TAKING STOCK OF COVID-19

The Short- and Long-Term Ramifications on Technology and End Markets

ABIresearch for visionaries

LETTER FROM OUR CHIEF RESEARCH OFFICER

Dear Colleagues,

At this time of global concern for the health of our loved ones, communities, and workplaces, ABI Research analysts have put together their thoughts on the likely short- and long-term impacts the global pandemic will have on technology and end markets.

There is no doubt that there will be a significant cost to human life due to the pandemic, but it could be argued that the pandemic's effect will also have significant and long-term ramifications for technology companies, those companies investing in technology to enhance operations, and the customers of those companies.

Taking a step back, to effect change, there must be stimulation of a magnitude that means companies cannot do anything but make bold decisions to survive. We have seen this in the scientific and technological gains emerging from World War II (WW2), as well as after the numerous stock market crashes in the 1920s, 1980s, and 2000s. Perhaps the Coronavirus Disease (COVID-19) outbreak and the global reaction to the pandemic is stimulation for change of the magnitude that will force companies to radically rethink how they operate and embrace technological investment to make this happen.

This situation could lead to the following outcomes:

- A more concerted and widespread move to lights-out manufacturing
- Increased usage of autonomous materials handling and goods vehicles
- A more integrated, diverse, and coordinated supply chain
- Investment in smart cities to support community resilience
- A move to virtual workspaces and practices
- And so much more

Before we feel this potential long-term impact, there will be some serious short-term implications. Contractions in consumer spending, disruptions to supply chains, and reduced availability of components will create a rough sea for all boats. There will be wrecks and we should be prepared for that. Before any change occurs, there will be a retrenchment in outlooks and a reduced investment in modernization, as survival instincts trump the drive to prosperity.

Stay healthy, wash your hands, and if you must self-isolate (as I am at the point of writing this), stay calm and stay positive!

Stuart Carlaw
Chief Research Officer
ABI Research

5G CORE & EDGE NETWORKS

Slowing Down The Software-Centric Shift

WHAT WE ARE SEEING:

The industry's overall shift toward global software-centric networks and operations is taking a hit as a result of the current bleak global economic outlook and COVID-19. Growth stagnation at a macro level is bound to have a causal effect on the demand side (enterprise verticals); sales in the enterprise domain are expected to fuel innovation and diffusion of 5G core rollouts and new telco digital offerings.

SHORT-TERM IMPACT:

The 5G market is growing faster than anticipated, with 2020 expected be the starting point for 5G Stand-alone (SA) core commercial deployments in Communications Service Providers' (CSPs) networks. But that expectation may take a little longer to materialize. That is due, in part, to the fact that COVID-19 will almost certainly derail further trials and testing to verify the processing performance and stability of 5G SA networks. In the short term, the industry may have no choice but to protect existing consumer revenue. CSPs will accompany that defensive approach with small-scale projects that aim to seek operational efficiencies without necessarily committing to new investments for 5G SA networks and intelligent software.

LONG-TERM IMPACT:

There is, by now, widespread agreement that the enterprise market will drive investment in 5G and fuel further growth. In the long term, the turmoil emanating from COVID-19 will serve as a springboard for the industry to mull over alternative growth options at its disposal. The industry's positioning in the global production frontier remains anchored to hard-to-duplicate network assets and infrastructure that continue to yield results on the consumer front. The brief "pause" in production processes of some major economies should give the industry an opportunity to ponder avenues so that it can reinvigorate itself. With 5G SA core, fiber-optic network, and dynamic new software, it is now possible for the industry to usher in a new era of prosperity, innovation, and collaboration for enterprises, communities, and individuals. But that will not come without challenges, particularly an across-the-board internal organizational retooling.

SUMMARY AND RECOMMENDATIONS:

There is no doubt that impending 5G SA core network deployments and cloud-native software give the industry an edge over competing forces. But sooner or later, those at the upper echelons of both the supply and demand side of telcos will almost certainly realize that they need to preserve the current order of doing business if they are to sustain that edge. Further prosperity and innovation will stem from new forays that are either built atop that edge in a vertical fashion or leverage new, highly complementary horizontal capabilities.

5G DEVICES, SMARTPHONES & WEARABLES

The Ripples From China Will Be Felt Globally

WHAT WE ARE SEEING:

With China located at the epicenter of the COVID-19 outbreak, the resultant impact has been disastrous for the global mobile device market, which has subsequently witnessed mass disruption to its production lines and a stalling of related supply chains caused by labor shortages and inactive logistics. As China is also the world's manufacturing center for the majority of these device types, and one of its biggest markets, the sector has been hit hardest by delayed shipments and a weakened development of next-generation products.

SHORT-TERM IMPACT:

While the tablet and notebook sectors have witnessed severe delays and reductions in output, the impact of COVID-19 has been felt most keenly in the smartphone market (notwithstanding the ongoing U.S.-China trade war). With the vast majority of leading smartphone vendors having the bulk of their production in China, including Apple, Huawei, Xiaomi, and OPPO, they have now been forced to adjust their roadmaps for new models and have revised downward their shipment projections for 2020. Moreover, the vendors' main supply chain partners, such as Qualcomm, Broadcom, Qorvo, and Skyworks, have also been affected by the shrinking demand for smartphones and it will take time to resume anything close to near-capacity in their production facilities. Consequently, the outbreak is expected to lead to a huge reduction in the production of smartphones, potentially falling by as much as 30% in 1H 2020. Disruptions in device distribution channels will amplify the impact, leading to malfunctions in the supply chain and the management of device and component inventories.

Significantly, in the short term, there will be an adverse effect on 5G devices. No sooner had 5G smartphones started to gain some traction and break into the market in significant numbers, than the outbreak will now trigger a suppression of its near-term growth, in particular pushing out the development and introduction of affordable 5G phones. This move to lower price tiers was expected to become a key driver for boosting 5G smartphone shipments in 2020, but the desired impact will now be lessened throughout the year due to the outbreak. Shipment volumes for 5G smartphones in 2020 will be much lower than previously expected, slowed by a stagnant supply chain and crippled demand. Undoubtedly, the market will also be faced with numerous disruptions and delays, most notably the launch of Apple's first 5G iPhones that are due to appear in September 2020.

LONG-TERM IMPACT:

Expectations are that the outbreak will gradually come under control by end of 2Q 2020, but it will take some time thereafter for consumer confidence to return and for the device sector to recover. It is expected that, even after a resumption in production, there will be a slower recovery of capacity than anticipated, notably in the smartphone and notebook segments. Moreover, there is also the potential for a longer-term impact on other global markets, such as the United States, Europe, Japan, and South Korea, caused by a shrinking Chinese economy and the spread of the virus to most of the world's regions. Hopes are that the epidemic does not spread further and go beyond the end of 2020, which would prolong the devastating effect the outbreak has had on the device industry, not just in China, but around the world.

Importantly, with such a large proportion of the world's mobile device market relying on China for manufacturing and component supply, which is contending with disruption on a massive scale, it has become clear that many in the chain were woefully unprepared to react quickly. With the exception of Samsung, which has slowly withdrawn from China over the past couple of years and now heavily uses India and Vietnam for the majority of its smartphone production deployments, many other leading vendors should consider diversifying production and reducing their reliance on a single country, manufacturer, or technology supplier. This will help alleviate supply chain risks in the future, moving away from China and relocating to markets that are ramping up supply chain production, notably Taiwan, India, and Vietnam, or even in countries outside of Asia-Pacific.

SUMMARY AND RECOMMENDATIONS:

It is not clear what the full extent or lasting effect that COVID-19 will have on the mobile device ecosystem, but in the short- to medium-term, it will heavily impact the smartphone market. Aside from taking its toll on both demand and the supply chain, it will particularly affect the industry's eagerness to drive 5G to lower price points in 2020, seriously blunting its growth potential.

The outbreak is also expected to see many along the supply chain accelerate and build up production capacity outside of China, rearranging their supplier deployments to combat the market's seemingly over-reliance on China. Undoubtedly, China will still remain at the heart of global manufacturing, although it will be incumbent on major vendors and related suppliers to put in place contingency planning for future production. This is despite the expected lengthy time and effort it will take to move away from the China market, as many have been firmly entrenched there for years. Vendors and suppliers need to fully understand their exposure to all those along the chain, identifying and evaluating all risks related to issues like capacity management and market demand, enabling them to react accordingly and mitigate the impact of any future market disruptions.

5G MARKETS

A Surge In Traffic Will Create A Big Test For Telcos

WHAT WE ARE SEEING:

The COVID-19 global proliferation has created massive media hysteria and public panic, and has pushed several governments to take some contingency measures to contain its spread. The situation has led consumers to migrate their social activities to online and increase their Internet consumption to access information and use digital services like mobile banking, online shopping, or food home delivery. Businesses have also offered their employees the flexibility to work from home, which is having a significant impact on both mobile data and voice traffic. Businesses have also discovered new ways of marketing their brand, training their staff, and moving business away from public gatherings to embrace new digital tools with the potential to save both time and money in supporting their operations. With all these constraints, current mobile and fixed networks have shown a very strong resilience to the crisis, even in countries like Italy, China, and Korea where extreme contingency measures have been taken. Indeed, we have not heard of a single network blackout or outage since the start of the crisis. This is largely because these networks are largely over-provisioned to cope with emergencies of this caliber. The question is how long this resilience will last if the COVID-19 crisis persists for an indefinite period?

SHORT-TERM IMPACT:

ABI Research expects mobile data traffic to surge significantly as a result of COVID-19, but current telco networks are unlikely to be challenged by the situation, except in a few areas that are poorly serviced by these networks. However, the further spread of the virus may limit the upgrade of these networks either because of equipment shortages or restrictions taken by mobile operators to limit the mobility of staff to prevent further spread of the virus. These network upgrades will not affect the networks' resilience to the surge of data traffic induced by the crisis, at least in the short term. However, this will likely delay operators' ability to execute on their plans to modernize their networks, using more advanced technologies like 5G, network virtualization, or AI, which will have a knock-on effect on their financial performance in the short term.

LONG-TERM IMPACT:

Despite all the negativity surrounding the spread of COVID-19, the current crisis is becoming an enlightening experience and a great accelerator of digitalization for both consumers and businesses. For example, consumers, even the most skeptical ones, are now prepared to integrate a digital lifestyle in their everyday lives. As a result, online services, including online shopping, e-banking, remote education, remote healthcare, mobile entertainment, and video-based social networking will proliferate at an unprecedented rate and will no longer be limited to a particular demographic, geography, or social class. Enterprises will also rely more on video conferencing, online marketing techniques, and online training for empowering their businesses. They will also be more favorable to automating the operation of their businesses so they are ready to handle situations similar to COVID-19. This development will greatly benefit several transformative technologies, including 5G, AI, Machine Learning (ML), AR, VR, location technologies, cloud and entertainment localization, robotics, and many others.

SUMMARY AND RECOMMENDATIONS:

Various industries, governments, and public organizations will learn a big lesson from the current crisis and should prepare themselves to better deal with large-scale pandemics, minimizing their disruption and any subsequent economic downturn. Decision-makers will have to strengthen their contingency measures and rationalize their reliance on physical mediums, such as unnecessary event attendance or training, mainly when they have digital alternatives at their hands. They will have to invest more in educating the population on the benefits of having a balanced digital lifestyle and pushing enterprises for accelerating their digital transformation.

A Blow To The Standards Bodies

WHAT WE ARE SEEING:

In addition to its detrimental effect on society as whole, COVID-19 is also affecting standardization work that would make 5G available for enterprise use cases. The cancellation of leading industry events, such as MWC in Barcelona, results in more complicated workflows for the relevant standardization body, the 3GPP, which means that the freeze of Release 16 (which is of key importance for 5G applications in industrial and logistics environments) will most likely be delayed, which will, in turn, delay the rollout of 5G in warehouses, shipping ports, and factory floors.

SHORT-TERM IMPACT:

While COVID-19 will delay 5G standardization work that is vitally important for its application in industrial use cases, a situation like this has accelerated 5G deployment in the healthcare sector in China. By enabling remote diagnostics, ubiquitous 5G coverage can help prevent the spreading of diseases like COVID-19. This is already happening in the Chinese Province of Sichuan, where the 5G network infrastructure has already been used to diagnose patients with COVID-19 since January 2020 by offering video consultation to patients that show symptoms, because 5G enables the wireless transmission of particularly large files (like video data). Meanwhile, in Wuhan (the origin of the virus), 5G has been installed in every makeshift hospital in January 2020 to enhance remote diagnostic facilities. More than 1,400 medical staff from the Chinese army have started treating these patients via video consultation.

LONG-TERM IMPACT:

Even though, in the short-term, this current pandemic is putting timely enterprise rollout of 5G at risk (due to the delay in standardization framework), in the long-term, enterprise verticals will consider 5G for automating workflows in factories and other industrial environments in order to keep supply chain disruptions at a minimum. However, we will also see 5G applications for life-critical verticals, such as agriculture/food production, to pick up pace, while a growing number of countries will consider enhancing their healthcare sector with 5G-enabled capabilities.

SUMMARY AND RECOMMENDATIONS:

Situations like these underline the importance of a technologically up-to-date healthcare system, as well as more automation in factories and production outlets. However, the current situation around COVID-19 will most probably induce a shift in the verticals that look into 5G deployment. While it puts 5G applications in industrial surroundings in a difficult position, current experiences will ignite considerations for 5G applications in healthcare and agriculture/food production. The telco ecosystem must prepare for this shift.

5G & MOBILE NETWORK INFRASTRUCTURE

The Supply Chain Will Bend, But Will it Break?

WHAT WE ARE SEEING:

The current global outbreak of COVID-19 is creating a challenging environment for telco operators with aggressive deployment plans, but also the entire supply chain that relies heavily on Chinese manufacturing. In addition to the previous geopolitical challenges that are halting operator rollouts, the new virus adds further strain and ambiguity in the 5G supply chain.

SHORT-TERM IMPACT:

In the short term, COVID-19 will slow down the deployment of 5G considerably, especially for vendors that rely heavily on Chinese manufacturing for their 5G equipment. Meetings that take place physically will also likely be postponed, meaning that The 3rd Generation Partnership Project (3GPP) will likely delay its upcoming Release 16 standard until the end of the year, adding further confusion for enterprise implementers anticipating this new version of the standard that introduces enterprise features. The overall development of 5G for both consumer and enterprise applications will likely be delayed as mobile operators look for ways to shield their businesses against both geopolitical constraints and the effects of the virus.

LONG-TERM IMPACT:

In the long term, the effects of the virus will likely accelerate the current trend to make 5G supply chains more robust and less reliant on a very small set of very large infrastructure vendors. This will be particularly evident in the U.S. market that is currently planning to create a more open ecosystem that relies on smaller and more agile vendors. Potential supply chain shortages for 5G equipment will reaffirm the strategy of the U.S. Government to create a more open market, which will go well beyond the U.S. market in the long term. Furthermore, the telco community will likely establish better ways to meet virtually and foster a more distributed development environment, especially for the 3GPP.

SUMMARY AND RECOMMENDATIONS:

There is little that mobile operators can do currently to counter the effects of the virus, but in the long term, the entire value chain should work together to create a more open ecosystem. This ecosystem should be primarily positioned to create open platforms that many different companies can use to create added value. This will be particularly vital for the success of enterprise 5G and private cellular.

5G's Momentum Will Be Slowed, But New Use Cases Will Emerge

WHAT WE ARE SEEING:

The outbreak of COVID-19 has created a crippling effect, not only on service industries, but also on manufacturing enterprises, including 5G infrastructure vendors. The 5G New Radio (NR) part of the supply chain has been particularly affected by this, especially because most 5G radio units and active antennas are being manufactured in China. Despite the current ongoing discussion on OpenRAN and open networks, most advanced 5G networks still rely on Tier One infrastructure vendors and their supply chains have been disrupted.

SHORT-TERM IMPACT:

The current virus outbreak will likely delay the deployment of advanced 5G NR systems, including Massive Multiple Input, Multiple Output (MIMO) and active antennas that several operators have already started deploying. This may mean that operators that have already deployed a significant number of base stations will be in a better position to become early adopters and benefit from an earlier transition from previous generations to 5G, but this will rely on the availability of relevant handsets. In the short term, 5G radio deployments will be delayed further due to geopolitical constraints and COVID-19.

LONG-TERM IMPACT:

In terms of business, it is important for mobile operators to broaden their supply chain and avoid a single-vendor infrastructure market. Apart from that, the effects of the virus outbreak will likely accelerate more innovative use cases and services. For example, considering a 5G Ultra-Reliable Low-Latency Communications (URLLC) scenario, if surgery and health monitoring can be done remotely, the doctor will not need to physically meet the patient infected with the virus.

SUMMARY AND RECOMMENDATIONS:

5G has reached significant momentum, but the current outbreak will slow down its progress. A great lesson has been provided by the virus breakout to both network operators and related authorities. The former should be able to manage the risk of relying on a few vendors dominating the infrastructure market. The latter should embrace new technologies and understand how these can be used in turbulent times to improve business and society.

AI & MACHINE LEARNING

Artificial Intelligence Will Play A Key Role in Responding to the Pandemic

WHAT WE ARE SEEING:

Several companies, including Alibaba, YITU, Graphen, and Google DeepMind, are already developing Artificial Intelligence (AI) tools to help detect the virus, diagnose its evolution, track its geographical footprint, project its future, and even predict its potential protein structure to find a vaccine for it.

SHORT-TERM IMPACT:

Aside from viral detection, AI will be adopted in the field of bioinformatics, where the Ribonucleic Acid (RNA) sequence of COVID-19 can be thoroughly analyzed to develop the right antiviral drugs. At the moment, no single drug can combat the virus effectively. In order to get ahead of the ever-evolving virus and to save as many lives as possible, new drug discovery, development, and testing processes need to be set up, as the conventional method is no longer suitable. Tools from established companies like Google DeepMind, startups like Graphen, and AI chipsets from vendors like NVIDIA and Intel will help accelerate the speed of drug discovery, development, and testing, allowing pharmaceutical companies and healthcare authorities to combat the pandemic.

LONG-TERM IMPACT:

Pharmaceutical companies and healthcare authorities will take lessons from the current chaotic situation, and anticipate universal programs and frameworks to better manage pandemic situations, predict the emergence and the spread of viruses, and, most importantly, find a cure for them in a timely fashion. The situation will encourage healthcare agencies, pharmaceutical vendors, and webscale companies to enhance their Research and Development (R&D) investments in AI as a core technology for enabling these initiatives.

SUMMARY AND RECOMMENDATIONS:

Healthcare institutions can no longer ignore the role of AI in their daily workflow. Global R&D expenditures for the pharmaceutical industry are estimated to be between US$180 billion and US$195 billion in 2022. AI spending in the healthcare and pharmaceutical industries is expected to increase from US$463 million in 2019 to more than US$2 billion by 2025. Needless to say, the pharmaceutical industry is a significant market that AI hardware and software vendors should target.

AUGMENTED & VIRTUAL REALITY

Production Delays are Inevitable for All, but the Impact Will be Felt by Startups and Smaller Companies

WHAT WE ARE SEEING:

COVID-19 has affected the majority of CE companies, especially in China, Taiwan, and South Korea. As anticipated, COVID-19 has impacted the Augmented Reality (AR)/Virtual Reality (VR) market as well, causing temporary delays in AR/VR device production, increased costs, and revenue losses. MAD Gaze, a Hong-Kong based consumer AR smart glasses provider, has announced delays in shipments, and changed its display panel supplier from a Chinese factory to Korean and Japanese factories due to production delays in Chinese factories. Nreal, a China-based AR consumer smart glasses provider, announced production/shipment delays as well. At the same time, bigger companies with higher demand and larger-scale supply chains face similar issues, such as Oculus, HTC, and Vive struggling to meet VR headset demand.

SHORT-TERM IMPACT:

The delays in production and scheduled shipments, and potential decrease in demand will have a huge financial impact on AR/VR device manufacturers, generating reduced revenue and unexpected extra costs for employee salaries or for alternative suppliers. Also, delays and reduced funding series are expected, mainly affecting startups. Finally, delays are anticipated in AR/VR application development and upcoming upgrades due to the cancellation of developer conferences (Apple, Google, Facebook).

LONG-TERM IMPACT:

Long-term production and shipment delays will mainly affect smaller companies, especially those launching devices for first time in the market (like Nreal or small VR companies). Delays may encourage potential customers to purchase products from competitors and bigger companies that are supported by high-scale supply chains and product stocks. Moreover, continuous delays of product delivery will negatively affect user experience (even if the delays are caused by unexpected reasons). The impact will be more significant on new companies/startups aiming to get established in the market and build a reliable brand name. Delays will also push roadmaps into the future, and depending on how significant a reduction there is in demand and manufacturing capabilities, some may be unable to last.

SUMMARY AND RECOMMENDATIONS:

The AR consumer market and smart glasses manufacturers are at a relatively lower risk in terms of losing potential customers and may not notice significantly reduced pre-orders/shipments, because AR consumer devices are not a high demand product at the current stage of the market, and the competition is still weak (consumers do not have range of options as in the VR or AR enterprise sector). However, both AR and VR solutions can contribute to addressing challenges. AR/VR can be a useful tool to support/supplement online education courses (in regions where schools/universities are closed and rely on online learning (e.g., some schools in the United Arab Emirates (UAE)). Also, AR remote assistance applications or AR/VR training can be a valuable solution to avoid unnecessary travel, and hardware choice is less impactful on these use cases.

A Tale of Two Sectors

WHAT WE ARE SEEING:

In regard to the impact of COVID-19 and how AR fits, the consumer and enterprise sectors are quite different. On the enterprise side, manufacturing concerns are valid, with a significant portion of hardware manufacturing housed within highly impacted regions like China. However, one of the most impactful and promising use cases for AR is remote expertise, and the circumstances around COVID-19 significantly increase the benefits associated with that use case. As companies struggle with travel restrictions, work from home policies, and overall demand slowdowns, AR will help alleviate some of the issues.

SHORT-TERM IMPACT:

Industrial markets have already seen a slowdown, which will continue into the near future. AR customer engagement will decrease in this circumstance, as slowdowns or closures of industrial processes mean there is no need for AR in the first place. On the other hand, companies will be searching for the means to maintain efficiency wherever possible, so remote expertise will see a significant bump in interest and usage as a result. As long as there is still ongoing activity, AR can be a valuable addition.

The challenge is investing and implementing AR in a meaningful way, while also struggling with the additional financial barriers of COVID-19 and its effects. While full-fledged head-mounted AR can deliver the most value over time, it is also the most expensive to implement when compared to lower cost, quicker to implement mobile device AR. The latter will dominate in usage as a result, but will still deliver immense value in remote presence and expertise, training, and workflow assistance. Data validation, annotation, and checklists can be done in real time by a single user, rather than requiring on-site validation and capture.

LONG-TERM IMPACT:

If anything, the short-term impacts will highlight the value of AR and VR as enterprise value-add tools. While pursued out of necessity in the short term, companies will be forced to recognize the value of AR, even in its simplest form on mobile devices, and will more easily see a business case going forward as things return to normal. Any investment done to use AR/VR in the short term also carries over long term, so some of the investment worries around CAPEX are naturally spread out over time.

A primary barrier in AR adoption and growth has been a lack of focused, relevant case studies and tailored proof of concept that an AR investment will be worthwhile. Forcing a hand through COVID-19 will have companies do this in-house, providing their own proofs of concept, perhaps before intending to, with hyper-specific results to analyze.

SUMMARY AND RECOMMENDATIONS:

Understanding the use cases possible with AR and VR in the enterprise, which are most valuable, and the variables associated with those use cases remains paramount. Identify the financial impact of restricted travel and workplace interaction. If expert travel is a notable pain point, then remote expertise could be invaluable. Then, answer questions around the best type of device to leverage (mobile, monocular, or binocular). What kinds of workflows will be most impacted will dictate the answer, with complex workflows requiring more capable devices most of the time. If AR and VR were part of longer-term planning, kicking those plans off earlier, at a smaller scale if necessary, will still reap the benefits of the longer-term plan, while reducing the COVID-19 impact overall.

DIGITAL SECURITY

A Cash Crunch Would Fuel E-Commerce – But For How Long?

WHAT WE ARE SEEING:

The outbreak of COVID-19 and current limited understanding of the virus has led to much speculation related to the risk factors associated with its ability to spread through items and things that are used and handled by multiple people. Cash is one of those items that frequently changes hands. Countries like Korea and China have put programs into place to disinfect new bank notes, while attempting to isolate older, used ones. In addition, the WHO has published advice to wash hands after handling banks notes or whenever possible to use contactless payments to avoid physically handling cash. This has raised the question of how the COVID-19 virus may impact the market for cash and how mobile and contactless payments could be used and usage encouraged to help minimize the risk.

SHORT-TERM IMPACT:

Over the past 2 to 3 weeks, an increasing amount of advice has been released, encouraging people to use contactless payments, rather than cash, despite sufficient evidence backing the fact that cash could increase the risk of COVID-19 spreading.

Programs and initiatives focused on increasing digital payments, as well as the creation of cashless societies, were already on the rise prior to the COVID-19 outbreak. The overarching trend of replacing physical with digital payments is already well underway and, in many instances, already well established. Although contactless (both card and mobile variants) could be used to bridge the gap and offer a non-contact solution for payments, the fact of the matter is that the entire payments industry will likely be impacted, particularly as people avoid crowded areas, such as large retail parks, malls, and shopping centers.

In addition, in most countries, contactless payments are limited to a certain transaction value (e.g., 30 GBP in the United Kingdom). Any transaction above the limit requires, the physical insertion of a card into a Point of Sale (POS) terminal to complete a chip and Personal Identification Number (PIN) reader. This is a device used by multiple people, likely presenting similar risk factors to that of handling cash.

As shoppers begin to self-isolate and avoid crowded areas, the only winner is the e-commerce sector, with all physical payments types (cash and digital) likely to decline in terms of transaction volumes.

LONG-TERM IMPACT:

The ability to contain and quickly develop a vaccine will ultimately define the longer-term market impacts. Brick and mortar retails are already struggling to compete with e-commerce giants, such as Amazon, and physical stores will likely see a reduction in foot flow, which will ultimately hit sales, having a direct knock-on effect in reducing ALL transaction volumes (regardless if it is cash or a digital variant).

SUMMARY AND RECOMMENDATIONS:

Everyone within the payment ecosystem has a role to play, from the payment networks, all the way to the merchants. Education will be key and communicating how best to pay to a country's population will be paramount in ensuring minimal risk to the payments market. Merchants can put measures in place to regularly disinfect cash registers and POS devices to reassure shoppers and payment networks. Banks and acquirers could work together to temporarily increase contactless spending limits to help mitigate the physical handling and touching of POS devices.

A Big Moment for Biometrics

WHAT WE ARE SEEING:

Biometrics have been brought into the spotlight as a key technology for early detection, patient screening, and public safety monitoring in an effort to contain the spread of COVID-19. Surveillance, border control, law enforcement, healthcare, and biotechnologies are the key markets that are rapidly introducing biometrics into infectious disease prevention and control protocols within China, the epicenter of the new virus strain(s), leading the worldwide effort. The focus revolves around two key areas both on an application-specific and macro level, with leading AI biometrics companies like SenseTime, Megvii, and Baidu adapting ML algorithms to meet the evolving threat.

On a macro scale, face recognition and surveillance operations are retrofitted with new screening software to detect individuals who are not wearing protective masks. Additionally, new AI developments are attempting to counterbalance any identification problems due to partial face concealment, which remains a prevalent challenge for face recognition, thus pushing biometric ML and AI algorithms to the next evolutionary step. On an application level, fever and temperature detection technologies have become the weapon of choice for biometric screening for law enforcement, healthcare, and transportation for public security personnel and field agents. This is achieved through handheld biometric devices, portable thermometers, smart clothing, and body-worn-equipment (e.g., law enforcement helmets capable of detecting high temperature in a 3- to 5-meter radius), but also on a grander scale through Closed Circuit Television (CCTV) infrastructure, surveillance cameras, infrared systems, and security checkpoints (e.g., in transportation, underground, and border control).

SHORT-TERM IMPACT:

Contactless technologies like face and iris recognition are currently forced to adapt to the emergent threat. Biometric AI and ML algorithms are pushed to new heights and extend governments' protective, monitoring, and screening reach. However, applications that rely on fingerprint and vein recognition modalities are suffering a significant loss due to being heavily reliant on contact-only sensing technology, posing a great hygienic risk and severely limiting infectious control protocols. In countries with a great reliance on biometric identification like India, this limitation has already manifested itself by forcing the government to effectively terminate all biometric-based access control, workforce management, and attendance applications in certain high-risk regions.

LONG-TERM IMPACT:

COVID-19 will have a significant impact on future biometric applications across different markets and verticals worldwide. Contact-only applications are likely to suffer in certain areas, including enterprise, healthcare, border control, and generally any use case scenario that deals with workforce management and access control. Vendors will rethink fingerprint and vein verification modalities and governments will try to give additional emphasis to face and iris technologies. This will cause more hurdles because a great deal of law enforcement, Automated Fingerprint Identification Systems (AFIS)/Biometric Identification Systems (BIS), border control, VISA, and immigrations applications are also based on fingerprint identification.

Instead, additional investment is expected to be given on face recognition (merging with AI and machine vision, capable of adapting according to the various objectives and screening protocols), iris recognition (bypassing the partial concealment limitations due to subjects wearing masks, but also capable of wellness monitoring, e.g., pupil dilation, blood concentration, etc.), alternative new biometric detection technologies (e.g., temperature and fever detection), and behavioral patterns and emotional/psychological state analytics (i.e., monitor, predict, and anticipate any abnormal incident).

SUMMARY AND RECOMMENDATIONS:

Contact-only biometric Average Selling Prices (ASPs) for sensors and related devices are expected to decrease, while investment for contactless biometric technologies will increase significantly. While other technology segments deal with the aftermath and other limitations due to supply line disruption and market uncertainty, biometric OEMs and software and algorithm developers will also have the added responsibility of providing new screening procedures to assist global efforts on healthcare, border control, and public safety levels.

ABI Research predicts that COVID-19 will also cause another chain reaction on the data protection front, putting additional pressure on citizen rights and related legislation, circumventing a good deal of privacy concerns for the sake of additional surveillance and monitoring operations. It falls on the governments and biometric vendors to create citizen-centric solutions, and adding the necessary restrictions. This will allow both assisting in the worldwide effort to contain and monitor the virus outbreak and preventing the concentration of Personally Identifiable Information (PII) and citizens' biometric, healthcare, and personal data in the hands of a few entities with no visibility, no legislative barriers, no surveillance limitations, and no biometric revocation options for the foreseeable future.

This is not an organic transition, but rather a forced evolution for the biometrics market, and one that is very likely to yield quite volatile results over time, while shifting global priorities.

FREIGHT TRANSPORTATION & LOGISTICS

Rising Costs, Shrinking Capacity, and Panicked Customers

WHAT WE ARE SEEING:

The American Association of Port Authorities sees 1Q volume decreased by at least 20%, including blank sailings, which may cost carriers US$1.9 billion. Rail freight is also impacted with intermodal down by approximately 50%, including from California's Long Beach and Los Angeles ports (the leading container ports in the United States and the busiest in the Western Hemisphere). Global air cargo volumes for the last month are expected to be down 9%. New restrictions on passenger travel from much of Europe to the United States will further affect air cargo capacity. DHL alone is reporting an impact of US $79 million to February earnings. All of this adds to the already existent decreases due to the China-U.S. tariff tensions.

SHORT-TERM IMPACT:

There has been a 4 to 6-week delay in shipments for cargo sourced from China. Other markets from Vietnam to Mexico often rely on Chinese components and raw materials, creating a knock-on effect to the supply chain, including transportation and logistics. The initial loss of road transport demand has begun in the ports and is expected to move to the warehouses and inland routes. Cargo capacity demand in China is beginning to demonstrate some initial signs of growth, with airfreight between China and the United States growing 27% over the last 14 days, creating a demand/supply imbalance. This capacity challenge will move to containers (stranded outside of China) and trucks. However, as the virus has continued to spread outside of China, government actions have included restrictions on travel from 26 European countries to the United States. "Belly cargo" (air cargo) is transported via passenger flights, estimated to be 50% of all air cargo. When this capacity is drastically removed between Europe and the United States, availability will be significantly impacted and spikes in pricing are expected.

LONG-TERM IMPACT:

There is little visibility to forecast, which will have a material impact on transportation and logistics this year. The virus is now impacting the global supply chain, with a current estimate of 113 countries identified as reporting cases. Transportation requirements will be hard to predict. Both capacity and pricing swings are anticipated across transportation modes, with the associated impact to shippers worldwide.

SUMMARY AND RECOMMENDATIONS:

Shippers need to evaluate options and model changes across modes of transportation, taking into account interruptions, delays, and significant price increases. Both manufacturers and retailers need to develop prioritization plans for customers, potentially with set limits per customer. Systems integration whenever possible (ERP, Transportation Management System (TMS), Warehouse Management System (WMS)), along with predictive analytics/scenario modeling, is ideal. Finally, keep in mind that as some countries begin to scale up production and transportation, others may move into containment strategies to address an outbreak. This will require near-real-time visibility across modes and the flexibility to make adjustments to everything from inventory quantities and locations to substitution whenever possible.

INDUSTRIAL, COLLABORATIVE & COMMERCIAL ROBOTICS

Time to Reassess the Global Manufacturing Supply Chain

WHAT WE ARE SEEING:

Currently, the primary effect of COVID-19 has been the halting of China's manufacturing economy during 1Q 2020. The industrial robotics market relies on China for at least 30% of its shipments. Following a slowdown in demand in 2019, one can expect the major industrial robot vendors to struggle again during 1H 2020. The recent quarantine of Northern Italy, one of Europe's key automotive manufacturing centers, will put further pressure on large robot-related expenditures.

The virus has been a good opportunity for companies to display robots for public applications. One of the more popular has been deploying mobile unmanned platforms with Ultraviolet (UV) light to disinfect facilities. Danish company UVD Robots is reaping the benefits of this opportunity and is scaling up deployments of robots to disinfect hospitals. The company has deployed robots in 45 countries, but has only recently been able to enter the Chinese market, as a result of increased demand. U.S.-based Germ Falcon is offering a similar UV disinfection solution for aircraft, while Chinese TMiRob is deploying disinfection robots in Wuhan. Automating disinfection is a key part of maintaining health and safety and could be one of the major bright spots in the response to COVID-19.

Another use case is material handling and delivery. Chinese Pudu Technology is using mobile robots to deliver medical supplies and food to patients within hospitals. This will likely be tested outside of China, with mobile robot developer Aethon well-placed to see an uptake in robot shipments for indoor logistics in medical facilities. The automated material handling market for health will reach US$ 4.2 billion in 2030, up from US$ 178 million in 2019.

Inspection, monitoring, and detection are all key aspects of containing the pandemic, and SoftBank-backed CloudMinds has deployed a handful of mobile robots to measure temperatures in Hubei province. Drones have also been deployed to enforce curfews and surveil areas for security purposes. This represents a big opportunity for aerospace and drone companies to increase sales to government agencies. ABI Research expects the small drone delivery market to reach US$10.4 billion by 2030.

Robots are only a small part of the response to COVID-19 and are more supplementary to the relief efforts that are currently on the way.

SHORT-TERM IMPACT:

There will be a precipitous drop in robot shipments in East Asia, and particularly in China. This will be extended because, even as Chinese plants come back online, demand from Europe and America will slump. This likely means another poor year for industrial robot vendors. Mobile robot developers and drone companies are somewhat less affected due to their more adaptable business model, smaller footprint, and the opportunities provided by the virus to deploy novel solutions in challenging environments. It is quite possible the sliding stock market will mean less venture capital and private investment for mobile robots and driverless cars, and the economic shock will accelerate consolidation as the weaker developers go under or are acquired by those vendors better prepared to sit out 6 to 12 months of economic stagnation.

The quarantining of Lombardy and Northern Italy, and its 16 million residents, has turned into a full-blown lockdown of the Italian peninsula. To enforce this, the government will need to increase its security apparatuses, as well as the productivity of its medical agencies. Robots will be key to achieving that through disinfection, monitoring, and surveillance. Onlookers can expect some robot companies like UVD Robotics to gain acclaim and attention during the crisis.

New applications like automated disinfection and delivery will see an increase in attention as well. The shutting down of households and even ships represents a chance for robot delivery companies (for both land and air) to display their worth. The drone delivery market, in particular, could take its experience with transporting supplies in the developing world and scale up their operations in the most affected countries.

LONG-TERM IMPACT:

Long-term, COVID-19 is leading to a significant reassessment of the global manufacturing supply chain. America's dependence on Chinese imports for basic equipment and medicines is becoming a contentious issue, and government representatives are already interpreting the crisis as a chance to revitalize the campaign to reshore more manufacturing capacity to the domestic market. The U.S. Government, with the support of senators, is drafting an executive order to create "Buy American" regulations for masks and medical supplies, in the hope of reshoring the supply chain. If this translates into more significant measures by governments to diversify or reshore the manufacturing of key goods, this could bode very well for the robotics industry, as such changes would require big increases in CAPEX and productivity improvements within developed countries.

The situation is currently very fluid, but if the drastic measures displayed in China, South Korea, and Italy are eventually adopted in Western Europe and the United States, there will be considerably more deployments of robots for emergency applications; so much so that they will be incorporated into government operations for future contingencies.

Crises shift perceptions on what is possible regarding investment and transformative action on the part of both private and government actors. By the time the COVID-19 pandemic has passed, robots will be mainstreamed across a range of applications and markets.

SUMMARY AND RECOMMENDATIONS:

For some robotics vendors, particularly larger actors in the industrial space, COVID-19 is going to add further stress to a difficult market and could force significant cutbacks in staff and expenditures, severely impeding automation. On the flipside, the crisis has highlighted the potential value of automating industrial processes to a greater degree to mitigate disruptions in the supply chain and workforce.

For the fledgling companies developing mobile robots for disinfection, delivery, security, and more, the crisis presents an opportunity to show their worth. Across the developed world, healthcare services and security agencies are likely to have their resources tested, and if novel deployments of robots for the afore-mentioned applications can prove their value, this could represent a test case for robotics to show their worth for challenging applications in health, security, and government.

In summary, COVID-19 represents a disaster for robotics vendors building solutions for developed markets in manufacturing, industry, and the supply chain. But for vendors targeting markets closer to government, such as health, security, and defense, it represents a big opportunity.

ABI Research recommends that industrial players develop customized solutions for non-manufacturing use cases, or look to build comprehensive solutions for enabling a scale-up in medical supply manufacturing. For mobile robotics vendors and software companies targeting more nascent markets, this represents a big chance to highlight the importance of robotics for dealing with national emergencies, as well as mitigating the economic shock.

INDUSTRIAL & MANUFACTURING

A Supply Chain in Shock

WHAT WE ARE SEEING:

For many firms, the outbreak of COVID-19 has meant staff working from home and more use of teleconferencing, rather than face-to-face meetings. However, it is a different situation for manufacturers because, despite investments in automation reducing the need for staff on assembly lines, they still need to receive raw materials. The impact of COVID-19 is both global and unpredictable, and the supply chain shock it is causing will most definitely and substantially cut into the US$ 15 trillion worldwide manufacturing revenue currently forecasted for 2020.

SHORT-TERM IMPACT:

Initially, plant managers and factory owners will look to secure supplies, realizing the constraints further up the supply chain and how much influence they have on their suppliers.

LONG-TERM IMPACT:

Manufacturers will need to conduct an extensive due diligence process, as they need to understand their risk exposure, including the operations of their supplier's suppliers. To mitigate supply chain risks, manufacturers not only need to be flexible and not source components from a single supplier, but also, as COVID-19 has highlighted, should not source from suppliers in a single location.

In software applications in the manufacturing setting, ABI Research forecasts that the supply chain impact of COVID-19 will spur manufacturers' spending on Enterprise Resource Planning (ERP) to reach US$14 billion in 2024. While many ERP platforms include modules for inventory control and supply chain management, in light of the outbreak, many manufacturers will also turn to specialist providers. Supply chain orchestration requires software to be more than a system of record, providing risk analysis, running simulations, and enabling manufacturers to understand and prepare for supply chain shocks.

SUMMARY AND RECOMMENDATIONS:

Industry 4.0 has received much attention; however, the focus has been on the activities inside the factory gates. But investments in robotics, Internet of Things (IoT) sensors, and more assume that assembly lines are still receiving a steady flow of raw materials. COVID-19 demonstrates that manufacturers need to be as focused on their suppliers' capabilities as they are on their factory floors.

M2M, IOT & IOE

The IoT Market Remains Steady – For Now

WHAT WE ARE SEEING

The rapid increase in the COVID-19 spread across the world has not produced any noticeable impact on the suppliers serving the IoT market or the demand for services. One Mobile Virtual Network Operator (MVNO) that is forming partnerships with Chinese telcos noted that the only impact it is seeing is a delay in communications and approvals, as more people are working from home. However, ABI Research expects to see some short-term and long-term impacts, but these are very dependent on the duration of virus spread, and then its expected decline in 2020.

SHORT-TERM IMPACT

Like many markets that support the global supply chain, IoT suppliers will be impacted, although it is unclear to what extent. With trade flows restricted either from less manufacturing or less business demand, IoT service providers are likely to experience a bit of downward pressure for their services, at least in the short term. The most affected, in ABI Research's view, will be suppliers for fleet management and asset tracking/monitoring services, if trade flows are restricted, but only for the very short term.

Chinese suppliers in the IoT hardware markets, from chips to modules to gateways, have been somewhat mum on the impact of COVID-19 to their businesses. Near term, China will see some of the greatest impact due to reduced manufacturing of IoT devices because China has the largest IoT device shipments and connections today. The United States is second for IoT device shipments and connections and has a growing footprint of Chinese-supplied IoT devices. However, COVID-19 may be the "two" in a "one-two" punch led by the trade war for Chinese IoT suppliers as companies reassess their supply chains and dependence on Chinese products. Interestingly, the follow-on effect of supply chain shifts away from China could be even more pricing pressure if Chinese suppliers decide to lower prices to maintain their current customer relationships.

From a channel perspective, a slowdown in global trade activity for IoT hardware vendors will likely have the most impact on sales through electronic distributors. For some suppliers, such as module vendors, up to 50% of their business can be through these distribution channels serving smaller sales orders that come in on a day-to-day basis. The other 50% of their sales are enterprise sales, typically with longer lead times for fulfillment for application segments like Original Equipment Manufacturer (OEM) telematics, smart metering, and home automation/security. These relationships are unlikely to be affected, although shipments related to these contracts could be delayed.

LONG-TERM IMPACT

Interestingly, COVID-19 could spur more investment in IoT services for condition-based monitoring in the longer term. The reason is that equipment needs to be monitored and serviced, which still is a heavily human-driven activity. If more equipment and machines are connected, less human interaction will be necessary, at least for daily assessments on equipment operations. Industrial markets will see the upside, particularly the manufacturing and energy markets, which are highly dependent on machine operations. But other markets to benefit include commercial building automation, healthcare equipment monitoring, and transportation infrastructure.

Finally, the new phrase of the day due to COVID-19, "social distancing," could see cities and even enterprises investing in more kiosk and vending services to lessen human contact. From the enterprise perspective, airports and banks are the most likely to show greater interest in kiosks and Automated Teller Machines (ATMs). It is true that both industries are already investing in these technologies; however, COVID-19 may see them increase their investments as an even more prudent strategy to protect their business operations and improve customer services. It is not too much of a stretch to see more worldwide health emergencies due to global warming changing the patterns of disease outbreaks and transmissions, particularly as the world population grows.

SUMMARY AND RECOMMENDATIONS:

The biggest impact from COVID-19 is its restrictions on the movement and gathering of people to limit the spread of the disease. This, in turn, is restricting not only business and vacation travel demand, and entertainment and event traffic, but also manufacturing activities where people drive many of the build and support processes. Taken together, these restrictions are slowing the flow of both people and goods, thus affecting the supply chain that supports these flows.

The relatively rapid spread of the virus has not produced any noticeable impact on IoT suppliers and their operations. And it is unclear if the coronavirus will drive the next hot new IoT application, such as disease sensor arrays or connected respirator masks. However, there will be short-term and long-term implications for the IoT supply chain for which ABI Research offers three recommendations for consideration:

1. Maintain and even increase communications with current IoT customers during this uncertain time and its impact on global trade. Beyond the internal communications happening as companies prepare for more work from home activities, strategic impacts of COVID-19 and how to prepare for the future are in the early stages of discussion. IoT suppliers should influence the outcomes!

2. For IoT hardware suppliers, supply chain assessments have already been in motion due to the trade war. But now is a good time to reassess positions in various IoT markets, either for potential opportunities due to longer term planning by enterprises using the IoT or for potential pricing pressures if Chinese suppliers leap out of the pandemic with lower product pricing to maintain shipment volumes. It should be noted that software and services available with hardware sales should be given more attention to buffer against price competition.

3. Automation and remote monitoring will be two areas that receive more attention in 2020 for IoT services as a result of COVID-19. Healthcare will be another market where technology will be top of mind to better protect against future health crises. IoT suppliers should put more emphasis on finding opportunities and developing services for these markets to capitalize on COVID-19 after affects.

How Will Utilities Be Impacted?

WHAT WE ARE SEEING:

As the COVID-19 pandemic continues to cause panic around the world, countries that are worse affected are beginning to take severe measures to contain the outbreak. While countries like Italy, Japan, and China have already declared region-wide lockdowns, other countries are coming up with various restrictions to residents' mobility to isolate the outbreak. Governments across the world are also cancelling or deferring business conferences, sports, and cultural events, and in some extreme cases, asking residents to stay indoors. As these measures to restrict residents' mobility are undertaken to contain the spread of the pandemic, they also have a significant impact on energy and water utilities operations, especially demand forecasts to ensure the reliability of supply to both commercial and residential consumers.

As governments impose restrictions on residents' movements, this will also impact utility service providers' ongoing maintenance projects and smart meter deployments that require utility field service engineers or third-party professional meter installers to visit customer premises to replace or install smart meters. Most importantly, utilities face the challenge of delivering uninterrupted services to their consumers, while there is a potential risk in the reduction of their workforce.

SHORT-TERM IMPACT:

Energy and water utilities will need to proactively take measures to closely monitor fluctuations in regional demand and re-direct supply where necessary. Utilities' energy and water distribution infrastructures will need to take into consideration potential increases in residential energy consumption, especially in cities, as office workers choose to work from home. For example, in Italy, residential consumption of energy and water will witness an increasing surge in demand as the government has placed restrictions on most residents to stay at home. Utilities will also be under considerable strain to provide continuity of services with limited field service crews, as any disruption in utility services could also create further panic in society. Similarly, utilities in other countries will need to plan contingency measures to ensure uninterrupted services to their consumers.

In regions affected by the COVID-19 outbreak, the challenges for field service engineers and installers to access premises will also become more difficult, especially for households where electricity, gas, and water meters are located inside the house. In countries where there are ongoing projects undertaking nationwide rollouts of smart meters, installation services are implemented either by the utilities' field service engineers or third-party service providers with contracts that stipulate strict meter installation targets. Globally, smart meter programs are expected to install nearly 155 million smart meters in 2020 to meet deadlines set by utilities and regional regulators. However, growth in smart meter installations is likely to decelerate for at least 1Q 2020 in regions like Italy, Japan, France, South Korea, China, Spain, and Germany, which will subsequently impact their overall 2020 installation targets.

LONG-TERM IMPACT:

The disruptions caused by the COVID-19 pandemic will test utility service providers' ability to predict changes in consumer demand and quickly take necessary measures to minimize operational issues and reduce costs. Ongoing grid maintenance projects and smart meter rollouts are likely to witness further uncertainties from supply chain lags in procuring equipment and parts due to disruptions in manufacturing. In large-scale smart meter deployments, utilities predominantly rely on a multi-vendor ecosystem to procure smart meters to mitigate such supply chain risks. However, as global supply chains are expected to be disrupted, it will challenge meter suppliers' ability to quickly recover and meet utility service providers' demand.

Utility service providers that have already digitized their distribution network and integrated their Operational Technology (OT) (e.g., smart meters) to the IT system will benefit from more accurate, near-real-time insights on demand to efficiently manage their resources. However, this will also further solidify the importance of IT/OT convergence, beyond the meter to cash applications, to all aspects of utility service providers' operations.

SUMMARY AND RECOMMENDATIONS:

Energy and water utilities will need to make the right long-term strategic investments in IoT technology to tackle various complexities arising from increasing consumer expectations, minimizing the impact of external disruptions on day-to-day operations. Additionally, utilities will need to acquire capabilities to improve information management and equip employees with tools that would enable critical enterprise communications and improve engagement with consumers.

Cloud-based IoT platform vendors will need to proactively work with utility service providers to integrate ERP systems and field service management platforms with real-time cloud databases, such as regional government databases that closely track the COVID-19 outbreak. This real-time information would allow utilities to identify high-risk affected areas and find alternative routes or work orders for field crews. Furthermore, such integration would allow utilities to make quick decisions on the allocation of resources based on real-time information from their OT assets, while adhering to regional regulations and improving operational efficiency. For utilities currently on the path to digitizing their operations, the convergence of OT and IT to create a unified asset information system is becoming ever more critical to future-proof grid resiliency and deliver service continuity.

Embrace Long-Term Thinking

WHAT WE ARE SEEING:

The precautionary measures implemented to prevent the spread of COVID-19 are causing greater disruption to international business than the infection itself. These measures ward off the greater catastrophe that is loss of life, but the interruption of normal business processes causes delays. Delays are time penalties, and time is money. Factories are closed, so components and equipment that use those components are not being manufactured. Customers that outsource their manufacturing are lobbying for factories to be allowed to reopen. Employees are being quarantined at home. And although many jobs today can be done from home, decisions are best made and fastest made when people are in the same place at the same time. Chinese culture, in particular, puts great emphasis on attendance in the workplace.

SHORT-TERM IMPACT:

Supply chain disruption has been the biggest material consequence of COVID-19 within the IoT industry, especially in this globalized economy that so heavily relies upon China. We live in a time when inventory is a critical cost consideration and companies cannot afford to hold more stock than they know they can ship. Manufacturing orders are increasingly placed as sales occur, instead of being catered to in anticipation. Smaller companies could easily find themselves unable to trade, as may specialized equipment providers. A significant percentage of electronics assemblers are having component and raw material acquisition issues. Presently, a minimal number are operating with a partial shutdown, but more are expecting to have to do so.

LONG-TERM IMPACT:

Pauses, delays, and temporary economic slowdowns are a small price to pay for ensuring speedy recovery and securing future growth, however. Intelligent inventory management can help companies understand manufacturing versus shipment shortfalls, to consciously ration or stagger deliveries to customers, or to suggest alternative products as a stopgap. Cancelled travel, conferences, and trade shows have interrupted deal-making. But this is not revenue that has been lost forever, they are opportunities that have been postponed instead. Communal industry protection and not selfish individualism is key to seeing this through. In the shield wall of antiquity, each combatant protected the compatriot to their left—a cohesive, connected unit is better for the survival of all involved.

SUMMARY AND RECOMMENDATIONS:

The IoT is an industry that, as it grows, should help to alleviate such disruptions, be they caused by disease or something else. Increasingly, automated public services infrastructure and automated manufacturing environments can continue to operate normally with less reliance on human interaction. Moreover, the deployment of automated sensor-based infrastructure can better monitor the flow of passengers through ports of transit for specific signs of illness. Sickness can be identified faster and patients can be treated sooner, improving their chances of recovery. The spread of an infection can be reduced, while essential infrastructure is made more resilient. Early warning systems prevent healthcare services from becoming overwhelmed, preserving their effectiveness, as overburdened services are less able to help patients with other needs.

Knee-jerk reactions cause precious resources to be reallocated and monopolized. So, preparation through continuous monitoring, courtesy of the IoT, matters. Pandemics are non-discriminatory. Individuals of any background may fall victim. There is no level of society or the economy that is immune to negative impact. The rapid sharing of information for the sake of the coordinating efforts across borders and between governments is something that sensors, AI, and the cloud can empower. Alerts and real-time dashboards can track the spread of a problem and provide practical information to people nearby about how best to respond to the situation.

Big Data Holds The Key To Combating The Pandemic

WHAT WE ARE SEEING:

The economy is taking a massive impact from the COVID-19 pandemic, whereas a lot of business disruptions are caused not only by COVID-19 itself (health of the workers and employees), but also by panic, misinformation, and lack of tangible data to assess the risks. From early January to mid-February, the mortality rate speculations were disrupting the supply chain and causing panic buying. Whereas the strong top-down approach implemented by South Korea revealed that average mortality rates were around 0.7% to 0.9%, the answer to the panic questions is simple: big data. The data-driven response and decision-making is also followed by the Centers for Disease Control's (CDC) Public Health Data Modernization Initiative, encouraging and enabling the update of current IT systems for better detection, tracking, and analysis in times of outbreaks. ABI Research believes that the answer to addressing the current epidemic starts with IoT data.

SHORT-TERM IMPACT:

In the beginning, we will see the app segment rapidly increasing, making the location and localization of people's clusters available. South Korea, which is already demonstrating a great use of data enabled developers to access an open Application Programming Interface (API), encouraging them to create smart inventory systems, so people can access the supply/shortage of masks, medications, and other medical supplies.

Additionally, there is potential for easing the regulations regarding privacy and personal data. The social volunteerism to vacate data could also become a great source for companies' commercial products in the future. Google Cloud Premier Partner software company Ubilabs, which is based in Germany and provides data security and privacy consulting services, already voiced concern over the misuse of data due to the pandemic.

LONG-TERM IMPACT:

When it comes to data and rapid analytics, ABI Research expects a rapid development in technologies, directed specifically for healthcare, transportation (including Business-to-Consumer (B2C) and Business-to-Business-to-Consumer (B2B2C) markets), and the government sector. The prospect of IoT data monetization is also rapidly increasing, because the current experience with COVID-19 exemplifies how remote monitoring can be vital. For example, Taiwan has demonstrated sophistication in using technology to mitigate the community spread, as the country uses temperature monitors in the airports, train stations, and public places, which were installed in 2003 after the SARS outbreak.

Therefore, after the 2020 outbreak, it is expected to see greater use of the remote monitoring system, and expansion of the stateless processing technology, alongside democratization of the IoT technology toward wider sectors. ABI Research forecasts that the 2019 revenue for IoT data and analytics services surpassed US$23.6 billion in 2019 and is expected to grow to US$118.4 billion by 2026. As a consequence of COVID-19, the healthcare, transportation, and public sectors could drive the Data-as-a-Service domain toward higher financial indicators.

SUMMARY AND RECOMMENDATIONS:

The concern over supply chain disruptions and potential economic and revenue losses has been a great focus within Industry 4.0 However, the crises-driven Data-as-a-Service and Analytics-as-a-Service monetization opportunities are largely overlooked. COVID-19 demonstrates that data are truly the new gold and, in the case of 2020, the absence of data is a great disadvantage, especially for sectors affected the most. Hence, ABI Research recommends replacing legacy infrastructure and investing in modernized IT systems, knowledge sharing, and standardization.

SMART CITIES & SMART PLACES

A Chance To Learn Key Lessons

WHAT WE ARE SEEING

From a smart city perspective, the problem around COVID-19 boils down to a discussion around urban resilience. This was covered extensively by ABI Research in 2019, as a key emerging trend in the smart cities market (Resilience Technologies and Approaches for Smart Cities (PT-2251); 5 Ways Smart Cities Are Getting Smarter). This research highlighted that due to their high population concentrations, cities are vulnerable to predictable and unpredictable disasters and catastrophes, including diseases and epidemics, along with earthquakes, tsunamis, volcano eruptions, sea-level rise and flooding, food shortages, wildfires, extreme heat, hurricanes, tropical storms and typhoons, terrorist attacks, civil unrest, cyberattacks, war, nuclear or chemical contamination, extreme air pollution, etc. Cities are not only vulnerable to loss of life, but also to loss of economic output and value.

Cities have become acutely aware of this, with some already having appointed chief resilience officers responsible for cross-departmental risk assessment, organization of readiness and preparedness, and putting in place technology-enabled manual and automated response management. As it relates to healthcare, ABI Research highlights decentralized home-based and remote healthcare capabilities, redundant and backup hospital infrastructure, and drone-based delivery of medicines as key examples of leveraging technology. China effectively deployed drones to transport medical samples and quarantine materials between hospitals, reducing the risk of contamination. China obviously also had plans in place to rapidly build additional hospital capacity to cope with emergencies like COVID-19.

However, despite these positive examples, the overwhelming conclusion must be that cities and, by extension, countries were woefully unprepared for epidemics like COVID-19. In many cases, even the most basic guidelines on how to minimize the risk of contamination were lacking. To date, cities, countries, and even the European Union (EU) and the World Health Organization (WHO) continue to improvise and decide on the fly how to cope with the rapidly spreading virus, resulting in disjointed and inconsistent measures varying widely between countries and regions. Stocks of face masks were largely insufficient. Hospitals had to very creative to cope with the exploding streams of patients.

SHORT-TERM IMPACT

Lessons will be learned from COVID-19, which is perhaps the most important aspect of all. The world as a whole and cities, in particular, will finally lose their innocence and naïve “nothing can happen to us” beliefs and adopt responsible attitudes toward resilience. We can be sure about one thing: other disasters are waiting in the wings to happen. The preparation for the next emergency has to start today.

LONG-TERM IMPACT

The good news is that technology will be a critical tool in the war against the unexpected. Leveraging robotics for the delivery of goods and transportation of people, tapping into the sharing economy to liberate additional capacity for housing, mobility, and freight during emergencies, building automated and flexible production lines and supply chains allowing scalability and regional independence, and massively deploying online and remote capabilities for education, healthcare, meetings, and entertainment will go a long way to being better prepared for disasters.

SUMMARY AND RECOMMENDATIONS:

While it will be hard to prepare for specific as yet unknown threats, putting in place a wide range of flexible technology platforms and capabilities will be instrumental in mitigating at least the worst effects of the impact of the emergencies that will hit the world in the future.

SMART HOME

A Safer Home Is A Smarter Home

WHAT WE ARE SEEING:

The impact from the spread of COVID-19 is compelling people to spend more time in their homes, limiting travel and avoiding public gatherings and recreational events, and increasing emphasis on telecommuting and even self-quarantining. With a new emphasis on the home environment and the importance of working from home, industries will likely expand that can ease the management of the home space and keeping people healthy within it. The increased value placed on comfort, ease, and simplicity within the home is likely to drive increased smart home interest and engagement.

SHORT-TERM IMPACT:

Key among the recommendations regarding COVID-19 protection in the home is to "clean and disinfect high-touch surfaces daily in household common areas (e.g., tables, hard-backed chairs, doorknobs, light switches, remotes, handles, desks, toilets, sinks).* Voice has already made significant inroads into the smart home space. With the push to avoid shared surfaces even within a home comes greater value in voice control. Voice control can mean avoiding commonly touched surfaces around the home from smartphones, including TV remotes, light switches, thermostats, and more. Voice can also be leveraged for online shopping and ensuring that those deliveries are received securely without the need for face-to-face interaction. Smart locks and smart doorbells/video cameras can enable deliveries to be placed in the home or another secure location directly, or monitored securely on the doorstep until the resident can bring them in. Such delivery capabilities are especially valuable for those already in home quarantine or for those receiving home testing kits.

LONG-TERM IMPACT:

Voice control is the Trojan horse of smart home adoption. Any additional drive and incentive for voice control in the home will help drive awareness and adoption for a range of additional smart home devices and applications. Greater emphasis and understanding, and above all, a change of habit and experience in moving away from physical actuation toward using voice in the home will support greater smart home expansion throughout individual homes. A greater emphasis on online shopping and delivery will also drive smart home device adoption to ensure those deliveries are securely delivered.

SUMMARY AND RECOMMENDATIONS:

Precautions for COVID-19 will bring new routines into many millions of people's daily lives in and around their homes. Smart home vendors and system providers can certainly emphasize the role of voice and other smart home implementations to improve the day-to-day routines within a home and the ability to minimize contact with shared surfaces, as well as securing and automating home deliveries. There is role for integrating smart home monitoring and remote health monitoring with a range of features, such as collecting personal health data points (temperature, activity, heart rate) alongside environmental data (air quality or occupancy) to help in the wider response and engagement for smart city health management.

*U.S. Government recommendations from the Centers for Disease Control (CDC)

SMART MOBILITY & AUTOMOTIVE

A Bumpy Road Ahead

WHAT ARE WE SEEING?

The struggling new vehicle sales market is being sent into a tailspin by the impact of COVID-19 on bricks and mortar retail, while the fragility of the globalized automotive supply chain is being painfully exposed.

SHORT-TERM IMPACT:

The most immediate impact of COVID-19 is the devastating impact on new vehicle sales. In China, the largest single market for new vehicle sales, the market had already begun to falter before the onset of COVID-19, due to a general macroeconomic cooling, trade war concerns, and a shift in policy for new vehicle subsidies. The impact of COVID-19 on vehicle sales was made visible in February 2020, with sales falling by 81.7%. Some vendors in the industry expect a global contraction of 5% in automotive sales in 2020, following a contraction of around 4% in 2019. In all geographies, an aversion to bricks-and-mortar retail due to the risk of infection will particularly impact the automotive industry, which is almost universally dependent on a dealership retail model. On the supply side, the automotive industry's exposure to China is now fully visible, with the impact spreading around the global supply chain long before the virus was declared a pandemic. China has not only become a major manufacturing location for components in today's vehicles, but is also a major target for investment in the development and manufacture of key enabling technologies for future vehicles, including Electric Vehicle (EV) powertrains.

LONG-TERM IMPACT:

The impact to vehicle sales should be confined to the short term and will likely recover once the outbreak has subsided. This will likely be followed, in the mid-term, by above-trend growth in car sales, as consumers execute on the vehicle purchase/renewal decisions that have been deferred by concerns over infection. Such an effect was visible from 2012 onward, after the economic shock of the 2008 global recession receded and consumers rapidly began to renew their aging vehicles. With respect to the supply chain, OEMs will have a natural instinct to insulate themselves from future supply chain disruption, engineering further resilience and redundancy into their manufacturing processes, just as the industry did following the 2011 Japanese Tsunami.

SUMMARY AND RECOMMENDATIONS:

The automotive industry is typically among the most exposed verticals to pandemics, environmental disasters, and economic shocks, given that a car is a typical consumer's second-most expensive purchase, and that each vehicle is built on a highly fragmented and globalized supply chain. OEMs must avoid the temptation to simply shuffle manufacturing locations (which offers little robustness to infectious diseases on a pandemic scale) and must instead purse investment in technologies like AI, robotics, and Collaborative Robots (cobots) to minimize their exposure to infectious outbreaks in emerging economies.

VIDEO & CLOUD SERVICES

A Sober, But Hopeful, Reality

WHAT WE ARE SEEING:

The impact of the SARS-CoV-2 virus and associated COVID-19 has and will continue to take a toll on the global economy until it is contained, but not all markets are equally impacted, and the cloud services and content markets are a prime example. Public events and gatherings, as in other markets, have been negatively impacted, with closures, delays, and reduced attendance; for example, conferences and events like the Game Developers Conference (GDC), Facebook F8, Google Cloud and I/O events, Pax East, and South by Southwest (SXSW) were rescheduled (or turned into a digital/virtual-only event), saw reduced participation, or were cancelled, as have a number of film festivals. Other public events like sporting events (including eSports tournaments) have moved, had limited or no public attendance, or been cancelled, and movie theater closures, coupled with an increasingly hyper-aware public, has led Hollywood to adjust some roadmaps (e.g., delaying the theatrical release of the new James Bond movie No Time to Die). As more of the public spends more time at home and indoors, the other component of the media & entertainment market in some areas is receiving a boost.

School closures, for example, are giving a bump to video gaming and Over-the-Top (OTT) streaming, and some events like the Intel Extreme Masters Katowice tournament finals set a viewership record for non-major Counter-Strike eSports events with more than 1 million viewers; the finals were closed to public attendance due to concerns over the virus. More broadly speaking, the more time people spend at home, the greater the importance of OTT streaming, video games, and social media in media and entertainment and maintaining social connections.

SHORT-TERM IMPACT:

In the short term, the cancellations and closures of public events/conferences and venues (e.g., movie theaters) are directly impacting event participants and revenue; smaller firms like indie developers and studios, in particular, are hit by these cancellations because they serve as a valuable marketing platform for their content and services. For larger studios and industry players, there are related costs as companies grapple with the spread of the virus, including expenses related to pulling out of a conference or cancellations and delaying releases or product launches. Some content houses have joined other tech companies in instituting work-at-home initiatives, which can add to the Information Technology (IT) budget.

Content consumption (outside of public venues), however, is up, and while this could create a short-term bump in revenue, if the virus continues to impact commerce and workplaces on a longer-term horizon, this will begin to more negatively impact a wider breadth of companies and markets.

LONG-TERM IMPACT:

While there are certainly manufacturing shortages and challenges, some aspects of the Consumer Electronics (CE) space, such as game consoles, have not experienced a significant impact to date; Nintendo has cited some pending shortages of the Switch in some markets (e.g., Japan), but better short-term outlooks in other regions. If manufacturing delays persist, this could negatively impact stock in the coming months and, potentially, future launches like the next generation of consoles currently planned for the end of 2020. Problems with this launch would certainly reduce the revenue expectations for retail and the console gaming market at large. Similarly, a protracted struggle to contain the virus will make it increasingly difficult for studios and content producers to produce and adhere to release schedules (some have already been delayed), disrupting the flow of content and potentially causing issues with services.

SUMMARY AND RECOMMENDATIONS:

At this juncture in time, outside of the public events and venues, the larger content and service providers within the media and entertainment markets are not projecting a significant impact from COVID-19. A protracted worldwide struggle to contain the virus, however, will certainly yield more significant problems for all companies throughout the media & entertainment landscape. To combat some of these problems, content holders could work with services to alter release windows; for example, a smaller film could spend less time in the theaters and hit the digital space at an accelerated rate to take advantage of the changing needs of the viewing public. Further, if lulls in content releases occur, service price discounts could help keep subscription growth positive, and if extended to existing subscribers (or alternative incentives), then it could help reduce churn.

Video Solutions Can Bring People Together – And Drive Revenues

WHAT WE ARE SEEING:

The COVID-19 outbreak has caused travel disruptions worldwide, as governments and healthcare authorities impose travel restrictions in order to control the human-to-human transmission of the virus. This has already affected many industries, including telecommunication. Mobile World Congress (MWC), one of the major annual trade shows organized by the GSMA, was cancelled in February 2020 over fears surrounding the COVID-19 outbreak. Cancellation of MWC occurred after industry players, such as Ericsson, Intel, Nokia, and many other companies, announced their withdrawal from the show due to the COVID-19 outbreak. Google has restricted business travel to China and Hong Kong, as have many others. Company-specific events have also been cancelled, such as Google I/O in May.

SHORT-TERM IMPACT:

Companies will increasingly rely on telecommunication opportunities as strict travel and workplace policies are enacted. To maintain knowledge share, and hopefully recoup some of the losses seen by these restrictions, companies will hold virtual conferences and events, while mandating work from home policies and using existing telepresence options.

In addition to travel and workplace restrictions and cancellations of large events, temporary closures of manufacturing facilities and retail stores in the worst affected regions will impact the supply chain. Delays in manufacturing, logistics, and distribution of Customer Premises Equipment (CPEs), including broadband and pay TV devices, are expected in the short term.

LONG-TERM IMPACT:

Disruptions in manufacturing, together with cancellations of events like MWC where major technology partnerships are formed are likely to cause delays in infrastructure development. 5G infrastructure equipment manufacturing in areas hit by COVID-19 could be postponed because China is among the major centers of telecommunication equipment manufacturing. This will result in the delayed construction of 5G networks, and testing and trialing of the next-generation mobile services. This will ultimately result in slower than expected network deployments in both wireless networks and 5G fixed wireless broadband expansion.

SUMMARY AND RECOMMENDATIONS:

Companies need to identify the extent of delays and equipment supply shortages in the short term and set realistic targets for new product or service launches or expansions. Proper assessment of market demand is also essential before making significant investments in new products because the crisis may financially impact consumers, resulting in reduced demand for new products. For example, a consumer's priority for purchasing a new game console or a new TV might be affected by the economic conditions.

In order to manage productivity, while travel restrictions are in place, companies could deploy video solutions to stay connected with their customers and collaborate with employees in different regions. Cloud-based video platforms are suitable for companies of different sizes to quickly deploy without requiring significant Capital Expenditure (CAPEX). Enterprise video solutions can be deployed for corporate communications, employee training, product demonstrations, customer support, and many other use cases. Enterprise video solution providers should take advantage of the current situation to introduce their products and services and expand their businesses.

WI-FI, BLUETOOTH & WIRELESS CONNECTIVITY

A Need For Flexibility Will Fuel The Future of Connectivity

WHAT WE ARE SEEING:

The outbreak of COVID-19 has resulted in many companies taking proactive steps to protect their workforces by encouraging working from home and promoting video conferencing as an alternative to face-to-face engagements. Many schools and universities have closed their doors temporarily, moving classes online and shifting to remote learning approaches. At the same time, people are spending more time at home as fears grow and more and more public events are cancelled, while consumer spending has shifted further from the high street toward online deliveries and digital subscription services.

SHORT-TERM IMPACT:

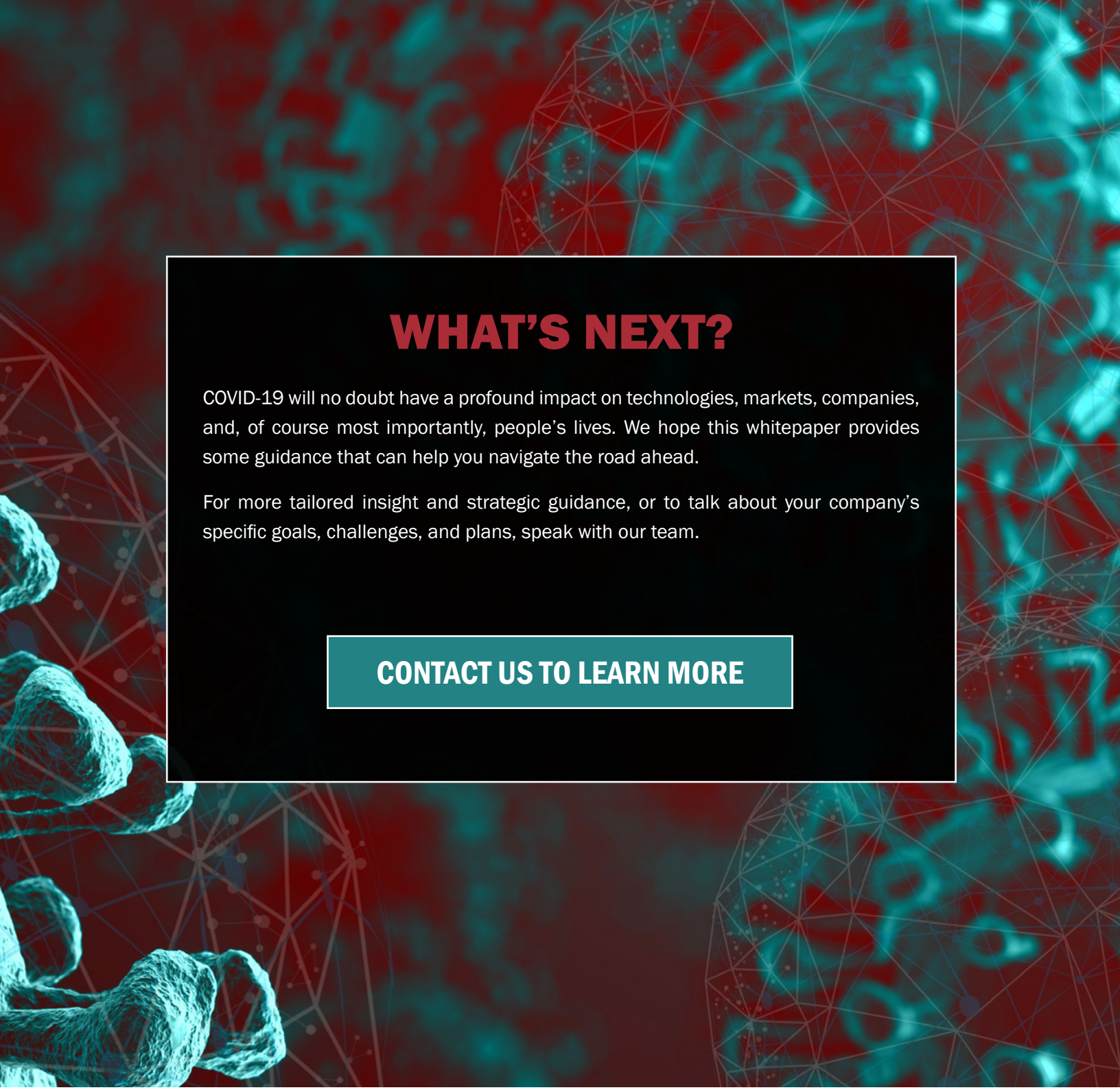
When these factors are combined, the additional number of simultaneous home users and related increase in video and other traffic are likely to put significant additional strain on home broadband and Wi-Fi networks. Many users may find that their existing home Wi-Fi network and wider broadband infrastructure are inadequate or incapable of supporting this significant uptake in usage. Many users are still likely to be using outdated Wi-Fi equipment with legacy Wi-Fi standards, such as 802.11n, rather than the latest Wi-Fi 6, which has specifically been designed to deal with better provision in more crowded networks. There may be renewed incentive for mesh Wi-Fi that can provide sufficient high-speed coverage to multiple users throughout the home. On the infrastructure side, a recent survey from Ofcom in the United Kingdom noted that only 10% of U.K. homes and businesses (around 3 million) have access to full-fiber broadband connections that support speeds of up to 1 Gigabits per Second (Gbps), while the additional drain on shared neighborhood resources could be significant. At the same time, companies will need to ensure they have the right infrastructure in place so large numbers of employees can connect to company Virtual Private Networks (VPNs) at the same time. Many companies may not have VPNs at all, while capacity limitations could put companies at further risk of security breaches or slow down productivity further.

LONG-TERM IMPACT:

The hope, of course, is that the impact of COVID-19 will be very short lived and that people will be able to return to work, school, and normality as swiftly as possible. In the longer term, today's necessities could lead to an increased desire and testbed for flexible and remote working and learning in the future, while companies may shift marketing and business resources away from conference-centric approaches toward new online and virtual marketing tools, particularly as additional concerns grow over the impact of climate change via international travel. In the longer term, it could lead to a reassessment of how many modern workplaces and working relationships are structured, reducing the impact of long commutes and travel, enabling more flexible working and remote collaboration, leading to improved employee satisfaction and improved work-life balance. In order to achieve this, additional resources will need to be devoted to VPNs, secure home networking, and remote-working/conferencing software. Alongside this, further investment will need to be made to ensure home broadband infrastructure can support high-speed Wi-Fi Internet access. Education will need to be provided on how to optimize and get the best out of home Wi-Fi networks. Employees will need to be equipped with equipment that can support robust, efficient, and low latency Wi-Fi standards, while various organizations around the globe will need to open up additional spectrum, such as 6 Gigahertz (GHz) to ensure the capacity of Wi-Fi networks can meet a global increase in demand for video, collaborative tools, and other data-heavy traffic going forward.

SUMMARY AND RECOMMENDATIONS:

Organizations will increasingly need to be more flexible and able to support and encourage options for remote working, learning, and training. Invest in alternative digital exhibitions and showcases, as happened with the cancelled MWC 2020, and understand what role technologies like AR/VR may play in the next decade of this digital transformation, whether for marketing, education, or training purposes. However, all of these longer-term transformations require a deep understanding of the need for high-speed, highly secure wireless infrastructure to and within the home. This could lead to greater incentives being placed on rolling out high-speed fiber or last-mile networks, better awareness of the need for robust whole-home connectivity via mesh systems, and the adoption of 6 GHz Wi-Fi and the latest Wi-Fi standards. In addition, it could lead to greater home Wi-Fi security, improved cybersecurity education, and a better understanding of the need for additional Wi-Fi capacity in the years to come.



WHAT'S NEXT?

COVID-19 will no doubt have a profound impact on technologies, markets, companies, and, of course most importantly, people's lives. We hope this whitepaper provides some guidance that can help you navigate the road ahead.

For more tailored insight and strategic guidance, or to talk about your company's specific goals, challenges, and plans, speak with our team.

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