



# The Grey Swan Event

From Responding to  
Re-imagining A New Era

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## Future Shock on Pause

We were vastly underprepared for COVID-19. Countries are reacting, pivoting, adapting every day, at every level – governments, health systems, trading networks, industry sectors, workers, educators, communities, families and individuals. A pandemic was foreseeable, so this is not a Black Swan event, but a Grey Swan, with impacts that are shaking up the world.

Before the pandemic, we were already experiencing an ever-increasing pace of life, brought about through massive science and technology advances and super-connected global networks. We were being swept along amid the realisation of Alvin and Heidi Toffler's *Future Shock*. The COVID-19 situation has given us cause and space to pause, slow down society, evaluate what matters. During lockdown, people have experienced their collective worth and power in acting for the greater good of society. Many individuals and entities are evaluating their values and life expectations, no longer taking their future for granted.

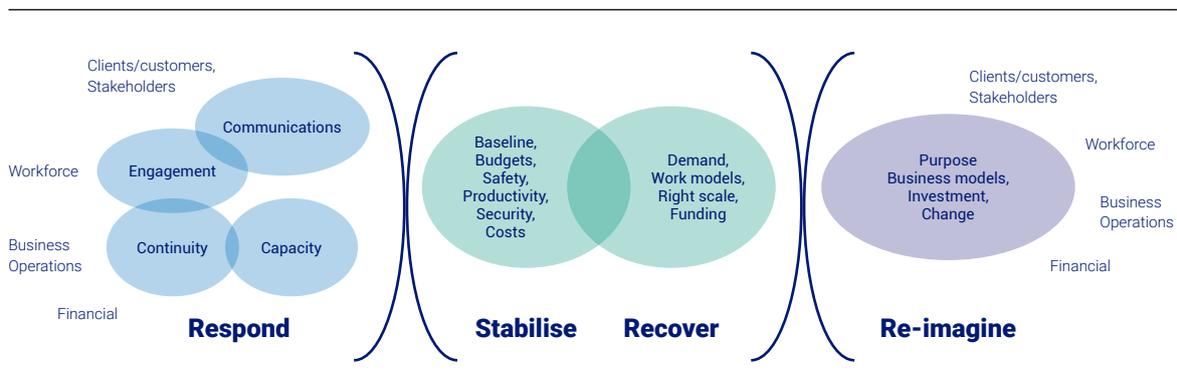
Post pandemic, we know the pace of change will resume, probably in fast forward. Politicians are already using language like 'preparing to shift gears from managing the health crisis to the economic crisis', desperate to avert prolonged recession. As crucial as this focus is, outcomes will be imbalanced if approached from past models and mindsets. Governments will need to take heed of demands for sustainable socio-economic reform and principles for the use of technology in service of society, coming from the chorus of awakened citizens, communities and businesses. This will profoundly influence the trajectory of change. Perhaps from the deep pain of this grey swan turmoil, we'll break from the past, emerging into a 21st century renaissance.

## Phases of Pandemic Adaptation

Turning focus to real time realities, we're in the midst of the acute phases of this crisis – the initial **response** and **stabilisation**. Organisations have responded to immediate needs, such as enabling people to operate from home and minimising cyber security risks around this. Most entities are now focused on achieving a stable modus-operandi, conserving valuable capabilities whilst activating an operating model appropriate for lockdown situations.

As restrictions ease back, the landscape for **recovery** will come into view, communities and businesses will take stock and move forward from a new normal to meet the patterns of demand. However, recovery won't be linear, further wide spread waves of outbreak will occur. Respected epidemiologists model the best case scenario for the United States as a second wave after summer (Sept – Nov), followed by herd immunity, with 1.1m lives lost. The worse case model is fleeting immunity, hence recurring waves, 2.2m deaths from the virus and further from other illnesses un-treated due to healthcare system collapse, along with crippling economic depression cascading from people's real fears of going out.

Whilst hoping for the best case scenario in every country, we should nevertheless expect to circle back through iterations of stabilising and recovering. As the future horizon comes into view, we'll **re-imagine** the next era. Organisations will consider the paradigm shifts characterizing this next era, re-calibrate their purpose, identify what parts of their operations need to transform and adopt new ways of doing business.



The Pandemic - Phases of Adaption

## Responding - New Normal For Living, Learning and Working

The pandemic response is super-charging digitisation and technology innovations and there will be a permanent uplift in digital ways of being and doing.

In daily life, the physical and cyber worlds are now more naturally integrated. For example, we're consulting our doctors, working, learning and interacting with family virtually. The ubiquitous adoption of consumer and business grade video-conferencing tools is proving vital to keep us connected.



It's a global leapfrog in collaboration infrastructure and it's obvious that it's here to stay for the future. These technologies have been stress tested and some found wanting, but they are rapidly improving with more intuitive, nuanced and secure features.

There's been a rapid adaptation of medical grade wearables to monitor body temperature, heart and respiration for COVID patients recovering at home. This will lead to more patient friendly and efficient health and wellness solutions, particularly for the management of chronic health conditions such as heart disease, diabetes, dementia.

Many first-time online shoppers have added to the surge in e-commerce. [Adobe's Digital Economy Index](#) for the US in April showed a jump of 110% in grocery shopping, 100% in books, 58% in electronics and 49% overall. Meanwhile, in an overnight transformation, hard cash payments in stores have become near obsolete.

Shopping has also become 'phygital' in response to COVID-19 lockdowns. Virtual and augmented reality experiences of stores, coupled with delivery services that take care to assure hygiene standards, have sprung up in many locations around the world. Business models include personalised VR shopping in local community high streets. This is a particular help to older people and those with disabilities. Having mastered VR technology for shopping, this opens up other life enhancing experiences for them.

For workers who are now mobile, the sudden embrace of telecommuting brings dreams of lifestyle change into the realm of possibility. Finally, the de-coupling of what you do from where you work and hence where you live enables freedom from odious commutes, more flexible work hours and greater access and diversity in the workforce. It will also fuel the predicted trend of people moving away from the 'rate race' to a more affordable and sustainable regional lifestyle.

Many businesses have moved to a fully scaled virtual workforce for the first time and this is challenging traditional, hierarchical processes and work-place cultures. The protocols for virtual teamwork are experimental, people are empowered to "work together, with whoever you need to, innovate to address emerging challenges and achieve the best outcomes for customers" (this being the mantra from our CEO is also echoed among numerous of our client and partner CEOs).



The outcomes of working flexibly, collaboratively, autonomously, outside siloes and from an intelligent human 'edge' will be enlightening for future workforce strategies

The outcomes of working flexibly, collaboratively, autonomously, outside siloes and from an intelligent human 'edge' will be enlightening for future workforce strategies. Will traditional siloed business models still be necessary? Will the swarming of diverse skills and perspectives be naturalised into organisational culture, changing business cadence and leadership styles permanently?

Workplaces themselves will be re-considered for the functions they serve, their location, layouts and digital amenity.

## Stabilising Challenging Operations Through Innovation

COVID-19 has triggered a flood of science, technology and organisational innovation, in cycles of weeks rather than months and years. This has been applied to directly combat the lifecycle of the virus and also to support people and systems adapt to lockdown.

It's been inspiring to see the 3D printing and additive manufacturing community volunteer skills and production facilities to print ventilator parts, whilst the conventional global supply chains and governments simply failed to respond to exponential demands with any agility.

Equally admirable has been the rapid self-mobilisation of many small maker networks to fashion personal protective equipment from recycled goods for front line workers who were at great risk without this.

Following are five further examples of ingenuity that have improved response and stabilisation efforts and are sure to inspire post pandemic industry innovation.

### Drones - Wuhan, China

China locked down the city of Wuhan to contain the spread of COVID-19. With most workers in quarantine, drones were used to supplement and replace human efforts in maintaining public safety and making life saving deliveries.

#### Pandemic Innovations

- Drones visually scanned urban areas in order to direct public safety messages where needed. Unfortunately this included drones 'scolding' citizens.
- Agricultural spraying drones were re-purposed to spread disinfectant across public spaces.
- Delivery drones were used as a safe and sanitary method of delivering urgent medical supplies into high risk infection zones.
- Population wide temperature testing is high risk for the personnel handling the process, so research trials tested ways to reliably calibrate air-bone drones with infrared cameras to measure body temperature.

#### Potential Post Pandemic Adoption

Wide adoption of drones in private / controlled airspaces

- Inspection helpers for workers in high risk industries such as construction, fire and rescue.
- Delivery services and safety monitoring in connected environments / precincts — such as urban precincts, university and hospital campuses.
- Surveillance for public safety in urban areas — autonomous, event driven inter-operation between fixed points of video surveillance and airborne drones.
- Mass drone based temperature testing at stadiums and major transit locations.

### Low code or No Code Applications Development - New York, USA

Consumer and enterprise applications are developed with minimal to no coding, using metadata based assembly and other automation methods, dramatically reducing development cycles.

#### Pandemic Innovations

Overwhelmed by the pandemic and with time of the essence, NYC created a COVID-19 crisis-management portal in 72 hours, without writing a line of code. The platform generates a live map of the virus and hot spots and also connects residents with critical services. It was built and deployed by a software development start-up working with NYC technologists

#### Potential Post Pandemic Adoption

The more disrupted an industry sector is, the faster will be their adoption of low code development platforms, to overcome legacy constraints and enable rapid re-design and transformation of businesses and processes (notable are energy, BFSI, health, supply chain and government). Systems of government can radically innovate, delivering Government as a Service, with an emphasis on co-design and creation of modular, shareable citizen service functions. Lego block like inter-operability and portability of the functions developed are key features of low code technologies.

## Cryptographic key exchange security and low energy Bluetooth - Silicon Valley, USA and various regions

In April, Apple and Google partnered to announce the rapid development of contact tracing services, a significant uplift in secure data exchange and identity protection, utilising Low Energy Bluetooth and cryptographic key trust technologies.

### Pandemic Innovations

The companies are making changes to their respective mobile operating systems to allow iOS and Android devices to use Bluetooth to detect and record when they come within defined proximity of any other iOS or Android device. A Bluetooth signal with a unique cryptographic key, unrelated to your personal data, is emitted and registered on the contact device. If you download tracing apps using the service and anyone you've encountered later tests positive for coronavirus, your phone will alert you of that fact, based on a match of the crypto-keys. The functionality will be built deep into their operating systems so that users no longer have to rely on what is inherently weaker security at the application level. This approach would improve the resilience of the government developed COVID tracing apps, such as Singapore's TraceTogether, and Australia's COVID Safe.

### Potential Post Pandemic Adoption

- More use cases for highly secure tracing apps will be developed leveraging these common security services.
- In conjunction with secure data computation technologies, this tracing service could bolster data privacy and security assurances around the ethical conduct of large scale research initiatives such as for health, urban design, cultural studies.

## Bio-connected Health Solutions - Australia, Asia Pacific

Monitoring patients remotely with clinical-grade wearables & sensors, using Machine Learning to improve symptom monitoring algorithms and augment clinical triage.

### Pandemic Innovations

An Australian University and two major hospitals are conducting research trials with non-critical COVID-19 patients recovering at home. Patients use an app to record their symptoms, clinicians monitor and triage remotely. In parallel, the symptom monitoring algorithms are tested and improved through Machine Learning, alerting clinicians and augmenting decision making. The next steps will integrate wearable data, using clinical grade wearable innovations. When scaled, this platform will protect non-critical patients, prevent unnecessary hospital admissions, improve decision-making, and conserve vital clinician resources.

### Potential Post Pandemic Adoption

Accelerating the integration of medical sensing tech with intelligent data analysis, alongside clinical expertise, will propel changes in many sectors — Health, Aged Care, Disability Services, Wellness and Sports coaching. This will deliver better health outcomes for people as well as substantive systemic efficiencies.

## Digital Twinning - United Kingdom

A digital twin is a virtual representation of a physical asset, a human, business process, a system or systems of systems (such as a whole city). In London, the pandemic took hold very quickly. NHS, Social Care, Support and Administration staff did not have up to date information about where the nearest critical care bed was, which was crippling for their response to the pandemic.

### Pandemic Innovations

Digital twinning technology (from lotics) created a [Critical Care Resource](#) — a digital twin of every hospital and bed in England, to provide real time status of critical care bed availability. To retain the real time richness and accuracy of the digital twins, local authorities input their essential bed availability data and additional data sources were streamed from the NHS.

It's the combination of multi-sourced data and metadata and real time event management that provides unique insight for on the ground decision making and an historic record for later research and analysis.

### Potential Post Pandemic Adoption

- Precision medicine — medical sensors / wearables will provide the data points for our digital biological twin. Medical treatments will compare the changes from baseline to treatment data sets, monitoring effectiveness. This will enable personalised, precision medicine.
- Urban Design — Numerous countries now have city scale digital twins (Singapore, Rotterdam, Helsinki, Columbus, Yintan and Amaravarti, a new Indian city created from a Digital Twin). The twins improve citizen life, social cohesion, city operations, public transport, logistics networks and tourism.
- Digital twinning offers unprecedented virtual experimentation – for modelling, testing, decision making and research and development.

## Recovering, Re-imagining

The businesses that survive this Grey Swan event and exit with the strongest bounce-back potential into 2021, will be the leading digital organisations among their industry peers for the next decade.

Coming from this traumatic period, there's an understandable defensive focus on costs and operational effectiveness. But alongside operational capability, the strength of the future digital social balance sheet is equally built from competing and winning on stakeholder experience and everything that enables meaningful, personalised engagement to flow at scale – outside-in responsiveness, speed, intelligent processes, trust and sustainable use of resources.

Each industry sector – health, education, energy, financial services, production, transportation, logistics, communications, tourism and leisure being just some, will adapt their models around resource sharing, resilience, right-shoring and globalisation.

Right now, our organisation is deeply engaged with clients, supporting and adapting with them. We're identifying patterns and starting to discuss the opportunities and value flows benefiting businesses and communities in the recovery and re-imagination phases.

Following are some of the scenarios arising from these discussions across various industries. They share common future features of attention to stakeholder needs in designing solutions, dexterity in responding to uncertain and fluctuating demand, flexible and leveraged resourcing models.

### Healthcare

Telehealth has delivered major productivity boosts and system wide cost savings. Particularly in regional areas, access to GP, mental health and some specialist services has been enhanced and the avoidance of long drives to regional centres for specialist checks has improved the patient experience, especially for older people. This goes some way to overcome disadvantages long endured by rural communities.

Health networks can envisage a future where tele-consulting in conjunction with telemetry data readings of patient symptoms will be incorporated as a standard delivery channel, creating more patient centred clinical pathways. This breaks with the institutional, medico centric models of the past. This significant change will re-allocate resources for virtual triage and community based care services, with GP clinics playing their role as collaborative case managers. Technologies that assure secure mobile health records and collaborative case management are critical.

With regard to public hospital and healthcare networks, the unimagined speed of delivery of pop-up hospitals and mobile testing clinics, along with the rapid re-deployments of skilled staff across modalities (eg surgical nurses pivoting to contact tracing) has demonstrated the ongoing potential for more modular design of healthcare systems and service delivery. This will enable system wide portability to meet evolving demands. From a technology perspective, this has come about from a pivot away from capex intensive buy and build technology procurements, to outcomes delivered by providers as flexible managed services that can be scaled up or down.

### Higher Education

Universities are continually striving to improve their models for research engagement and commercialisation with government and industry. Arising from fruitful collaborations during the COVID-19 crisis, universities have fresh know-how to engage with large, medium and small organisations and communities to translate research to impact and value.

Co-location, co-design and co-creation will accelerate the transition of research to innovation and real world solutions. All universities can play a significant role in future focused industry renewal. Regional universities in particular could re-purpose some of their substantial campus real estate assets to support small and medium enterprise precincts targeting sustainable regional renewal and transformation.

For the past decade or so, Australian Universities have benefited from their regional proximity in attracting international students from Asia Pacific.

As a consequence of education delivery being rapidly and fully virtualised around the world in response to the pandemic, borderless global competition in higher education has intensified.

This is a rising threat to attracting and retaining key academic and research staff, and maintaining business models reliant on high intake levels of international students. Furthermore, domestic students are increasingly poachable.

Hence, there's keen focus on employee and student engagement in the recovery phase. Data analytics about student journeys, online study patterns and pre-emptive interventions, as well as immersive digital experiences that enhance learning will differentiate the better performing digital universities.

The re-imagination of higher education will involve dramatic changes, equivalent to the level of industry disruption occurring. It's foundational purpose and value to society is evolving. Innovative universities are re-thinking their core stock in trade, ie credentials and their business models as a lifelong education provider in a forever transforming, knowledge based socio-economic system. Some universities will soon merge to improve their finances, operations and competitiveness.

The businesses that survive this Grey Swan event and exit with the strongest bounce-back potential into 2021, will be the leading digital organisations among their industry peers for the next decade.

## Industry

The past 30 years of global consolidation of manufacturing and supply chains has denuded local industries – household appliances, cars, pharmaceuticals, medical devices and equipment, food processing, scientific instruments, defence materiel have all gone the way of lowest cost off-shore operations. Countries now have a lived experience of the national risks and consequences.

Governments will identify their key sources of competitive advantage and invest to grow GDP around these sectors. In Australia, there are obvious growth opportunities from more integrated primary production and food processing value chains and also through value adding within our resources sector, such as Lithium based batteries.

The Australian government has also signaled that grants and investment incentives will target smart, localised capabilities addressing our sovereign needs and in particular, they will focus on growth for small and medium enterprises. Additive manufacturing will be a key area for research and innovation collaborations, focused on medical technologies, health and pharmaceuticals.

During the pandemic, a group of Australian additive manufacturers turned emergency hospital bed production into an IKEA like approach. In a matter of days, they teamed with a globally approved critical care bed designer to prototype. Next they mobilised local supply chains to produce flatpacks for on-site assembly in emergency pop-up care facilities.

A feature of numerous smart innovations during the crisis has been the re-purposing / re-cycling of available resources to create and flow critical assets, where traditional supply chains could not respond quickly enough eg ventilators, masks, pop-up hospitals, workforce re-assignments, even internet bandwidth conservation. This is prompting broad consideration of the principles of the [Circular Economy](#) and agile principles of flow. Scaled investment in new industry models that design out waste and re-use materials across a full lifecycle, such as renewable energy and sustainable fashion, will create sources of growth that optimise the three P's (profits, people and planet).

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A significant amount of banking consolidation and diversification into adjacent markets will occur as banks re-cast their business models for the next era

## Banking and Finance

In relation to the impacts of the pandemic, financial systems have been a source of support – with banks putting holds on household and business loan repayments and fintechs providing small business finance. But banks are juggling many complexities. Credit losses will mount and margins are reduced by near zero interest rates. Shareholders accustomed to continual dividend earnings growth will be disappointed and vocal. Retail banks need to keep their customer channels open while dealing with social distancing and all banks are enabling their workforce to operate from home while maintaining supervisory and compliance functions that aren't easy to monitor remotely. And on the way through all this, banks need to be attentive to their brand and expectations of customers who are feeling financially vulnerable.

Multi-faceted cost trimming is underway, from cancelling unused technology licenses and halting in flight projects to cutting back branch hours and amenities. Significant cost savings are coming from rapidly uplifting customer digital experiences through improving mobile banking and using intelligent tools such as chatbots. This shifts demand away from the higher cost contact centre channel.

Customer data plays a more critical role now. Segmenting customers according to propensity to manage the crisis, or, needing more pro-active support and service is crucial.

Banks are trying to act with discretion in individually handling customer circumstances at scale, but personnel need to work around rigid bank products and systems. Longer term, the drive toward new business models and the re-personalisation of banking will lead to a shift from monolithic banking applications / systems to more flexible and modular business applications that nevertheless ensure good governance. This will drive sector wide growth of low code / no code enterprise applications development.

Coming out of COVID, priorities for banks will be to better understand their consumers and engage the bank around them, not the consumer around the bank's product. Channels, products and pricing will be tailored from knowledge about individual customers. Banks are expected to uphold the highest of societal values, so banks behaving with compassion now will be advantaged later.

Significant consolidation and diversification into adjacent markets will occur as banks re-cast their business models for the next era, baking in operational resilience for a new normal characterised by ongoing financial turmoil for some time.



## Diversity Around The Planning Table For The Future

Many governments assembled bi-partisan stakeholder coalitions to better respond to the pandemic. Some are now expanding to plan recovery and beyond that, broad reforms to safeguard the future. The best coalitions will gather together diverse actors.

Already poised at the planning table are the traditional powers entirely focused on mitigating the closures and supply chain disruptions to restore a 'normality' of vast consumerism, at speed. The same old linear economics and industry models, focused on scale and productivity, driving automation, global labour triage and lowest possible wages. When the blue skies over Delhi again disappear, these forces would rationalise away such impacts with a zero-sum game argument of jobs and growth versus environment.

There should also be a strong movement around the planning table (including ethicists, human rights organisations and everyday people of all generations), who advocate for a fairer, human centred and sustainable style of global economy and society. Science and technology is now so central and enmeshed with our future, we need to agree the core paradigms around its use. For example, should we enact internet connectivity as a basic human right? Should we agree principles regarding the societal purpose of technology, in order to guide investments in research and economic value creation?

Japan's [Society 5.0](#) has done this. Japan's blueprint is for a super smart society, through transforming the Japanese way of life, with the cyber and physical worlds harmonising to benefit people of all ages and abilities. This is an inclusive socio-economic model, powered by digital technologies. [NTT's Technology Report for Smart World 2020](#) provides an overview of the 11 most impactful technologies for the world, and importantly, it explains the value creation potential of each technology in enabling more naturalised systems and a human centred order.

Diverse business, industry, worker and not for profit representation is very important. All actors need to appreciate that tomorrow's business strategies will harness the massively scaled, hyper-connected eco-systems of people, things, data, processes and experiences. The changes from the past business world are characterised by pivoting from centralised and siloed to decentralised and distributed models. The technology pivot is conceptually similar – at the heart it entails a shift from monolithic systems to enterprise architectures of hybrid, modular capabilities, with each technology layer de-coupled – so the business eco-system is software and data driven. The fulcrum of the pivot is humanity, as shown by the Japanese model.

Scientists and technologists take a seat at the planning table with responsibility to describe the realities, possibilities and impacts of the exponentials driving planetary disruption and the digital social revolution - the science of climate, genetics, biological and social systems and the technologies of mobility, digital social platforms, data analytics, digital twinning, Artificial Intelligence, implantables, the Internet of Everything, robotics, photonic and quantum computing and autonomous systems. Inspired innovations in these fields have enabled timely responses to COVID crisis situations. For a re-imagined future that is inclusive and sustainable, technology adoption must be about positive disruption and evolution that society values. We can and should avoid re-invoking future shock. We mustn't throw society back into the turbulent slipstream of ungoverned exponential change where power has accrued to very few actors.

Science and technology is now so central and enmeshed with our future, we need to agree the core paradigms around its use. **For example, should we enact internet connectivity as a basic human right?**



**Together we do great things**