A close-up, profile view of a woman with dark, curly hair wearing a white surgical-style face mask. She is looking towards the right. The background is a blurred outdoor scene with a white car and buildings under a bright sky.

RESILIENCE TO RECOVERY:
Five Drivers Shaping
Our New World



The events of 2020 and the COVID-19 pandemic have completely transformed how we live, work, interact and move from place to place. In cities from Hong Kong to London to Chicago, some of these changes will shape our world for decades to come. As Arcadis researchers, engineers and problem-solvers, we were compelled to explore these changes—from the micro to the macro—and brainstorm how we can help cities, city-dwellers, municipal leaders and corporations prepare and adapt for the long term.

We focused on five dimensions of urban life: Mobility and Transit, Workplace, City Vitality, Healthcare and Education, and Utilities and Digital Infrastructure. We identified a key change in each of these categories and harvested feedback from 180 industry professionals in Hong Kong, Singapore, Sydney, New York, Chicago, San Francisco, London and Paris. We asked for their perspectives and quantified their opinions about the character and longevity of these global changes.

Taken collectively, the responses provide insight that build a narrative about how 2020 has altered life in some of the world's greatest cities—a type of “butterfly effect” that is certain to lead to additional, unforeseen shifts down the road. To state the obvious: The impact has been considerable and will likely be percolating in our lives for some time to come.

And yet, as of this writing, the pandemic is still with us (though a vaccine has just emerged). We can't pretend that we can gauge the full scope and breadth of these changes when we are all in the thick of it. What will life look like when this is all over? Is this the beginning of a tectonic shift in how we live our lives? And what will we need to do to keep our communities safe, thriving and healthy?

While these questions are easy to debate, what we cannot dispute is that the pandemic has brought into sharp focus the need for a new, broader type of thinking: For bold ideas and innovative, resilient solutions that address not only today's pressing issues but those we have yet to imagine.

This report is a first step in that process.

Methodology

Arcadis surveyed 180 leaders from eight urban centers:



While each has its own unique cultural and economic fingerprint, these cities were selected because of their size as well as their economic and cultural heft. They are also cities in which Arcadis has a solid presence, which gave us access to key professionals focused on salient issues. We concentrated on five dimensions of urban living:



Mobility and Transit



Workplace



City Vitality



Healthcare and Education



Utilities and Digital Infrastructure

4 RESILIENCE TO RECOVERY



We asked respondents how their cities dealt with the pandemic within each dimension. Then we asked about an identified key issue or trend, as well as the local longevity of that trend. In the big picture, the data reveal how cities have coped with the events of 2020. Our results also show how Arcadis can support future changes so that cities can not only prepare for a future crisis, but also how they can make everyday life more sustainable and enjoyable for people in cities everywhere.

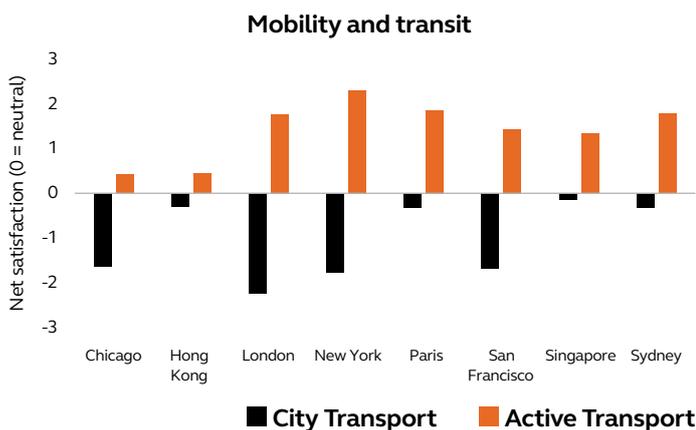
As we suggested above, this report is just a start—in many places around the world, we remain neck-deep in the pandemic and many healthcare systems are still operating at (or beyond) capacity. We know this. But we also believe that this report lays down a benchmark that we intend to revisit over the course of the next year. Already we can see new paths and emerging trends that merit deeper exploration and study.

John Batten
Global Cities Director



Mobility and Transit

In dense, urban environments, mobility and commuting touch almost everyone. COVID-19 turned that journey upside-down. Suddenly, commuting became a real health risk or, because of so many working from home, disappeared altogether. Ridership was decimated in many urban areas. By early Spring 2020, according to the transportation-data company Transit, bus and subway ridership in the United States was down 74 percent in New York; and 87 percent in the Bay Area from pre-pandemic levels.



We asked our experts how the pandemic affected the performance and sustainability of their local transport systems. Then we asked about our assumption that active transport (walking and cycling, for example) has increased significantly and whether the change would continue once a coronavirus vaccine is widely available.

Our findings showed that, generally, cities with well-funded transport systems were perceived to have performed better during the pandemic. And, with the exception of Chicago, the cities that had transport systems that struggled the most with the pandemic also were perceived to have significant increases in the amount of active travel. New York, in particular, with the well-documented financial woes of its subway system (Source: The Economist)

saw both a significant perceived increase in active transport in our survey, and our New York respondents were the most likely to say this would be a long-term or even permanent change.

Most cities expect to see their mass transit systems bounce back once a vaccine is widely available. However, respondents in the United States and, to a lesser extent in London, are markedly more pessimistic. This highlights a perception that the financial damage suffered by city transport systems will be longer lasting, which will require an even more agile response to the recovery from operators in those cities.

Although the cities we surveyed are all quite different in terms of population, transit systems, culture and geography, responses from Hong Kong and Singapore indicated that the relatively small uptick in active transport would be short-lived in their cities. Conversely, 70% of respondents in London and Paris believe active transport will have a long-term or permanent role. Historically, neither of these cities has had the same reputation for active transport as other European cities like Amsterdam and Copenhagen, and this shift may create an opportunity to develop a more robust cycling culture in London and Paris.



“In Chicago, people who have worked from home during the pandemic have grown accustomed to not having to commute anymore on crowded trains and buses through rain and snow. I don’t think we will want to face those commutes again any time soon.” -Chicago

Survey Says?

This is what a handful of our respondents had to say about mobility and transport in their cities.



“Increase the amount of active infrastructure (walking and cycling) that is also safe for the users. Increase the amount of outdoor public space while also making it available all year round, which would necessitate the development of amenities or technology (low or high tech) to make it comfortable for people to be outside.” -New York

“London is made up of small scale ‘town centres’ on the periphery of the main city centre and many are already feeling the benefits of not having to commute on crowded transport systems.” -London

“Making leisure and services accessible within 15 minutes of home feels relatively achievable, as long as walking, cycling and public transport are supported as viable travel options. The use of remote working as an alternative to the commute is the further game changer.” -London

Our Experts Respond

Time and convenience have always been key drivers of mobility effectiveness, but we can now add health to our list. Just as security changed the nature of air travel after the 9/11 attacks, ensuring the health and well-being of passengers will be an essential factor for transit systems now and into the future.

We also expect to see more Mobility as a Service (MaaS) solutions, relying on digital technology to integrate various forms of transport into a single, accessible, on-demand experience. Survey findings suggest that active transit—a means of getting around that is powered by human energy, like biking or walking—will be a growing part of this. The use of active transit grew rapidly during the pandemic, and we expect to see cities redouble their efforts to balance their transportation systems through cost-effective investments into active transport, something that has been shown to result in healthier places and healthier citizens.

In cities like London and New York, the public transit systems are more economically dependent on ridership. Given the financial threat to these operators, recovery solutions will require asset management that keeps costs lean while ensuring safe operation, as well as decision optimization tools to help prioritize future investment. At the same time, some of these cities, including London, are allocating additional funding for active transport, even as investment in mass transit is constrained. This is an opportunity to improve health and well-being while investing in a worthwhile transit option, but it does add complexity to an already complicated transit planning process.

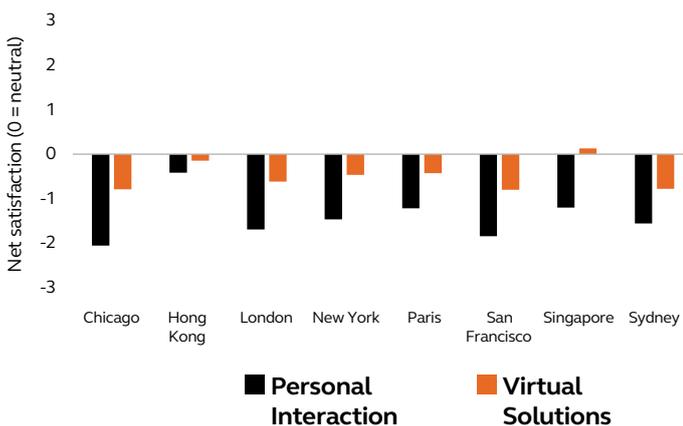


Workplace

Even before the pandemic, some 70% of global business professionals worked from home at least one day a week (Source: CNBC). It's safe to say that daily remote working has gone from the exception to the norm since COVID-19 hit, and this shift has sent ripples through business communities around the world. While the move toward virtual offices and social connections have challenged traditional thinking, it has also shown that the nature of business—not to mention the character and contour of the workplace—is becoming more mobile, agile and flexible.

If we carry this thinking into our social and civic lives, we see a deeper impact. We asked our respondents if COVID-19 has changed the quality of person-to-person interaction, and received the expected response—of course it has. And not for the better.

Workplace



After nearly one year of living with various levels of lockdowns, stay-at-home orders, and sharing holidays and major life events via teleconference, many respondents seem to have reached an emotional breaking point—this issue yielded some of the most consistently negative scores in our survey.



We know that many businesses responded swiftly and comprehensively to the work-from-home shift, developing employee mobility plans, acquiring the right equipment, software and security, and finding creative ways to shore up productivity. While these were certainly the right moves, cultural cohesion and employee engagement have emerged as essential elements that can easily fall by the wayside in an all-digital environment.

While our survey group was split 50:50 on whether the impact of virtual solutions on workplace productivity would be a long-term or short-term issue, the data do suggest a negative effect on morale that might result from an over-reliance on virtual tools and remote connections. From a longevity standpoint, respondents in Asia, who appear to be more comfortable with working remotely, were split down the middle on whether working from home would be a long-term or short-term trend.

It is self-evident that many organizations and companies will need to strengthen their digital infrastructure to maintain a cohesive corporate culture, but it also points to a need for creative approaches that need more time to ripen—a solid argument for the notion that the physical workplace with person-to-person contact will not evaporate any time soon.



Survey Says?

This is what a handful of our respondents had to say about workplace in their cities.



“I believe COVID has forced people stuck in the analog age to step into the digital age with [virtual] meetings.” -San Francisco

“People won’t go back to commuting by crowded public transit to the crowded downtown areas until it is safe. My guess is that a lot of people will not want to return to commuting if they can avoid it, and they will work from home or get jobs closer to home.” -San Francisco

“In the post-pandemic workplace, choice will be key. People enjoy being empowered to choose, within sensible constraints, where they can work best. They also need to feel they can make the journey to the office safely. Employers are working harder at understanding their employee needs and how best to make the accommodation and tech work for them.” Kim Heartwell, President and CEO, CallisonRTKL

Our Experts Respond

Public health crises aside, there are several extremely compelling reasons for businesses to embrace digital solutions and consider offering telework for as many employees as possible. By the numbers, and according to Global Workplace Analytics, if everyone with a compatible job and a desire to do it worked remotely just half the time, businesses would save on average US \$11,000 per person, per year, and the employee would save US \$2,000-\$7,000 per year. On top of that, it would reduce greenhouse gases by the equivalent of taking more than 9 million cars off the road permanently.

Certainly, we are seeing a gap between digital work and digital life. Based on multiple studies and surveys, most workers would like to work from home at least a few days per week permanently. It’s safe to say based on our data and common sense, though, that most would rather attend a party in person than via teleconference. Our findings also suggest that overuse has taken the shine off tools like Teams and Zoom, but we should be careful not to discount the advancements and advantages they offer us to bring together disparate and far-flung groups.

For our part at Arcadis, we know that technology and digital connection must be part of a fundamental business strategy that is interwoven with wider operational processes. Ultimately, the power of digital, enabled by data and analytics, will drive improvements in productivity and engagement. Placing people at the center of all this will represent a shift in thinking for many, but it’s essential to how we all connect effectively with one another.



City Vitality

From Times Square to Sydney Harbour, city centers were all but abandoned during the pandemic. Restaurants, cafes and bars shut down as office workers were sent to work from home. Schools closed and public transit worked on a skeleton schedule. With the people gone, many of the world’s greatest cities lost what made them great. And the people themselves? Opinions and experiences vary widely, but to some extent, everyone’s personal well-being has been dimmed by the loss of this vital spark.

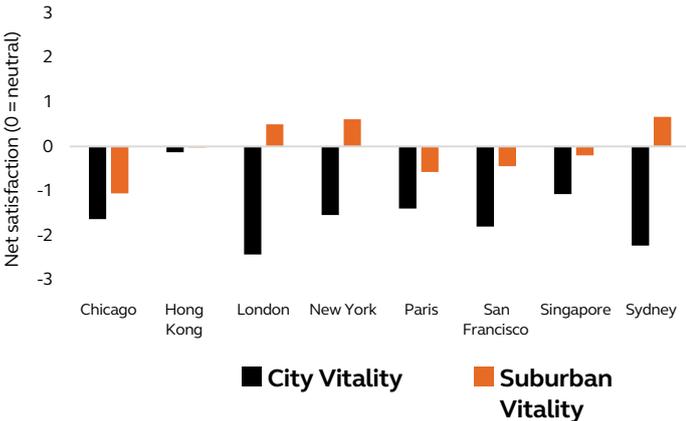
In our survey, we asked our respondents about how the pandemic has impacted the vitality of cities versus the vitality of suburbs and smaller towns. Certainly, not every city has a strong ring of suburbs around it, but anecdotal evidence suggests that as people began working remotely, they started relying more on businesses and services closer to home. This, in turn, would suggest a growing vitality outside the employment hub of a city center. Our data bears out that assumption to an extent, but, interestingly, many respondents felt that this change would not outlive the pandemic. New York was a notable exception, with respondents much more likely than any other city to say that the growing vitality of suburbs and smaller towns is a long-term or permanent change.



Of course, the perception of a city’s vitality varies greatly with how it handled the pandemic and the extent to which any sense of “normality” has been restored during the year. In Hong Kong, where the virus was controlled fairly early and residents have previous experience with the 2003 SARS epidemic, respondents were less concerned about the city coming “back to life” once the COVID-19 pandemic is a thing of the past. That contrasts strongly with Europe, where over 80% of respondents reported poor or very poor outcomes for city center vitality.

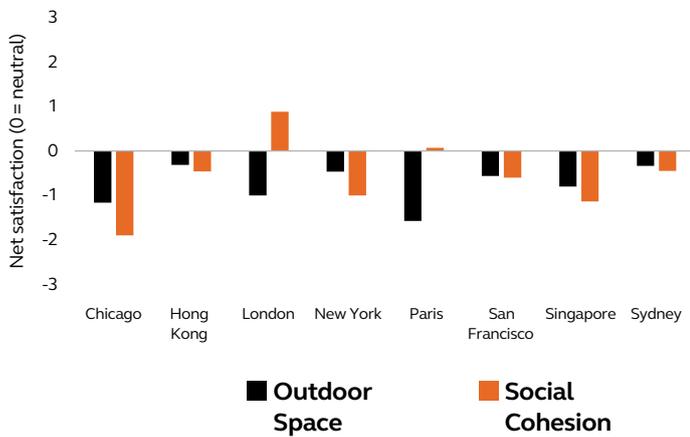
The picture for suburbs and towns was much less clear cut. In London, where the perception of city center vitality was so downbeat (90% reported poor or very poor perception), the view of areas outside central London is more positive and our respondents believe this will be longer term. This perception is shared by 25% of the global sample, with a similarly upbeat assessment in New York and Sydney. Interestingly, Paris, which is a much more compact and dense city, had a negative score for suburban vitality.

City vitality - Place



As researchers and problem-solvers, we tend to look at cities from a bird's eye view, but that is not to diminish the individual, personal experiences of the pandemic and the toll it has taken on well-being. In the hardest hit cities, even access to open, outdoor spaces was limited, which was undeniably detrimental to physical and mental health. We asked our respondents how well their cities dealt with this and asked about the future—will social connection and engagement change forever or is this a passing fad?

City vitality - Quality of life



In Europe, we saw a strong, negative reaction to our question about restrictions on open space, especially in Paris where the severe lockdown made most public spaces inaccessible. This was less apparent elsewhere, even in very built-up cities like Hong Kong and Singapore.

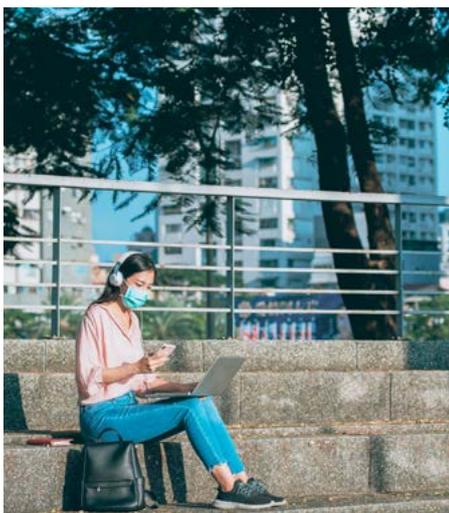
And was the social cohesion brought on by lockdown as significant as the media may have portrayed? Respondents from most cities indicated that the change in social connection would likely be short-lived, but New York, San Francisco and London said that the change may be longer term.





Survey Says?

This is what a handful of our respondents had to say about quality of life in their cities.



“Conversion of traffic lanes into public use or business use spaces would help bring vitality back to the city.” -San Francisco

“Repurpose office space for more cultural and leisure experiences. Encourage young people and new businesses to take over space at cheaper prices.” -London

“Life is already returning to Hong Kong’s commercial centres as there is a relatively high degree of confidence that the pandemic is currently under control here.” -Hong Kong

“More focus on outdoor activities, reduce reliance on cars a primary means of transport, increase green spaces in cities, abandon expensive commercial building projects (offices) in favor of more residential buildings and public facilities (playgrounds, public toilets, benches, bicycle parking spaces).” -Paris

Our Experts Respond

Lockdowns and safety restrictions have affected cities and communities everywhere. While certain aspects of urban vitality will be reasonably quick to come back once a vaccine is widely available, others will take time and ingenuity.

Rethinking city center real estate is one such challenge. The currency of downtowns is heavily reliant on the activity and vitality of the place, from shops, restaurants and bars to civic amenities, tourism and businesses small and large. These all of course attract people, but if people are reluctant to congregate and run the commercial engines of these places, the viability of city center economies will be challenged.

Bringing people back into the post-COVID city will be one of the biggest challenges for city authorities and asset owners. Attracting more residents and new commercial offerings through the conversion of buildings could be one solution, making cities more pedestrian friendly may be another. What is clear is that there will be an unprecedented opportunity to reinvent cities for the 21st century.



Healthcare and Education

Of the areas we surveyed, perhaps no two endured more of a stress test during the pandemic than healthcare and education. Indeed, the past year has shown us just resilient these critical sectors are, and how much they could potentially gain from the digital revolution unleashed by COVID-19

There is little doubt that complex healthcare systems have been put under unprecedented levels of strain by the pandemic. In major cities in the US and elsewhere, hospitals were overrun with patients as legacy systems buckled under the pressure. However, it also proved possible to expand critical care capacity in a matter of weeks, exemplified by the UK's Nightingale Hospital program, which delivered over 3,000 extra ICU beds in advance of a surge in patients. Inevitably the impact of COVID-19 went well beyond the immediate crisis response to a wider shut-down of the healthcare system as routine care was re-prioritized and hospitals and surgeries were made COVID-19 safe.



Schools and universities had to hunker down too, and this had a further, cumulative effect on both the quality of the healthcare and education delivered, as well as levels of activity in cities. For example, on the education front, the challenges of transitioning to remote study proved to be much greater than that experienced in the workplace, with innovation needed in the techniques and materials required to teach a remote student population of and ensuring that every student has access to online resources.



For the survey, we set out to examine the extent to which routine face to face health and education activity had been disrupted by the COVID-19 response as well as the extent to which would result in a longer-term switch to digital delivery. This is important, as experience during COVID-19 will inform the development of future care and teaching models. As expected, most respondents highlighted a significant fall in demand for face-to-face services albeit data from Hong Kong and Paris suggests this pattern is not universal. Demand for digital is strong in all locations. Most respondents felt that the reduction in demand for services in central locations is a short-term phenomenon. However, adoption of digital was seen as being a long-term trend, particularly in the US and Europe, where 80-90% of respondents saw the change as either long-term or permanent.

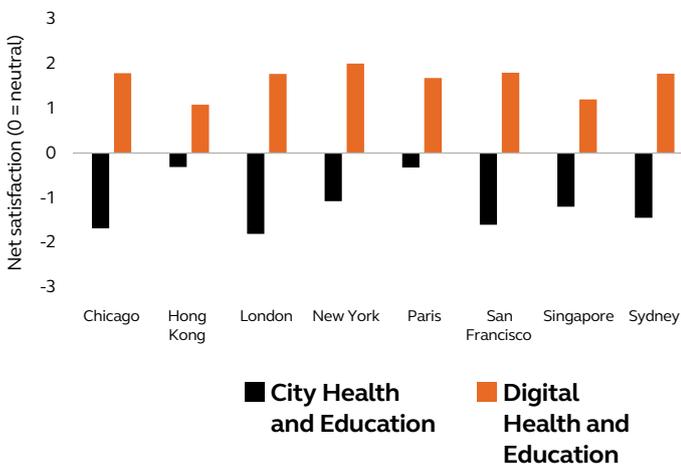


So, what are the implications of these divergent trends? Firstly, both the health and education sectors will have a huge task in resetting to zero, dealing with backlogs, revenue shortfalls and the effects of missed teaching and treatments. But the findings also suggest growing momentum for change. To be clear, these findings are

not a repudiation of city center, face-to-face services, but instead show the opportunity for hybrid models that make better use of existing assets. This will create opportunities not only to better harness the power of digital in health and education, but also potentially could free up space and outmoded brick-and-mortar facilities to accommodate new innovations and technologies.

The emergent digital divide should be more of a concern. As society becomes more reliant upon access to digital tools, it becomes necessary to ensure that people have universal access to digital in the same way that we ensure universal access to heat and clean water.

Healthcare and education





Survey Says?

This is what a handful of our respondents had to say about service delivery in their cities.

“I think the delivery of goods and home services and remotely-provided services (education, healthcare) will remain at high levels, reducing the need to leave the house at all.” -Chicago

“In education, children of poverty have less access to digital solutions and equal education. Some senior citizens are digitally-challenged. Steps to identify deficiencies in digital access for certain groups should be first, and then figure out how to get them access to digital communication and education tools.” -Chicago

Our Experts Respond

To be sure, we have likely reached a point where it is possible that neither the patient nor student must go to a service—the service can come to them. Telemedicine visits were more of a niche option for certain specialties before the pandemic and now they are commonplace. Teachers all over the world have had to innovate and reimagine how they teach material and evaluate knowledge. Everyone in the education system, from preschoolers to Ph.D. candidates, has had to get used to the idea of online learning.

To the extent that it makes sense for online healthcare and education to continue, that genie is likely out of the bottle for good. This is not to say that most schools will remain online once there is a vaccine or that no one will go to the doctor’s office anymore, but routine medical advice and elements of schooling for older students may very well continue to be conducted virtually. The physical assets used by hospitals and universities could, and perhaps should, be as open to change and adaptation as any office or hotel. Cities, education providers, healthcare organizations, private companies and individuals will need to adopt this spirit of innovation in planning for the future and improve their infrastructure accordingly.



Utilities and Digital Infrastructure

We asked whether the pandemic had affected the reliability and resilience of core utilities, including power and water, and our respondents were reassuringly neutral. Electrical grids did not fail, clean water continued to flow, and sewage systems thankfully did not disappoint, all of which highlights the impressive preparedness of utility providers across all locations.

For the digital experience, the survey paints a completely different picture, with over 80% of respondents calling out the contribution of digital utilities in making cities more resilient. Furthermore, a similar survey response called out the contribution of digital as being a long-term or permanent trend.



Digital Utilities and City Resilience



While we see this as a very positive indicator, it is not without its hurdles. One of the most prominent issues the pandemic has brought to light is the digital divide—the gap between the haves and the have-nots. As office professionals worked from home with robust internet connections and beefed-up corporate servers, service workers, wait staff or small business employees were often let go or furloughed, with patchy government support depending on geography. The digital divide was made even more stark when schools went online; depending on socio-economic status, some students were

able to attend class with a personal laptop and a lightning-fast internet connection while others had to make do with whatever they could find. A free, public education, once an attempt at creating equal footing for all children, has suddenly become barely accessible for students without internet.

Major media outlets around the globe have discussed the impact of this digital divide. Politicians, activists and economists have called for free or subsidized digital utilities to remedy this problem. Whatever the solution, it will take careful planning from governments and municipalities, not to mention the private sector, but could transform how we think about infrastructure. Every city in our survey responded that digital utilities will be a long-term issue that will affect the resiliency of cities and communities well into the future.



Survey Says?

This is what a handful of our respondents had to say about digital utilities and infrastructure in their cities.

“Lower income citizens MUST be given broadband or 5G wireless and maybe the loan of laptops or tablets.” -Hong Kong

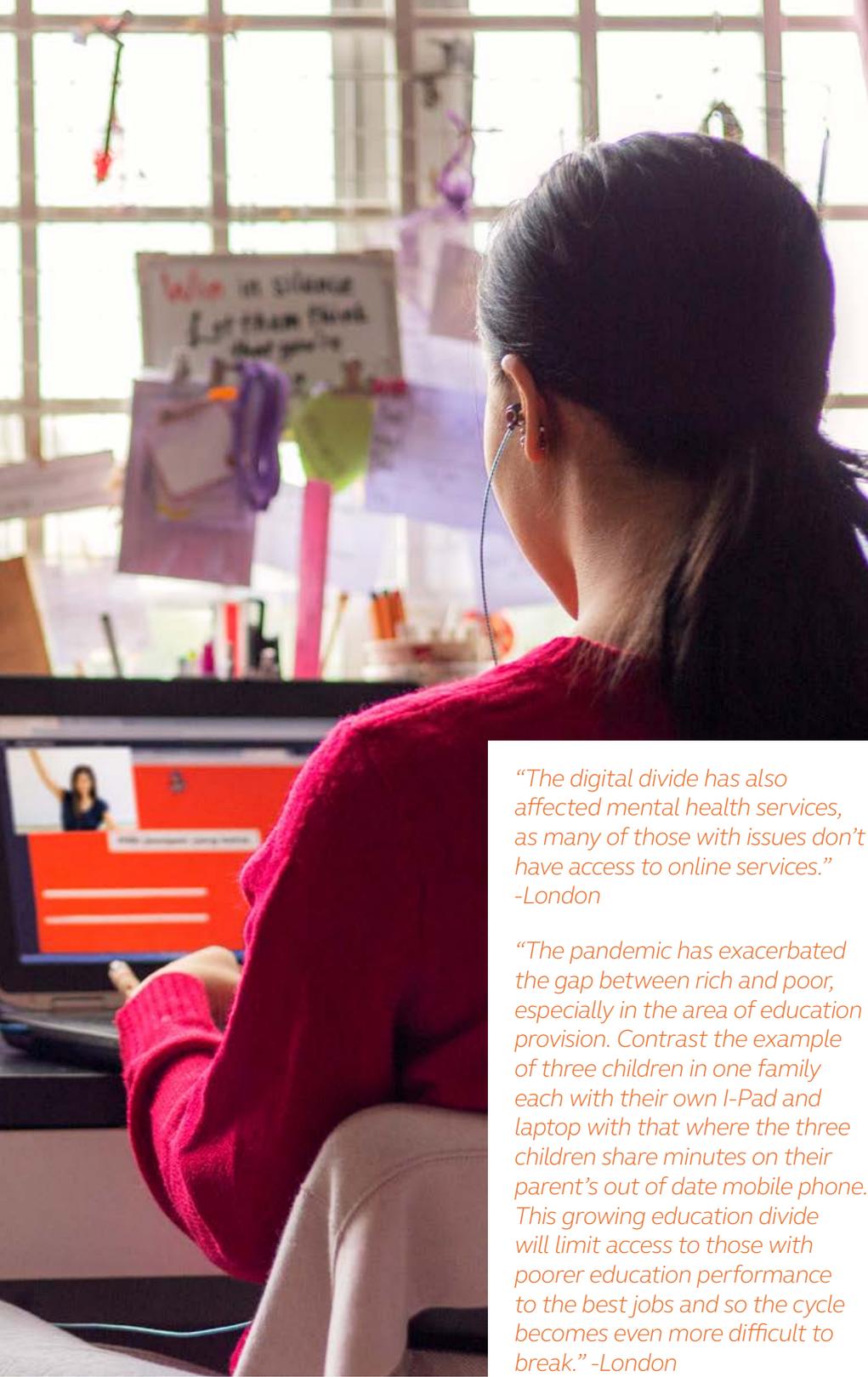
“Given that Hong Kong has extreme social inequalities even by global standards, the digital divide is inevitable and entrenched. Cities can address the issue by mandating basic internet speeds and guaranteed access / price plans. Other countries like Singapore or South Korea have far more interventionist policies for digital provision and are achieving better economic success for it.” -Hong Kong

“I think people without access to reliable internet are being increasingly left behind as in-person options disappear. And the less digitally savvy are left behind to a lesser extent. It’s harder to connect to distance learning and stay in contact with friends and family for social connection, especially for seniors and people who live alone.” -San Francisco

“Free city-funded wifi should be a public utility.” -London

“I don’t know if the digital divide has grown worse, but what is evident now is that all cities, counties, and states, if they want to remain viable, have to take legislative and regulatory steps to ensure convenient, inexpensive, and reliable access to high speed internet and cell phone coverage. This is absolutely critical for economic success.” -San Francisco

“Families/people with limited income do not have access to basic IT equipment such as PCs, laptops, tablets or printers. Buildings which are not connected with fiber optics can be overwhelmed with the demand for data. Cities can develop better metropolitan area networks or ask telecom providers to share 4G connectivity with users that need it the most.” -Paris



Our Experts Respond

The idea of broadband as a public utility or a municipal infrastructure issue is not new, but many cities and countries have dragged their feet on the issue because of perceived complexities and costs. The events of 2020 have shown that high quality, secure internet access is crucial to economic and personal success and cities should not wait for another crisis to make it a key issue.

In the United States alone, there are 50 million students, 15 million of which do not have regular access to the internet or devices; 9 million of them have access to neither (Source: CommonSense Media). To make things worse, 400,000 teachers in the U.S. lack internet access. This is truly an educational and economic crisis that will have long-term consequences. Cities, municipalities and other organizations can enhance broadband resilience, digital infrastructure, and shore up data centers as a first big step to close the digital divide and create more economic opportunity for everyone.

*“The digital divide has also affected mental health services, as many of those with issues don’t have access to online services.”
-London*

“The pandemic has exacerbated the gap between rich and poor, especially in the area of education provision. Contrast the example of three children in one family each with their own I-Pad and laptop with that where the three children share minutes on their parent’s out of date mobile phone. This growing education divide will limit access to those with poorer education performance to the best jobs and so the cycle becomes even more difficult to break.” -London

“In education, children of poverty have less access to digital solutions and equal education. Some senior citizens are digitally-challenged. Steps to identify deficiencies in digital access for certain groups should be first, and then figure out how to get them access to digital communication and education tools.” -Chicago

Key Takeaways

When an event as cataclysmic as the coronavirus outbreak occurs—disrupting billions of lives and leading to more than 1 million deaths around the world—historians, who have the great luxury of distance and time, inevitably draw a number of conclusions. Unfortunately, we have no such luxury. And the conclusive clarity of a historian’s perspective will have to wait. What does seem clear, however, is that the pandemic has changed how we think about such consequential topics as city infrastructure all the way down to the minutiae of our everyday interactions. Given that, and the findings of our survey, these are some of our key takeaways.

Technology is everything and everything is technology. Without exception, everything we do from this point onward will rely to no small degree on technology—from how we communicate and connect, to how we transact our lives, to how we progress as a people. As our survey revealed, many of the things we once took for granted, including a child’s place in the classroom or a patient’s access to healthcare, hang by a thread. The quality of life for so many will depend on the degree to which we bridge the Digital Divide and the ever-widening security threat to our networks and sensitive data.

Cooperation is essential. The issues caused and exacerbated by the pandemic are not easy problems to solve; they are big, stubborn, intractable challenges. They defy obvious categorization (note how the issues in our survey overlap) and simple solutions. Solving them will surely take bold, audacious thinking from the full measure of society—from fledgling entrepreneurs to established tech titans, the public sector as well as private interests. This takes cooperation across all boundaries and territories, breaking down silos and the cross-pollination of ideas among technology, science, industry and public policy. It also means taking a more flexible approach to projects, working across organizations with new models for project management.

Infrastructure (literally) underpins everything. COVID-19 disrupted supply chains around the world and taxed (but did not break) all aspects of our physical infrastructure, highlighting a real and present threat. The flow of essential medical supplies, food and other key necessities was full of friction and delays, due in part to aging infrastructure networks. As economies begin to re-start, well-targeted spending on low-carbon, resilient infrastructure will lay the groundwork for future economic growth, whether that’s an improved transport network to move goods, a digital backbone to power a new operational model, or education facilities to train the workforce of the future. Moreover, studies have shown that spending on resilient infrastructure (resilient to climate change as well as pandemics and other crises) provides not only a net benefit in financial terms but creates valuable jobs and supports an improved and more secure quality of life.

The 15-minute city comes back. As we parsed the survey results, it was difficult not to re-visit the idea of the “15-minute city,” a foundational concept of urbanism where everyone is able to meet most of their needs within a short walk or bike ride from their home. It is a place composed of walkable, “complete” and connected neighborhoods. As cities work toward recovery, the 15-minute city is more relevant than ever as an organizing principle for development.





While the idea is not a new one, it has certainly gained momentum because of the pandemic and it merits deeper consideration. It reduces unnecessary travel across cities, provides more public space, fosters a sense of community, promotes health and wellbeing, boosts resilience to economic, health and climate shocks, and improves cities' sustainability and livability.

Repurposing assets is key to resiliency. As we begin to come out of the pandemic, as terrible as it has been, we have an opportunity to rethink the way entire sectors have worked (or not worked). From mobility and health to workplace and education, it's clear that technology is making it possible for us to reimagine how we have been using existing spaces in some cases and how we can scale down in others. By repurposing brick-and-mortar facilities and real estate for how we want to live in the future, rather than their legacy purposes, cities and communities will become naturally more efficient, more resilient and more vital.

Don't look back. As the prospect of widespread vaccination becomes closer, we can dare to think that 2021 will be a year when we will be able to socialize freely, travel widely and resume lives that have been put on hold for 12 months. However, with respect to the management of cities and city assets, going back to the old "normal" might be a mistake. We now have an unprecedented opportunity to reconsider how cities work and how they are used. Whether high streets will be reanimated by housing, or offices rethought as collaboration hubs or leisure venues, we should be confident in taking a fresh look at what the city of tomorrow should be.

Harnessing Big Data to create smarter cities. Cities around the world are waking up to the value of data-driven systems to drive efficiencies, reduce costs and streamline operations. We're seeing this in the management of utility services, where cost and reliability are prime drivers, public transport, which will likely need some type of re-invention to return to pre-pandemic levels, as well as public safety. By inserting sensors across city infrastructures and creating new data sources—including citizens via their mobile devices—city managers can make better, more informed decisions.

It is clear that the global pandemic caused by COVID-19 has left an indelible mark on our world and altered the rhythms of our lives. The most obvious consequences, from the stresses it has placed on our healthcare systems and the economic armature of businesses across the planet, from how we work to how we shop, have touched billions and will likely play out over the course of the next year. Or years. At Arcadis, we are undaunted by this upheaval and remain committed to the urgent pursuit of new ideas and solutions that improve the quality of life for all.

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