

POST PANDEMIC RESILIENCE

Foreword:

At Arcadis, we had a hopeful start to 2020, like many of you reading this. Each day of the roughly three years I have spent leading this company, I have witnessed our focus on delivering results for our clients around the world, while fulfilling our commitments to our people, our stakeholders and society. We were all set to carry that forward throughout this year as well. In January though, the COVID-19 virus took hold of the world. We closed our offices in China when the lockdown was implemented there. Throughout the following months, nearly all Arcadians transitioned to remote working, most of them while sheltering in place in their homes.

While we knew that infectious disease outbreaks happen, I think it's fair to say that only a few people out there understood the extent to which a virus like this could upend our lives. I'm happy to report that, so far, we have had the good fortune of not having lost any of our people to the deadly disease caused by the coronavirus. But many of our people have lost people they know and love or they've seen their spouse or their children or their friends lose their jobs or their business. It's hard to overstate the amount of uncertainty and suffering that exists in the world today.

As we have worked together through this pandemic, we have learned new lessons and we have been reminded of old ones. COVID-19 has once again demonstrated that tackling inequality and helping the most vulnerable in society benefits everyone and is essential for truly resilient societies and economies. At Arcadis, we have been fixated on the following question: what makes a business or a city or even a person more resilient and better able to cope with a future pandemic, or whatever else the future holds?

This report lays out how our thinking about resilience is evolving, and its close links to the sustainability agenda. Ultimately, becoming more sustainable will make our global society more resilient. We are committed to helping our clients and our own company become even better prepared for an uncertain and unpredictable future. The key is an unwavering focus on making sure those critical communities, systems, infrastructure, and other essential aspects of society are both robust and adaptable. For us, it's all about our people.

As the leaders of nearly 28,000 people, the Executive Leadership Team, our regional leaders, and I have been focused on resilience: keeping our people safe while ensuring business continuity and uninterrupted provision of service to our clients. Fortunately, Arcadis has a strong heritage in resilience, from strategy and planning to the implementation of tangible projects and measures that make a difference.



I could not be prouder or more impressed with the way that we have rapidly adopted new ways of working and have continued helping clients succeed. Our people have accomplished so much this year and they have done so while coping with the shock of this pandemic and associated stressors we could hardly imagine a short time ago. That's why, throughout this document, you will also hear directly from some of our people. In their own words, they talk about what they have experienced over the past months and their own personal efforts to be resilient during these difficult times.

I hope you will enjoy the read, but also learn things that will help you enhance resilience within your organizations.

Peter Oosterveer

Chief Executive Officer
and Chairman of the
Executive Board



UNDERPREPARED, UNDERPRIORITIZED

Introduction

The COVID-19 pandemic has brought a level of disruption to the world that brings into sharp focus how difficult it is to adequately prepare for an uncertain and, all too often, unpredictable future. For a world that had only just recovered from the shock of the global financial crisis of 2008, the pandemic has hit hard. Although pandemics have long been warned of, the coronavirus has had a devastating impact on almost every facet of life, in almost every country in the world. Clearly, the world had underprioritized investments to mitigate the effects of an event of this nature.

The long-term economic impact of the coronavirus pandemic is still unclear, but there is no doubt that we have entered a prolonged period of change. Stimulus packages in most of the largest economies are contributing to a short-term softening of the economic blow, but major questions remain over what will happen when the stimulus packages end, and the impact of true levels of unemployment and declining economic output become apparent.

Globalization is also at risk. Political pressure in many countries around the world may lead to more nationalist policies, but the interconnected and interdependent nature of the global economy means that a widespread wave of protectionism would make the global economy less resilient and could instead lead to a prolonged period of economic distress. Rather than retrenching and looking inward, it's our belief that nations that continue looking for collaboration beyond their borders will benefit the most.

Arcadian Voices

WEN MEI HA
Wuhan, China



Wen Mei Ha is our Director of Water Management in China. She lives and works in Wuhan, where COVID-19 first emerged.

“About a week before the Chinese New Year, I realized the spread of the virus had become a serious problem. But my life changed drastically on January 23rd, when authorities closed down the entire city of Wuhan. I had recently moved my parents from Beijing to Wuhan, so that I would be able to take care of them. So, when the lockdown began, I felt very lucky that we were not separated because they were here.”

Wen Mei was able to continue her work from home but the uncertainty caused by the outbreak did take its toll.

“Keeping my parents safe has been a top priority for me during the pandemic, so I have been quite busy caring for them. And of course, at the beginning of the outbreak it was not clear how long we would need to shelter in place. Initially, this caused me stress, as I was worried about the important resilience projects we’re working on for clients. Over time though, that worry went away as myself and my team settled into working from home and were able to continue delivering for clients. I think COVID-19 forced me to get more rest and to take time to think. I believe my family has become stronger mentally. And we have seen how well the local government was organized, as well as how resilient our community has been. People really maintained a positive attitude and helped each other when necessary. I believe we can recover from this crisis and learn lessons from it that will make us all stronger.”

Fortunately, Wen Mei, her parents and her colleagues in Wuhan were able to stay safe and healthy during the 76-day, citywide shutdown.

RESILIENCE AND RISK

The deepening health and economic crises caused by coronavirus underscore the importance of investing in resilience, particularly given that we can be sure that more shocks will come – even if we are uncertain about the form in which they will appear. With our global society ever-more intertwined, disruptions are likely to become more frequent and more severe, including the likely impact of concurrent events such as hurricanes, droughts, or civil unrest. This means that we must prepare for the unthinkable, as approaching resilience from a risk-management framework alone will not adequately prepare us for future unknown shocks.

Risk management is an important part of resilience planning, but to explore resilience solely within a risk framework means that unexpected resilience challenges will undoubtedly be missed. The World Economic Forum’s (WEF) [Global Risks Report 2020](#) is a stark example of how this is the case. The report was issued in January 2020, as the coronavirus was spreading largely undetected around the world. WEF surveyed an “extensive network of business, government, civil society and thought leaders,” to produce its Global Risks Landscape. A “rapid and massive spread of infectious disease” is listed as a risk, but the survey respondents assessed the likelihood that this would occur to be quite low. With hindsight it becomes quite clear that our risk assessments can be woefully inaccurate.



FROM STRATEGY TO IMPLEMENTATION

In our 2019 report, [The business case for resilience](#), we showed how embedding resilience thinking into the investment plans of cities, businesses and public organizations can lead to significant social, economic and competitive benefits, with clear returns on investment. While this remains the case today, COVID-19 has exposed unforeseen deficiencies in our global society and economy, and it has provided ample evidence for why we must quickly address those resilience challenges that we already knew existed.

As we plot our way out of the pandemic, we must do all that we can to close the gap between resilience planning and resilience implementation. Changes will only happen if resilience-enhancing projects and initiatives are completed. The opportunity lies in finding a balance between fulfilling our immediate priorities in the recovery from the pandemic, with the need to prepare for future, uncertain and unpredictable disruptions, stressors and shocks.

Arcadian Voices**CARLO MASSEROLI**
Milan, Italy

Carlo Masseroli is our City Executive for Milan. Northern Italy was ravaged by COVID-19, with hospitals in the region stretched beyond their capacity to treat patients in March of 2020.

“On March 12th, the city was put into a full lockdown. The spread of the virus had gotten so bad and hospitals here were so full that they were literally having to turn away some critically ill patients. I was able to transition to working from home, but it was a big change, because working from home was quite uncommon here. Having in-person contact with co-workers and clients is a central part of the Italian business culture. At the same time, I think we’ve learned a lot about using technology to do our work in new ways that have the potential to make people, businesses, and cities more resilient.”

Despite the major change to his normal way of life, Carlo says there were positive aspects to the lockdown.

“This was definitely a difficult period. It was hard not being able to meet with colleagues or with family and friends. And after so many weeks at home, you really start to miss those personal freedoms, like going out to a café or going on a walk through the park. I tried to focus on the brighter side of things, like being able to spend so much quality time with my wife and our four children. And I saw this throughout the city and country. So many people went out of their way to help others, especially the doctors and nurses, who were risking their lives to treat the sick. I’m very grateful to them.”

Carlo and his family sheltered in place for two months until the lockdown in Milan was lifted at the beginning of May 2020.

Within this overall framework, responsible resilience planning goes far beyond a discussion of probabilities, and provides the opportunity to add value, while also reducing risks.

THE QUALITIES OF RESILIENCE

Resilience is a quality that we should all strive to achieve. The interconnected nature of society means that events in one part of the world can create dramatic, ripple effects that are felt around the globe. We have now seen that our societies and economies are so intertwined and complex, that a small number of infections in one section of a city in China, can start off a chain of events that led to hundreds of thousands of deaths, millions of people becoming infected, and effectively shutting down the global economy, all in a matter of months.

Enhancing resilience therefore begins with identifying critical systems, infrastructure and even workers that are absolutely needed in order for society to function no matter what happens. This could be key supply lines, without which operations would cease, or data centers that house vital business intelligence that drives decision making. From a societal perspective we have learned that these critical pieces include the nurses and doctors working in hospitals, as well as the grocery store and delivery workers and the municipal and utility workers who have kept essential services running during the lockdowns.

Once those critical systems have been identified, it’s imperative that continuous effort is made to ensure that they are robust (strong enough to withstand varied and significant stress and shocks) and adaptable (capable of being modified or changed over time as the circumstances change under which they need to function). Along with this, organizations that want to truly embrace resilience must also be vigilant when it comes to constantly collecting and analyzing data on the performance of their critical systems, infrastructure, and workers, as circumstances change over time. This will allow them to make smart decisions, early on, that can help them avoid costly disruptions to operations or the provision of service to their customers.

Resilience shares these qualities with sustainability, where tackling climate change is as much about adaptable solutions as it is about mitigating the effects of global warming. Within this overall framework, responsible resilience planning goes far beyond a discussion of probabilities, and provides the opportunity to add value, while also reducing risks. And, like sustainability, we must focus on achieving resilience by moving quickly from the strategy phase – determining the best steps to take to enhance resilience – to the implementation phase – delivering projects that actually make a difference and enhance resilience for the future. Throughout, we must avoid the temptation to focus solely on short- to medium-term plans, at the expense of longer-term resilience planning.

RESILIENCE ON THE FRONT LINES

Healthcare

All around the world, the healthcare sector has come under extraordinary pressure during the COVID-19 pandemic. Ensuring undisrupted and safe health services has emerged as a preeminent resilience challenge, and many healthcare systems around the world were underequipped for the magnitude of the crisis. Supply shortages left hospital staff without the tools they needed to treat the sick and to protect themselves from contracting the virus, and the healthcare system also struggled to protect our most vulnerable, with COVID-19 decimating nursing home and long-term care facility populations in nearly every country to which it has spread.

The pharmaceutical and life sciences industry is also facing major challenges from the pandemic. Pharmaceutical companies and other health laboratory facilities have had to simultaneously safeguard their workforces, while working to develop COVID-19 vaccines and treatments at unprecedented speed, with global supply chains disrupted and an over-reliance on just a few geographic locations for critical supplies. The services, suppliers and industries that facilitate our healthcare systems are also under continual pressure to ensure their resilience, not only to deal with pandemics, but for future unexpected or unthinkable events as well.

In the post-pandemic world, new entrants to the healthcare sector will bring an increased focus on the customer experience to the delivery of health services, giving end users more and more choice, while increasing expectations of what healthcare can deliver. Existing healthcare providers will therefore need to find ways to absorb the costs associated with enhancing the way that they currently deliver services.

Arcadian Voices**EDGAR WESTERHOF**
New York City, USA

Edgar Westerhof is our USA Director for Flood Risk & Resilience, working out of our Long Island City office in New York.

"I started following the situation quite closely when things got bad in Italy and Spain. I have friends and family in Europe who were impacted before many people here in New York were feeling affected. Much of the media here was still covering the outbreak as something only happening in other countries. I had no doubt that the situation in New York was about to become ugly too, but I had no idea how bad things would become. New York is one of the hardest hit areas in the world. So far, we've lost more than 30,000 people just in this state."

Edgar found himself at the epicenter of the US outbreak of COVID-19. Travel restrictions, put in place to help stem the spread of the virus, ended up becoming the source of stress for Edgar and his family.

"As the situation started to deteriorate here, I was worried about my wife, who was travelling abroad for work. For a while it was unclear if she would be able to come home. Luckily, that worked out. Later though, I had planned to visit my family in the Netherlands for Easter and also to celebrate my mother's birthday. But I did not travel because as a Dutch national I felt there was a risk that I would not be allowed back into the US. But that was a small sacrifice compared to the people on the front lines of this crisis. It's been amazing to watch how this city has responded. New Yorkers are strong and practical people. They have preserved through 9/11 and the devastation of Hurricane Sandy. I know that we will bounce back stronger from COVID-19 as well."

After a harrowing two months, conditions have been steadily improving for Edgar and his fellow New Yorkers.

**RESILIENCE FOR HEALTHCARE PROVIDERS**

Disaster preparedness and business continuity plans are at the forefront of post-pandemic resilience and a system-thinking approach must be taken to review current processes and critical systems and to strengthen the weakest links. This includes supply chain resilience, which is clearly essential to frontline medical teams that need critical personal protective equipment and machinery including ventilators. It also includes healthcare's physical infrastructure, ensuring workers and patients can safely occupy facilities and spaces no matter what happens. Healthcare facilities need to therefore be adaptable, to respond to changing conditions, and single-use spaces will need to be adapted to become hybrid spaces that can be easily converted to different uses.

RESILIENCE WITHIN THE LIFE SCIENCES AND PHARMACEUTICAL INDUSTRY

Pharmaceutical companies and their supply chains are immersed in the COVID-19 crisis, but resilience is coming from the way in which pharmaceutical companies are collaborating in new ways to find a coronavirus vaccine and treatments. This new way of working – strengthening bonds between pharmaceutical companies, research institutions, governments and the healthcare sector – will help the industry to be better prepared to confront other infectious disease outbreaks or health crises that will require a coordinated global response. Supply chains in the global pharmaceutical industry will need to be redesigned to be fit-for-purpose – including examining the need for reshoring and nearshoring of supplies for important treatments and therapies. Ultimately, organizations will need to find the right trade-off between the obvious advantages of global trade and the increased security of sourcing critical supplies closer to home.

RESILIENCE AS A COMPETITIVE ADVANTAGE

Business

For businesses that had only recently overcome the global financial crisis of 2008, planning for business continuity and competitive advantage in a post-pandemic world is a new and ongoing challenge. The long-term economic impact of the coronavirus is still unclear, but there is no doubt that we have entered a prolonged period of change. Many of the regulatory checks and balances introduced following the global recession of 2008 have helped keep the international banking system intact, but, to a large degree, the resilience of the global economy will depend upon the actions of the global financial powerhouses, including the US Federal Reserve, the European Central Bank and the Chinese State.

Globalization is also at risk. Political pressure in many countries around the world may lead to more nationalist policies, threatening the many ways in which the global economy currently functions. While there will undoubtedly be some efforts to nearshore and subsidize certain supply lines that are essential for medical tests and vaccine production, a widespread wave of protectionism would make the global economy less resilient and could, at least in the short-term, lead to an extended period of economic distress.

Everyone around the world is in this together. Rather than responding to the economic challenges by retrenching and looking inward, it's our belief that organizations that continue looking for collaboration beyond their borders will benefit the most.

Arcadian Voices**HELOISA CAPRIOLI**
São Paulo, Brazil

Heloisa Caprioli is a Corporate Communications Coordinator working out of our office in São Paulo, Brazil.

“I was on vacation in Japan when I realized the number of COVID-19 infections in Brazil was growing rapidly and that companies there were starting to have their employees work from home. When airlines started cancelling flights, I made the decision to cut my holiday short by a week to ensure that I would make it home safely. With the flights full of people wearing masks and other protective equipment, the 30-hour journey back home was surreal. It was like a scene from a science-fiction movie. When I got back to Brazil, I began working from home. I was already doing this twice a week before the pandemic so I could easily adjust to this new situation. In fact, there have been benefits to this new way of working. With my commute to work now gone, I started sleeping better and I think I am more productive at work.”

The lockdown began in Brazil weeks after most people in Europe and the United States were sheltering in place. Heloisa was not fully prepared for the effects of isolation.

“I really miss meeting with my family, friends, and co-workers, getting together for a barbecue, a drink, or a birthday party. I realized that even simply having a chat with someone at the coffee machine at work is something that enriches my life. I took that for granted before the pandemic. The COVID-19 outbreak is also quite bad here in Brazil. I have close family members and friends who got infected and the fear of potentially losing them is an emotional strain. Sometimes it’s been tough to maintain my mental health and my social relationships, but I have learned that I am more resilient than I thought. I have also learned that even though the world is very big, when it comes to health and safety, a crisis like this makes it very small.”

For the time being, Heloisa will continue working from home as the public health crisis in Brazil continues to unfold.

A CULTURE OF RESILIENCE

For organizations, one of the ways out of the crisis is to embrace resilience thinking as an essential part of business strategies going forward, right at the heart of business continuity planning and commercial business plans. Resilience is a core competency in all successful businesses and is crucial to achieving and maintaining competitive advantage.

The systemic weakness in supply chains following the 2008 global financial crisis – where price efficiency became the primary selection criteria for many businesses, with a focus on driving down prices – needs to be addressed. Resilience will come from forging deeper and more collaborative relationships, and greater transparency between organizations across the supply chain. Corporate cultures will need to be reshaped in order to encourage an environment of collaboration and trust, both within organizations and throughout supply chains.

BUSINESS-CENTRIC RESILIENCE

One of the most crucial activities is to revisit business continuity plans and understand the critical parts of the business – the people, the processes, the supply chains – that are essential for continued business operation. This needs to be a rigorous assessment, that leads to a prioritized action plan with the aim that these critical elements are made as robust and adaptable as possible. Embedding resiliency throughout all business activities will also enable companies to remain alert to the impacts of market changes, allowing them to respond in a way that leads the market and creates competitive advantage.

**THE COMMERCIAL SECTOR CAN LEAD THE WAY**

Businesses and investors in the commercial real estate sector must place people at the heart of their resilience planning. By understanding how end users are likely to want to live and work in building assets, assets and facilities can be adapted, repurposed or re-designed, and plans put in place to become more resilient in the face of changing market needs. Digital tools will help in creating those plans and will allow them to be modified over time through constantly monitoring and analyzing the changing conditions. This increased knowledge of trends within the market will allow greater commercial and operational flexibility, bringing increased competitiveness. Sustainability must also be placed at the heart of post-pandemic planning, driven by the demands of both investors and occupiers. Ultimately, embracing these measures will help create competitive advantage and help create value in the new marketplace.

RESILIENCE IS MISSION CRITICAL

Utilities

The utilities sector has been hit hard by the COVID-19 pandemic and utilities have been rushing to safeguard their workforce while also ensuring the delivery of critical resources to the public like water, electricity, public transportation, and broadband connectivity. The sector is also in a critical and challenging position, as the services they provide form the foundation of civil society, alongside other critical infrastructure, and underpin the increasingly interconnected nature of society – a system of systems.

The impact that utility companies have goes well beyond the services they provide to clients. Like every member of society, utility companies have a responsibility to help foster a truly resilient world, which is about the creation of inclusive, well-educated, healthy and well-informed communities as much as it is about hardening assets or building redundancies into systems against shocks. The pandemic has helped clarify the need to move beyond framing resilience solely within the context of risk management and integrate a more mission-centric approach.

A mission-centric approach begins by characterizing the mission of the facility, organization, or other scale of interest and characterizing the essential functions, systems, assets, and internal and external interdependencies required to accomplish that mission. These systems can then be assessed against key metrics for resilience, root causes for gaps explored, and solutions developed that strengthen the organization's capacity to meet its mission, reducing susceptibility to the range of risks it faces in the process. A risk-based approach still has its place, but the mission-centric approach can help prioritize focus, illuminate blind spots, and build resilience against unexpected hazards in ways that might not be anticipated or even intended.

Arcadian Voices**RUPERT LEUNG**

Hong Kong



Rupert Leung is our Executive Director, Head of Engineering Solutions in Asia, working out of our office in Hong Kong.

“From early February, the border between Hong Kong and mainland China was closed. Schools were not resumed after the Chinese New Year holidays, effectively being closed since 23 January. As COVID-19 progressively spread to other countries, more testing and mandatory quarantine measures for people entering Hong Kong were imposed. The government also put in place a comprehensive tracing regime, which allowed them to track down and quarantine anyone who had come in contact with someone who had tested positive for the virus. There were also very strict social distancing measures (limiting the number of people at the same table in a restaurant, limiting of number of people assembling in public areas). This worked well and as a result we did not have to have a full lockdown.”

By most measures, Hong Kong stands out as a place that demonstrated a high level of resilience to the COVID-19 outbreak.

“We were lucky to be in Hong Kong because the situation has been managed quite well both by the authorities and by the people in general. This is because of their experience with the SARS virus in 2003. The most difficult part was wearing a mask at all times in public spaces because it is not always easy to breathe with one on. But we know that being vigilant about wearing masks and the social distancing rules is what has kept the situation under control here. It is also a sign of respect to your fellow citizens. Workwise there was not much change except less traffic when going to work, as there is no school and some people work from home. We did have a lot less contact with friends and relatives, which was hard at times. Also, my younger son was not in school and my older son had to return home early from his studies in the UK.”

Even though Hong Kong was able to cope well with the outbreak, Rupert says that authorities and citizens there are learning lessons from this pandemic that will help them become even better prepared for future crises.

**UTILITIES CAN LEAD THE WAY**

Although they are likely to be the last recipients of stimulus funding to kick-start regional economies, utilities have a significant opportunity to help close the gap between resilience planning and resilience implementation. Digitalization will need to be accelerated, building upon the advances made within the first few months of the pandemic which saw remote working and the increasing use of digital tools to safeguard their primary mission – ensuring uninterrupted service under all conditions – while keeping their workforce safe. Utilities will need to continually assess business continuity and disaster preparedness plans to ensure the continued protection of critical systems and assets, including their greatest asset – their people. In the pandemic recovery phase – despite the fall in revenues and energy prices – there is an opportunity for utilities to refocus investments towards projects and initiatives that will lead to greater resilience in the future, embedding resilience into every aspect of the business in the same way that regulatory codes and environmental standards are embedded.

Utilities will need to continually assess business continuity and disaster preparedness plans to ensure the continued protection of critical systems and assets, including their greatest asset – their people.

It is crucial to place resilience at the heart of a utility organization’s mission and embed this throughout all business planning. By developing a true understanding of all of the systems, functions, metrics, and interdependencies required to accomplish that mission, resilience will be enhanced in ways that might not be anticipated, or even intended. The human elements of organizational systems must also be addressed, as resilience comes from knowing where critical knowledge resides within the workforce or the supply chain and using digital tools to make sure that this knowledge is captured or accessible at all times.

RETHINKING URBAN RESILIENCE

Cities

Cities are vital to our resilience. Well over 50% of the world's population live there, and they are the engines driving much of the world's economy, accounting for over 80% of global GDP. Most city administrators have spent considerable time and effort enhancing their resilience against a whole host of threats and risks, particularly relating to climate change, extreme weather events and rising sea levels. But until now, the potentially devastating impact of a pandemic had not played a large role in collective thinking about planning, designing, building, and operating urban spaces.

It's now become clear that cities are only as resilient as their most vulnerable citizens, who are just as important as infrastructure, institutions, or governance structures. Planning for urban resilience in a post-pandemic world must include a major focus on improving the resilience of people and the communities in which they live.

Tackling inequality, promoting inclusivity, diversity, and helping the most vulnerable in society will benefit everyone and should be a central part of any resilient recovery strategy. Those vulnerable parts would otherwise impact the entire system.

Arcadian Voices**JEROEN RIJSDIJK**

Amsterdam,
The Netherlands



Jeroen Rijdsdijk is a Principal Consultant in Urban Water Management & Climate Adaptation, working out of our Arcadis Netherlands office in Amsterdam.

“I started working from home in mid-March and I am fortunate to be able to use digital technology to do much of my work. My wife and I both worked from home and we took up cycling twice a day for exercise and to add a bit of a routine to our lives. I saw it as traveling to and from work, even though we were just cycling away from home and then back. The main downside was the lack of spontaneous encounters with colleagues and less structured ways of sharing ideas. There was a lot more planning that went into interactions with colleagues. Also internationally, because my team and I often work with Arcadians in China, the Middle East, Spain or other parts of the world, so I think we were able to adjust to the situation quite smoothly. In the international interactions we were also dealing with the different COVID-19 stages and local restrictions in the different countries.”

Though Jeroen and his team were used to communicating through digital means, this was not the case for all of their clients.

“The challenge was to quickly adopt different ways of communicating and collaborating with colleagues and clients. Many of our clients are municipal authorities and some of them were not as accustomed to working digitally as we are at Arcadis. It took some time to establish good, digital communication with some of our clients, but this has all worked out quite well. We have even been able to continue doing complex climate risk dialogue sessions with large groups of external stakeholders. In fact, the Dutch Delta Commission is holding us up as an example of best practice in adapting to the new reality and pressing ahead with the national climate adaptation plan.”

Fortunately, Jeroen’s work and home lives were not significantly disrupted by the lockdown.

**RESILIENT COMMUNITIES**

The crucial role of societal resilience in the COVID-19 recovery is a call to action to place community resilience at the center of urban resilience. In urban design and development, collaborative relationships between all the stakeholders in the community should lead to a participatory approach where communities can actively express their desires, wishes and functionalities needed for their resilient recovery. The business case is clear. There are also a number of frameworks and digital tools that can be used to help understand the full range of economic and social benefits of investing in resilience over the short, medium, and long-term.

ROBUST AND ADAPTABLE URBAN PLANNING

Cities need to embed the principle of creating robust and adaptable urban spaces and public infrastructure, so these places will be functional even during severe shocks. Creating more green spaces provides health benefits to residents but also improves air quality in cities, reduces the impact of noise pollution and helps to combat urban heat island effects. Green spaces also make cities more resilient to flooding by minimizing water run-off and serving as locations for urban water storage and increased biodiversity.

RETHINKING BUSINESS DISTRICTS

The pandemic has also raised questions about how city centers are organized and how they are valued. For example, organizations will be rethinking their use of expensive, city center office space as new working patterns – with more remote working – emerge in the pandemic recovery phase. This crisis has also demonstrated the importance of having affordable housing within city centers, so that critical workers like nurses, bus drivers, and sanitation workers can live closer to where they work. This may mean that there is an opportunity to transfer office space into the public housing realm, creating more mixed use of space and buildings, improving livability.

Arcadian Voices**PETER HOGG**

London, UK



Peter Hogg is our UK Cities Director and City Director for London.

“Things really started to change in early March, and by the 16th, I was already working from home fulltime. I very quickly had to pivot my working life from one that had hinged around personal engagement and face-to-face time with clients and stakeholders, to one based in a virtual environment. My wife and I also have two school-aged children, who also had to shift to homeschooling. It was a big adjustment for us all, especially in the early days when there was a lot of uncertainty about public safety. Food and household supplies also became a bit of a worry because of panic buying. On top of that, I had concerns about the health and safety of extended family members, who we were no longer able to visit and check up on. All in all, though, we were able to adjust to the new reality quite quickly.”

Although COVID-19 has taken a major toll on the UK, Peter believes that some measure of good will come from the crisis.

“We have learned that our business and large tracts of society are highly adaptable and that this is one of the most important characteristics we need to promote. I think we all need to develop a mindset that these sorts of events can and will happen. It is impossible to perfectly plan a response to the next crisis on the basis of the learnings from the last one, but what is crucial is that society becomes more flexible, adaptable, and resourceful. If we can accomplish that together then I hope we’ll look back at this pandemic as not just something that cost us lives and livelihoods, but also as a catalyst for improving our preparedness for the future.”

ENHANCING MICRO-MOBILITY

The resilience and sustainability of urban environments will be hampered if the pandemic leads to a shift away from public modes of mass transportation back to private vehicles, which have been hailed as the safest way to travel in a pandemic. Reducing future commuter traffic would benefit the overall resilience of cities in numerous ways: improving air quality, reducing traffic accidents and required parking space, potentially freeing up space for affordable housing or green spaces. The increased demand for pedestrian spaces and bicycle infrastructure – including e-bikes – must be fulfilled, and blue-green corridors that combine bike lanes with green spaces, pedestrian zones and green water infrastructure will have the potential to revitalize urban spaces. Infrastructure to support an increase in smaller electric vehicles should be prioritized, along with other individual transportation systems, like funiculars and maybe even moving sidewalks.

The construction industry will also need to improve its own resilience, by increasing productivity and efficiency, embracing the sustainable use of materials and reducing resource consumption, reducing carbon footprints, and designing using cradle to cradle principles.

**REMEMBER SUSTAINABILITY**

Sustainability principles must not be forgotten in the post-pandemic world. Those urban spaces and cities that do thrive will need to be better prepared for a future pandemic but also for climate change impacts, which requires not only an adaptable approach, but mitigation measures too. There should be a renewed focus on new buildings but also retrofitting older buildings with sustainability features such as green façades, energy-efficient power systems and monitoring and evaluation systems which help critical systems to adapt to changing circumstances and to operate more efficiently. The construction industry will also need to improve its own resilience, by increasing productivity and efficiency, embracing the sustainable use of materials and reducing resource consumption, reducing carbon footprints, and designing using cradle to cradle principles. It should also accelerate the adoption of digital tools, prefabrication, and off-site construction techniques.

FRAMING THE RESILIENCE DISCUSSION

In our work with private and public sector clients around the world, we focus on the following five principles for enhancing resilience:



PEOPLE

Societies, cities, communities, and organizations are only as resilient as their people. After the pandemic, we must focus on improving the health and wellbeing of the most vulnerable, and enhance the resilience of wherever they live, work or play.



DESIGN

Resilience can be enhanced by embracing new resilience-conscious ways of designing and retrofitting buildings, facilities, and urban spaces in a post-pandemic world.



PLANNING

Resilience thinking must be placed at the heart of business continuity planning. Collaboration must also be embraced, between communities, organizations, industry sectors and supply chains.



DIGITAL

Digital tools and platforms are essential for gathering and analyzing data which can inform smart decisions that can ensure business continuity and lead to competitive advantage.



SUSTAINABILITY

Resilience and sustainability go hand-in-hand. By implementing projects that improve sustainability performance, reducing resource consumption and protecting the environment, organizations enhance long-term resilience.



It's all about the people.

In the post-pandemic 'new normal', greater resilience will come from prioritizing the health and wellbeing of communities, workforces and workplaces, including strengthening public healthcare systems, improving affordable access to utilities and developing policies that promote and incentivize health. At a city level, this means public health education, safe public transport, air quality improvements and more urban green spaces to help the most vulnerable in society. At an organizational level, this includes healthy work environments (good ventilation and comfort, flexible workstations), and policies that promoting a healthier work-life balance.



People

Organizations must dramatically improve their understanding of the human element in all aspects of their business.

For example, those operating in the commercial real-estate world will need to understand how people will actually use their building assets in the post-pandemic world in order to make investments that lead to competitive advantage. This means understanding asset classes of the future and imbuing existing assets with the qualities that will make them appealing and in high demand in the future.

Collaboration is crucial.

Strengthen collaborative relationships with all of the key stakeholders within communities that can work together to achieve resilience – health services, critical civil infrastructure, public services, governance, including at street or neighborhood level. This is crucial across all business sectors too. Already, the pharmaceutical and life sciences sector have dramatically increased cooperation and collaboration to never-before-seen levels in the quest to develop a cure or a vaccine for COVID-19. This push for collaboration must also be embraced within supply chains across the world. Collaboration – particularly around risk and problem solving on contracts or in supply chains – will result in greater levels of business resilience, along with a higher standard of care and higher degrees of safety and quality.

Corporate cultures should be revisited, emphasizing greater trust, openness, and transparency throughout all operations.

Trust between management and employees is the key to cultivating a truly adaptable workforce, which is particularly important during crises. It also means you are more likely to receive important feedback on what works, what doesn't, and then plan for how to increase resilience based on using the collective intelligence of the workforce.

It's also critical to re-introduce mission and purpose into corporate cultures.

By moving beyond a risk-based approach to a mission-based approach – “what do we want to be and what's stopping us from getting there?” – fundamental questions can be asked about how an organization works, opening the door to change.





Embrace new ways of designing – and retrofitting – buildings, facilities, and city spaces to enhance resilience, and counter the possibility of future outbreaks.

This means using design to enable new ways of working or building a framework to be able to adapt quickly to the emergent needs in an outbreak. Healthcare providers should design adaptability into their facilities, creating flexible spaces that can host patients and health professionals safely, provide flexible patient pathways, and enable surge capacity in times of crisis. For commercial building owners and operators, building systems and controls will need to be reassessed, along with comprehensive space-planning. Developers will also need to ‘build back better’, embracing sustainable design, lower resource consumption, and the creation of adaptable spaces that can be transformed and adapted into different uses.



Design

Design is also crucial to transforming the built environment to match the future demands of the marketplace.

City spaces will need to be rethought, with more green and blue spaces to bolster community resilience. Parks and waterways will improve biodiversity, water storage and run-off, reduce acoustic impacts, improve air quality, and mitigate urban heat island effects. They also help communities to be more adaptable and mentally resilient, by providing essential outdoor space. Commercial building portfolios will need to be repurposed and adapted to fit the emerging ‘new normal’, which may mean more mixed-use and adaptable and sustainable buildings. Commercial resilience will come from owning and developing assets that lend themselves to being easily transformed into different asset classes, which will unlock sustainable value.

Pre-fabrication or off-site construction can help increase productivity and adaptability, and also promote more flexibility in space use, off-site modular construction, more efficient use of natural resources and better design to enable post-pandemic workplace trends.

Life sciences organizations should also take the opportunity to upgrade or repurpose the most appropriate facilities to enhance production capacity, including the use of modular facilities and autonomous shells for greater adaptability.



Look for ways to create more diverse, greener, smarter, and more livable communities.

Urban transport systems and smart mobility will help enhance resilience and sustainability, with a greater emphasis on micro-mobility. Smart tools will guide car use, bicycle pathways and public transport systems, ensuring that public transport usage is optimally distributed for the individual and the collective. Public health benefits can be unlocked by encouraging modal shifts in transport – providing pedestrians and cyclists with more space, creating a new style of public transport.



Be prepared for the unknown and the unexpected.

It's crucial to improve resilience after each crisis event but relying solely on risk assessment means 'known risks' tend to be looked for and mitigated against. The next disaster may well be very different. As a result, make your planning processes iterative. Utility companies, for example, need to take a holistic and adaptable approach to resilience planning in a world where crises are more common and can occur simultaneously or in rapid succession. Static plans will no longer work; the rapidly changing technology landscape and operational context means that planning needs to become an iterative process.



Planning

Develop resilience strategies in the planning phase and then move quickly to the implementation phase.

Don't get caught in the strategic phase, as it is only through the delivery of projects that resilience will be enhanced. After a crisis there is usually a short period of time where there is an opportunity to focus on making critical systems more robust and adaptable, which means working with organizations that also know how to implement the resulting strategy – architectural and engineering design, master-planning, business planning, program management, access to public and private finance.

Build proactive, comprehensive, and inclusive stakeholder engagement plans.

This will increase transparency and ensure that business continuity and disaster recovery plans aren't rendered ineffective because of a lack of critical supplies, or because organizations weren't aware of all of their upstream and downstream vulnerabilities. This requires engagement through multiple tiers of supply chains but will increase the resilience of most industry sectors.

Learn from the unprecedented levels of collaboration within the life sciences sector.

The trust comes from their joint quest for a vaccine and it should be encouraged to continue after the pandemic. Collaboration has existed before, but not on such a large scale. Maintaining these relationships after the pandemic will make the sector more robust and more capable of adapting to the next global health crisis.

Embrace environmental and social governance reporting into long-term plans, reflecting the greater pressure for transparency that will come from investors and building occupiers.

Increasingly, institutional investors are requiring their investments to be made in demonstrably carbon neutral projects, or in assets which can be turned around to become environmentally sound.



Digitalization – spurred on by COVID-19 – needs to be accelerated.

This will allow communities, business organizations and city administrators to fully capture the benefits of data, support wider community participation and enable new business models. Artificial intelligence and advanced data analytics offer pharmaceuticals the opportunity to develop treatments and medicines significantly quicker than before, enhancing their own commercial resilience, but also the resilience of the expanded range of patients they can treat.



Digital

Telemedicine

Has the significant benefit of reducing patient consultation time, but also frees up considerable resources and could drive down demand on hospital facilities, including reducing the number of hospital beds in-use, providing more adaptability in the provision of healthcare. Learning from data can also make a city more resilient, and cities should broaden the scope of their consultation on digital initiatives to include citizens too. Smart utilities will continuously learn and adapt by using data from wastewater and data from mobility to feed into a continuous learning cycle.

Be transparent with the data that your smart infrastructure collects, as data will significantly inform resilience plans.

Digitalization of physical infrastructure – smart, interconnected infrastructure – is transformative for urban resilience. Owners and operators of significant public infrastructure should harness digital tools to make their asset management – in operation and maintenance – more robust and adaptable to future unknown or unexpected events.

Within the buildings sector, digital twins are beginning to gain significant ground.

By using BIM and its associated technologies, a true picture of the relationship that buildings have with the environment can be generated, both in terms of how the building impacts the environment, and how it responds to changing environmental conditions.

Reclassify broadband internet as a critical utility.

Internet services underpin so many aspects of resilience within cities that broadband internet services should be repositioned as a critical service, offered universally. Digitalization can enable significant shifts in how cities function (remote working changing commuter patterns and workspace utilizations, reducing environmental impact, and expanding business districts into mixed use communities).

Invest in data security too.

Digital infrastructure is also a resilience threat. Failures in technologies and processes, cyber-attacks and power outages can lead to system vulnerabilities. There are well-trodden paths to ensure digital resilience which should be taken.

Collaborate with large and small technology companies to create new tools, new ways of working and to deliver services to end users.

Already, some of the world's biggest technology players are providing COVID-19 screening tools or contact tracing infrastructure to help public health agencies contain the spread of the virus. By exploring new ways of providing individual and tailored technology services in healthcare, the overall resilience of the sector will be enhanced.



Sustainability

Avoid focusing solely on economic recovery and resilience at the expense of sustainability

Accelerate the transition to using cleaner renewable energy, which have wider societal impacts on health and air quality. For example, utilities can enhance business resilience by proactively investing in the renewal of high- and mid-voltage electricity grids, in hydrogen instead of natural gas, in district heating initiatives, and in carbon capture and storage. Also use the acceleration of post-pandemic building activities (repurposing existing assets, transforming commercial business districts) to embrace sustainable goals, including construction techniques.

Embrace nature-based solutions that will make cities more resilient, as they are more robust and less vulnerable

For example, cities like Rotterdam and New York combine flood protection measures with other urban functions such as parking, transport, recreation, and tourism, as well as natural functions such as ecosystem-based functions.

Focus on your own energy independence

This includes reducing reliance on the energy grid and making use of on-site renewable energy generation to help with the resilience of critical assets, such as water pumps and air-flow units. Surplus power can also be sold back into the grid, generating revenue.

Financial resilience must remain a key focus

Including reviews of existing systems to ensure their continued relevance or whether ongoing costs and the level of operational and management intervention needed are sustainable.

Resist the temptation to focus solely on the short-term challenges

Related to lower energy consumption, falling revenues and the immediate need to re-prioritize capital expenditure projects. By focusing on the goal of resilience and by accelerating the transition to cleaner forms of energy, utilities will enhance the robustness and adaptability of themselves, and the communities they serve.

Embrace carbon reduction strategies throughout all operations and supply chains

When redesigning supply chains, greater effort is needed to source more sustainable supplies and services, as environmental impacts and carbon emissions can be greatly reduced across the board. It's essential to invest time and resource in developing a thorough knowledge of the risks, vulnerabilities and opportunities within total supply chains, not just the immediate supply chains for your own business.

Invest in skills to ensure workforce resilience and the sustainable growth of industry

By ensuring that workforces are able to keep and grow their skills, post-pandemic resilience will be easier, and will contribute greatly to the productivity of the industry.

Lead the market by investing in sustainable communities, not just sustainable assets

The major global investment funds will move towards this, in large part because the climate change agenda will drive it. Resilience planning involves understanding where the market is moving towards and plotting how to get there. Integrate Environmental, Social and Governance reporting throughout to give tenants and investors greater transparency.

WINDOW OF OPPORTUNITY FOR CHANGE

Conclusion

It is imperative that we embrace resilience thinking while we are working to recover from the pandemic. At Arcadis, our experience shows that there is usually a short window of opportunity following shock events – floods, hurricanes, superstorms, terrorist attacks – within which greater steps can be taken towards increasing resilience. This is typically the timeframe within which client focus is aligned with a supportive regulatory or business environment, typically with increased access to funding, which can help them move more quickly from strategy to implementation. Organizations need to harness all their mental energy and resources, embrace entrepreneurship, and push for significant government action to enhance the resilience of all of those critical systems that are essential for survival.

Arcadian Voices**JUVYJEL DICHOSO VILLANUEVA**

Manila, Philippines



Juvyjel Dichoso Villanueva is a Senior Graphic Designer and Team Lead in our Global Marketing Communications team. She works out of our office in Makati, in the Philippines.

“Our lives changed here completely in a less than a week. The government placed all of Luzon island under enhanced community quarantine. In Metro Manila, all business operations were shut down and people’s ability to move around the city was very restricted. There was also a heavy military presence on the streets, with local police and soldiers setting up checkpoints between different territories. I live in Pasig City, which is close to a municipal border. Our closest grocery store, pharmacy and bank are just on the other side of the border. So, going to run errands went from a simple thing to something that required a lot of planning and precautions.”

Juvyjel and her family have remained healthy and safe, so far, during not only the pandemic but also Typhoon Vongfong (Ambo) which killed at least 5 people and caused more than \$30 million dollars (USD) in damage to the country.

“I believe that our government should do more work to help us prepare for risks and their potential impact on our lives. We have natural disasters here frequently, like the typhoon that hit us at the same time we have been dealing with COVID-19. It seems like we keep surviving disasters and then only look at what happened, instead of getting ourselves ready for what can happen in the future. I think that early detection of problems and becoming a more sustainable society will help weaken the blow of disasters. And I also believe we need to do better when it comes to using digital technology to its full advantage, to not only keep us connected but also to become a stronger society.”

**RESILIENCE MAKES ECONOMIC SENSE**

The pandemic will have removed some of the barriers that stood in the way of decisions to invest in resilience in the past, as it is now quite clear what can happen if we continue to put off this work. Because we don’t fully understand the risks we face or the scope of their potential impact, it makes sense to invest in the robustness and adaptability of the aspects of our organizations, society and lives that we need to function well at all times. The alternative is running the risk of catastrophe, in a world in which potentially catastrophic shocks are likely to occur with increasing frequency.

A sustained focus is now needed on eliminating the gap between resilience planning and resilience implementation, using a clear value framework that can demonstrate the true value of embracing resilience. When we looked at urban resilience, [The business case for resilience](#), we showed how important it was for as many relevant stakeholders as possible to work together to explore the opportunities that create return on investment. There is a clear need to do the same in response to the COVID-19 pandemic.

Organizations should now have the confidence to invest in the resilience of their people, their assets, their important operational systems, and their communities. It is time to move away from the notion that returns on investments in resilience are only obtained when and if a shock occurs, to a new state where we understand that resilience is an inherently valuable goal to pursue.

A sustained focus is now needed on eliminating the gap between resilience planning and resilience implementation, using a clear value framework that can demonstrate the true value of embracing resilience.

This report was developed based on insights and contributions from the following Arcadians:

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Arcadis is the leading global Design & Consultancy firm for natural and built assets. Applying our deep market sector insights and collective design, consultancy, engineering, project and management services we work in partnership with our clients to deliver exceptional and sustainable outcomes throughout the lifecycle of their natural and built assets. We are 27,000 people, active in over 70 countries that generate €3.3 billion in revenues. We support UN-Habitat with knowledge and expertise to improve the quality of life in rapidly growing cities around the world.

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