID-19 has put a spotlight on these issues. It has also blown open any fiscal restraint. COVID-19 at its heart has been a health crisis, which has seen those with pre-existing conditions prior to the outbreak most adversely affected. We are likely to see the recession that follows have the same impact on organisations that were similarly pre-disposed to economic downturns suffer the most.

The scale of the Government's 2020 Rebuilding Together Budget as well as the pre-Budget COVID-19 response are testament to this. For the lockdown and the immediate recovery phase, the Government is leveraging its balance sheet like never before. The 20% debt cap has been well and truly exceeded. A one-in-100 year event has required a one-in-100 year fiscal and economic response. The billion dollar question is when and how the Government will get its books back in order.



Global order

Unfortunately, the speed of New Zealand's economic recovery is not solely within our control. The global economy and the pace of other countries' return to some sense of normality will play a big role. So too will the new international order which emerges post-COVID-19.

The lack of trust between countries has intensified during the pandemic. National governments have acted mostly alone, closing national borders and pursuing differing public health and economic policies to address national circumstances. This is understandable. However, at its worst we have seen examples of nations hoarding supplies of medicine and protective equipment.

If this trend continues post-COVID-19, it will come at a significant cost, potentially impacting multilateral efforts to effectively tackle what are global issues, such as climate change, inequality and cyber crime. New Zealand, as a small world-facing country reliant on international trade and capital flows and a strong rules-based system, could be worse off as a result.

What is clear is that when New Zealand and the rest of the world emerges from the depth of the COVID-19 pandemic, it will be to a new and different global 'normal'.



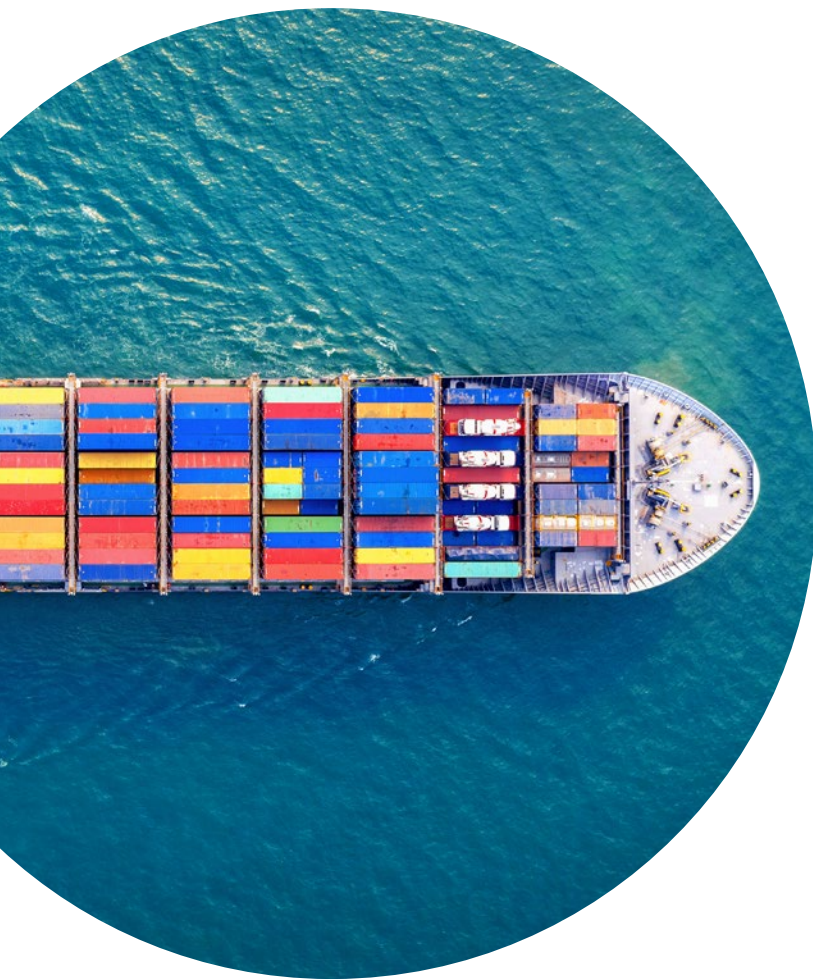
Globalisation and trade

Prior to COVID-19 there was increasing evidence of a globalisation backlash. There is no doubt that a globalised economy has been key to delivering millions out of poverty into economic prosperity. However, there have also been losers as traditional jobs in more developed economies have moved to cheaper locations offshore or have been automated. Put simply, the tide of globalisation has not uniformly lifted all boats, some have sunk. The response has been varied, including trade protectionism, both directly (through tariffs and trade wars) and indirectly (through challenges to the global trade order and the WTO). COVID-19 related trade disruptions have exacerbated some reactions.

Since COVID-19, Japan is looking at ways to onshore production of goods intended for domestic consumers, while East and South Asian economies may be the beneficiaries as multinationals look to diversify their existing supply chains. The Sino-US trade war and 'America First' policies have already signaled a more isolationist outlook. While a change of US administration later this year could reverse some of the developments, it is unlikely to be a wholesale change of approach.

COVID-19 will expediate these shifts, with globalisation and the global economy precariously placed.

The pandemic is an opportunity for New Zealand business to take stock of existing trade and supply chains and evaluate whether they remain fit-for-purpose. It also provides an opportunity to look for opportunities to innovate and navigate the new world, and position New Zealand as a supplier to the world.



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New Zealand's two biggest trading partners by far are Australia and China. This is unlikely to change in the short to medium term at least: Australia due to Closer Economic Relations which facilitates free movement of goods, capital and people; and China due to the size of its industrial and consumer markets.

However, as the devastating impact of COVID-19 on international tourism and education services (two key export earners for New Zealand) demonstrates, there are risks to having too many eggs in the same basket. We must be open for trade and address the need to diversify. However, New Zealand business should be prepared to operate in an environment which may see the increase of trade barriers and tariffs, and should look to simplify and de-risk supply chains, where possible.



Productivity

Living in Aotearoa we are envied for our work-life balance. It is why so many people relocate here, and why they will continue to do so in the future. As a consequence of this, and some other influences such as geographic location, passive business culture and infrastructure constraints, New Zealand has been a laggard in labour productivity, which has contributed to us moving down the OECD rankings, (that measure income per capita), and the increasing wage gap with Australia. The longer term rebuild presents an opportunity to reset the dial by:

- Harnessing technology: the lockdown has demonstrated that technological advances (e.g. video telephony and high-speed broadband) mean that working remotely is now a feasible and productive option for many. It allows people to work smarter. This has both societal benefits, such as less air pollution and congestion on our roads, and private benefits, such as freeing up time spent commuting for non-work (leisure) activities. The productivity gains from use of technology in our roles need to be locked-in by government and business.
- New skills development and retraining for New Zealanders with a focus on building a more technologically literate workforce: the economic displacement caused by COVID-19 presents an opportunity to develop programmes that will give displaced New Zealanders the skills to operate in an increasingly technologically-oriented world.



RESET



Immigration and talent

GDP is driven by productivity per person and participation rate. We will be seen as a desirable destination in the future. Perhaps one that people are prepared to trade traditional benefits for. If we can attract better talent, more productive talent, even whole businesses, this must improve productivity. R&D and innovation will also be helped by imported talent with special skillsets, but we must ensure that this talent is focused on the economy of the future that we are trying to build.

Many of our essential workers have been migrants (eg: electricity and telephone linesmen, healthcare/aged care professionals, primary produce pickers). Inward migration is an essential part of our labour mix.

We need to be very careful that these essential workers don't leave before we then consider who's coming in. There's also a need to balance local unemployment with the need to address local skills deficits – based on the understanding that these roles are not roles that Kiwis have wanted to fill in recent years.

Supply-chain shifts

Large multi-nationals have realised the need to diversify and de-risk their global supply chains. Their reliance has been tested and they will need fundamental shifts to protect against further global crisis. This could present an opportunity for Aotearoa with our safe, clean and resilient brand and reputation.

Foreign direct investment

If New Zealand is successful at managing COVID-19, we will be seen as an attractive place for FDI. Microsoft's announcement about building a local data centre is a great example of this. Similarly, we are seeing an upswing in interest from foreign Private Equity funds looking at New Zealand as a safe haven for their capital. Our remoteness will be seen as a positive.

Our attractiveness as an English-speaking nation, with good levels of literacy and education, and strong connectivity, could position us well as an appealing destination for shared service models that have struggled under the COVID-19 crisis, along with other similar business models.



Education and training

Education will need to be transformed to adapt to shifts in the workplace. More focus will need to be given to vocational training, and not just in the traditional trades or qualifications. Skillsets will need to be built to meet the structure of the future economy. We need to reimagine, to open up technology qualifications to apprentices, place less reliance on traditional higher education systems and look to diversify through mechanisms such as professional apprenticeships that have been deployed in the UK.

Governments and educators will need to work with business to address skills gaps and shortages, while a connected ecosystem will need to be created to ensure the evolution of training is meeting the demands of employers and employees.

Technology must be front and centre of education at all levels in the future, economies will need more trained data scientists, IT technicians, technology specialists and engineers, amongst others.

Workforces of the future will demand more on-the-job training and development from their employers. The traditional learning and development frameworks will not be sufficient to keep up with the pace of change, or to allow organisations to continually adapt in a more agile world.

Job creation and talent reallocation

We need to understand more deeply the global trends around the future of work, high growth sectors of the future and well paid, high employment industries that leave us less exposed to the service sectors going forward. Hospitality and tourism globally will fundamentally change. We need to think hard about the reallocation of workers from these sectors, noting that tourism has the potential to come back stronger if we capitalise on New Zealand's safe, clean and green global positioning.

Entrepreneurialism and Innovation

Key to future economic success and future resilience will be how we incentivise risk and how we support budding entrepreneurs. New Zealand is full of them, but we have not been great in the past at incentivising them in the most effective ways. We need to look at areas such as Silicon Valley, London, New York and others to understand what incentives through tax, grants, infrastructure and other investments we need to make to drive future supercharged growth. Just as many other countries did post-GFC.



Assuming we are successful in our goal of eliminating COVID-19, we will be seen as a desirable and safe destination. This will put an additional premium on migrating to New Zealand, which should be used to ensure that we attract the best talent in the world.

Government and business

The global crisis response has been an unusual time for the relationship between government and business. We have already seen governments rightly interject directly into business with essential support packages and other stimulus that affects decision making inside businesses. Sooner or later, that short term stimulus has to run out, and businesses are already making medium and long term decisions based on their own assessment of the size and shape of their market and cost base post-stimulus.

When considering the longer term Reset of the New Zealand economy more collaboration and dialogue between government and business will be key. Both will need to work together in unison to design and influence what we want the future to look like, taking into account some of the big drivers that will underpin any future economy. Drivers such as climate change, sustainability, enhanced productivity, increased technology investment and stimulus of innovation, research and development and entrepreneurialism will be pivotal.

Both will need to understand the individual roles that they play in enabling and resetting the economic environment.

The opportunities to adapt our economy will mostly occur inside businesses. Government can provide the infrastructure and policies that enable change, but it is businesses themselves that must take responsibility to drive the change that is needed. Businesses must digitise to increase productivity, or lift their sights to higher value outputs, or attract new investment capital.



KEY ECONOMIC QUESTIONS
WE NEED TO ASK:

What does the economy of the future need to look like?

What role does government and business play in building the Future economy? How do we encourage greater collaboration and planning between the two?

What incentives are available to us to drive innovation and entrepreneurialism?

The productivity gap: how do we harness technology to drive improvements in productivity?

What infrastructure investments best drive productivity improvements?

How do we diversify our export markets to de-risk our reliance on China.

What are the skills gaps we need to build for the future?

How do we de-risk our outbound supply chains by having more direct involvement in shipping and air freight capacity?

How do we match the labour gap between the under-resourced and over-resourced?

What government incentives do we need to drive entrepreneurialism and risk taking?

What sectors do we see as high growth and high employers of people?

What talent do we need to attract and train to drive future growth and productivity, and what do our associated immigration policies need to be?

What appetite do we have for FDI, at a time when our attractiveness has never been so high?

RESET



3 – TECHNOLOGY

COVID-19 has turbo-charged the adoption of technology across the globe. Industries that were traditionally slow to adapt have been thrust into having to move at pace, create agility within their organisations, reduce red tape, become less risk averse, and experiment with new technologies to innovate out of situations that they have found themselves in.

Remote service delivery is now a reality in many industries. The introduction of telemedicine has moved the health sector forward potentially up to ten years. Education systems similarly have had to adapt and demonstrate that the traditional learning models can be evolved. We have had to adopt digital ways of working as people have been forced to work from home, and we have had to find new ways and new channels to engage and interact with customers.

Technology has, and will, fundamentally transform the world as we know it, and the pace of that change will be the fastest we have ever seen. There is no playbook, but one thing is certain: organisations that underestimate the value of digital will ultimately die out.

Consumer technology adoption in New Zealand has been relatively high. As a nation, we are on the whole tech savvy, which is evidenced by the sheer volume of online retail sales placed with overseas retailers. Unfortunately, that can't be said for Kiwi organisations. We have been slow to invest and slow to meet consumer demands. Our productivity has suffered and is poor in comparison to our international peers.

To date, we have operated in a conservative environment, where risk taking has been something that we have been unwilling to do. We have had a herd mentality; with a few exceptions, we allow others to do it first and we follow. We have been able to accept this, partially because of our geographic location and the barriers to entry that creates such as lack of competition, and partially because of our population size and the challenge of scale.

We now have the opportunity to shift the digital agenda. Technology has to be part of the answer for the biggest questions we face today, such as population health, food insecurity, the welfare system, productivity and workforce allocation.

We need to become early adopters, innovators, entrepreneurs and intrapreneurs.





Digital talent

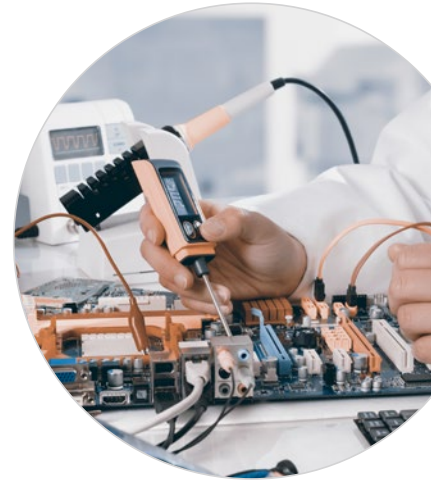
To do this we first need the right talent. We have the opportunity to reach out to the international markets and attract the world's best talent.

Talent from technology hubs such as San Francisco, Silicon Valley, London, Frankfurt to name a few.

Fundamentally we also need to think about who we train and educate locally, all the way from schools through to continuing education in the existing workforce.

Traditional multi-year, linear education paths will fail the test of agility in our new environment. A model built on nimble micro-qualifications and continuous learning will prove more relevant and productive.

As organisations look to build more resilient operating models, and we generally look to limit human contact, the use of automation and robotics will dramatically increase, and consequently so will productivity.



Ecosystems and collaboration

The Technology sector has exploded in recent years, driven by entrepreneurial stimulus, enhanced collaboration between tech companies from large to small, and the reinventing of business models, side-stepping the need for capital intensive investment models. Ecosystems have developed allowing organisations to tap into technologies that would have historically been cost prohibitive, allowing IT developers to create scale and distribution. In South Korea during lockdown, 22,000 pharmacies created a collaboration site to monitor and share information about mask stocks. Platforms such as Amazon have used ecosystems to drive growth and increase range. Microsoft has developed its partner ecosystem that has created exponential growth across its business. Apple's App Store generated US\$50bn in sales in 2019.

Going forward organisations will need to find new ways of operating. Joint ventures, collaborations and ecosystems will become the norm as organisations look to reduce capital expenditure and move to highly elastic variable cost models. We would expect XaaS ("Anything" as a Service) and other subscription model providers to benefit hugely from this going forward.

Automation and robotics

As organisations look to build more resilient operating models, and we generally look to limit human contact, the use of automation and robotics will dramatically increase, and consequently so will productivity. Automated shopping experiences such as Amazon Go, automated dark stores, automated warehouses, inventory management robots, automated bacteria detecting and cleaning robots, and automated vehicles, will become the future norms.

Automation will also come to our paddocks, fields and orchards with robotic platforms providing increasing alternatives to manual labour while simultaneously gathering crop and herd data to populate digital agriculture models.

This will have significant impacts for traditional workforces, especially in more manual focused employment. Human roles will always remain but they are likely to look very different and will require different skillsets in the future.

Artificial intelligence and big data

AI has played a vital role in the COVID-19 outbreak since day 1. AI startup BlueDot detected a cluster of unusual pneumonia cases in Wuhan in late December and accurately predicted where the virus might spread. AI tools have been developed to help front line health workers diagnose the virus. Alibaba created an AI diagnosis system they claim is 96% accurate and can diagnose in seconds. Google's DeepMind used its AI algorithms to understand the proteins that might make up the virus and has used its ecosystem to share the knowledge in the hope of advancing a cure.

From an organisational perspective the use of Big Data and AI will enable us to better understand our customers, our citizens and our employees, to allow us to create more personalised experiences, allow us to make more informed, predictive decisions and drive better outcomes for all, but we must maintain a focus on the elephant in the room, privacy.

Digital twins are accurate virtual models that will allow us to faithfully model a huge variety of real world artefacts from buildings to paddocks to roads. A digital twin provides a reference model to rapidly identify any anomalies in the real world, for example an unidentified infection in a herd or an individual animal. Equally a digital twin provides the ability to predict future behaviour, for instance the thermal performance of a building in the event of future climate change impacts.

Cloud adoption

Traditional on-premises technology solutions were already under threat of extinction before COVID-19, now we expect to see a significant ramp up of organisations looking to shift to cloud. Cloud offers more flexibility to a future agile, work-from-anywhere workforce.

It allows organisations to shift cost from longer term CAPEX to agile OPEX operating models, and allows for more collaboration and easier tailoring of solutions. In New Zealand we have been relatively slow in adopting new cloud technologies, due in part to challenges accessing overseas services but, as we have seen with Microsoft's recent announcement, to invest in permanent infrastructure locally, we are likely to see rapid growth here, as issues such as performance (latency) and data sovereignty are addressed.





Cashless money systems

Historically, in times of crisis, consumers hoarded cash. This time, however, the pandemic has accelerated the trend away from cash and towards digital transactions as we look to reduce physical interactions and infection vectors. It is already generating increased interest in digital currencies, with China said to be close to releasing a digital version of its currency. It sees a digitised currency as a way of increasing its global influence and reducing the dominance of the US dollar in global commerce and finance, a dominance that enables the US to exert geopolitical influence through the global financial system. The Bank of England Governor, Mark Carney, shocked many last year when he advocated development of a “multi-polar” digital currency to displace the US dollar as the world’s reserve currency, arguing that there was growing asymmetry between the dominance of the dollar in the global financial system and the diminished US share of global economic activity.

In common with all fiat monetary systems, digital cashless currencies will rely on confidence and real-time performance. In a digital world with huge scale, platforms such as blockchain will support these requirements by providing non-repudiation assurance using techniques such as distributed ledgers.

Augmented reality

We have seen augmented and virtual reality technology allow consumers to interact and participate in a variety of arts and entertainment during lockdowns. Museums have created bespoke interactive, at home experiences, people have attended virtual concerts, 2.3 million participants joined an “online rave” night in Beijing. Job fairs and career expos have been created to meet the new surge in unemployment and employers have created innovative new ways of using VR to conduct job interviews and meet candidates “face to face”.

Drones

We have seen drones deliver medical supplies, perform aerial surveillance during lockdowns and be used to perform remote maintenance checks on grounded aircraft. As drones become more powerful, longer ranged and better regulated, we are likely to see them perform more day to day tasks.

In combination with virtual reality, drones and other remote sensing platforms will enable remote service delivery across a wide range of industries, replacing or supplementing the need for onsite inspections, for example for adherence to building standards or condition reports for asset management purposes.

RESET



Blockchain

With the rise of digital currencies and increasing consumer focus on food, security, health and provenance, tracing solutions such as blockchain will grow rapidly. To date the business case to justify the investment has been weak, but as we see multiple organisations and countries look to adopt blockchain technologies, the cost structures will change, will become less prohibitive and there will be significant demand to scale.

It has been claimed that during the pandemic blockchain could be used to track the spread of the virus, standardise product requirements across geographies, facilitate financial payments, rapidly validate customs certifications to ensure that personal protective equipment was deployed quickly, and used to speed up claims processing in the US healthcare system to reduce the amount of physical interaction.

As economies recover, blockchain could provide consumers with the ultimate confidence in the provenance of their primary produce. The emphasis here will be less on the technology and more on the reliability and veracity of the data held in the produce's blockchain history.



3D printing

We have seen the use of 3D printing rapidly scale in recent months, particularly to meet the needs of healthcare systems, which had traditionally been slow to adopt the technology due to red tape and regulation. In New Zealand we have seen it used to create PPE shields and masks, while globally it has been used to create parts for ventilators at speed. We will see it used more widely in the future as retailers begin to harness the opportunity to produce in store and personalise and customise goods, as manufacturers look for ways to improve supply chain resilience and as health systems innovate.

Additive manufacturing has the potential to accelerate the pace of global supply chains with the transport of real physical components being replaced with the simple transmission of digital files. Intellectual property management will increasingly come to the fore in a world where anyone can print anything, assuming the design is available.

Ethics and privacy

The fundamental question that will come up time and again, is how will we regulate data in the future. How much is too much? What levels of privacy will citizens be willing to give up for safety or enhanced personalisation. These are fundamental questions that will need to be asked, debated and revisited as we continually move into a more technology, and data driven world.

As we increasingly come to rely on algorithms and machine learning approaches to make key decisions in our society, we must have confidence in the accuracy and equitability of those outcomes. Without the natural empathy of a person involved directly in a decision, how will we assure the appropriateness of the decisions taken on our behalf by algorithms, which may not even be able to articulate their reasoning in terms we are capable of understanding. New skills and roles will be required, AI psychologists may be a valid career path in the future.



Cyber security

The total volume of phishing emails and other security threats relating to COVID-19 now represents the largest coalescing of cyber attack types around a single theme ever. As we move into the future this risk will only increase as workforces become more fragmented, as we invest in new technologies and rely on robots to carry out tasks previously carried out by humans. Organisations, governments and individuals will need to plan, invest and educate themselves in order to limit the financial and physical disruption that can be caused by cyber crime. Smart cyber weapons such as AI generated deep fake videos and machine learning algorithms used to impersonate victims of fraud, will require tech-equivalent defences to fight back.



IOT

Smart homes, smart offices and voice assistants have all become popular in recent years as we have become time poor and look for convenience in our lives. COVID-19 has only amplified these trends as they remove the need for the physical. We can voice control lighting, so we don't touch the same light switches, we can use voice to change tv channels, we can use smartphone apps in hotel rooms to control curtains, television, air conditioning, order room service and limit human interactions. Adoptions and demand for these technologies will greatly increase as a result of the pandemic.

Equally our limited abilities to travel will require increased reliance on remote sensing platforms for everything from air quality to moisture content in soil. The move to real time sensing capabilities will need to be matched by real time decision-making capabilities akin to the automated trading we see across world financial markets.

The volumes of data acquired through these capabilities will increase exponentially and will outpace our ability to relocate the datasets in bulk. Rather we will see datasets be created and reside in single unmovable repositories and analytics tools brought close to them via tools hosted within the cloud.

Autonomous vehicles and smart transport systems

A technology driven future will lead to systemic changes in how we view and design future transport systems. Autonomous vehicles will play a significant part in that transformation and will potentially lead to fundamental shifts in traditional models such as car ownership, vehicle insurance and mobility as a service pricing structures. Public transport systems have the opportunity to optimise routes, reduce congestion and pivot to be more customer centric in the future. A step further into the future could see the growth in non-road autonomous vehicles such as autonomous, vertical take off vehicles designed to make short range journeys with multiple passengers.

Regulation is still in its infancy around the world, but the pace of change and innovation is fast in this space. Early adopters could potentially reap the benefits of reduced implementation costs to prove concepts as well as benefit from the productivity gains that such technology will bring with it. The question for New Zealand is whether we want to lead or follow.



KEY TECHNOLOGY QUESTIONS TO ASK:

What technologies are proven to drive productivity up, at pace?

What are the talent gaps that we need to fill, both immediate and future, that can be delivered through the education system?

What incentives are available to us to encourage technology innovation, R&D and entrepreneurialism?

How do we improve skills gaps at governance levels to better understand Technology decisions and requirements going forward?

How will we approach data privacy as a nation and as organisations?

How can we use technology to reallocate our workforce in the short term?

How can we use Big Data to drive better decision making in our organisation and in our societies?

How do we ensure that our organisations and government are protected from cyber crime in the future?

RESET

Recognise
Reconsider
Reinvent



