

Post-Pandemic Reflections: Disruptive Technology

An assessment of emerging risks
and opportunities



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Disruptive technology amid pandemic disruption

The Covid-19 pandemic has profoundly impacted people's lives, families, communities and the global economy - and its future evolution remains uncertain. The scope and speed of impact across all business and economic sectors has been huge – global lockdowns have seen a collapse of demand and activity akin to the Great Depression.¹ In the analysis that follows, we review how social and economic changes may propel the potential of disruptive technologies to unprecedented heights. We focus on 3D printing, the Internet of Things, cloud computing, fintech, digital payments, healthcare innovation, robotics, cybersecurity, clean energy and



smart grids. In the short- to medium-term a key question for investors may be whether these disruptive technologies can help provide solutions to maintain social distancing, ensure business continuity, strengthen health-care outcomes and prevent service disruptions.

3D Printing

Global supply chains left many companies vulnerable to coronavirus disruptions.² The pandemic has thus brought to the forefront a lot of attention to 3D printing, including around the production of ventilator parts and protective equipment.³ Northwell Health, a New York-based hospital system, started to make its own nasal swabs using 3D printing, enabling the production of thousands of swabs a day that could be used in testing for the coronavirus.⁴ The crisis has also put industrial 3D printing technology center stage illustrating its capabilities.⁵ The post-coronavirus “normal” for manufacturers may involve more localized and more flexible production in order to meet surge capacity and be better prepared for future problems.⁶

1 <https://blogs.imf.org/2020/04/14/the-great-lockdown-worst-economic-downturn-since-the-great-depression/>
<https://www.forbes.com/sites/petercohan/2020/04/06/how-covid-19-crunch-compares-to-spanish-flu-great-depression/#4f0f92261798>

2 <https://www.ft.com/content/be05b46a-5fa9-11ea-b0ab-339c2307bcd4>

3 <https://www.forbes.com/sites/tjmccue/2020/05/08/additive-manufacturing-industry-grows-to-almost-12-billion-in-2019/#5f6a764a5678>

4 <https://news.yahoo.com/yorks-northwell-health-begins-3d-173444482.html>

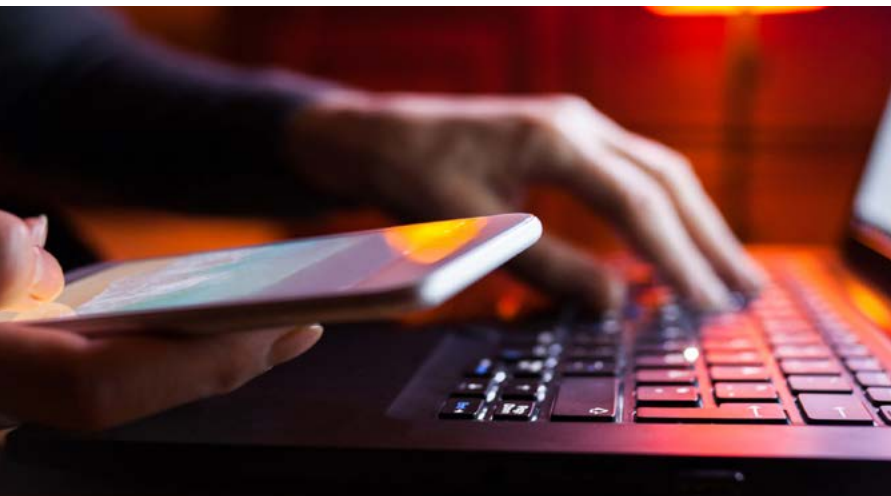
5 <https://www.bloomberg.com/news/articles/2020-04-09/the-3d-printing-community-is-the-pandemic-s-unlikely-hero>

6 <https://www.protocol.com/3d-printing-found-market-in-coronavirus-pandemic>

Internet of Things (IoT)

The pandemic crisis has highlighted the importance of IoT to companies for business continuity and healthcare. In terms of business continuity, IoT-enabled warehouse technologies have enhanced transparency in global supply chains: real-time data on the product's journey have facilitated rapid responses to shifts in demand, at a time when employee movement may be considered unsafe and absenteeism has risen.⁷ The IoT also includes networks of CCTV cameras and smart connected sensors which have enabled firms to continue operating with reduced human involvement in line with the required social distancing protocols.⁸

The effective quarantine of infected people has been a key step to control the spread of Covid-19. Countries like Hong Kong turned to IoT- and GPS- enabled apps to track and, when necessary, to enforce self-quarantine measures.⁹ A survey of 5,000 consumers conducted in early March by Hub Entertainment Research found that smart speaker ownership increased to 42% of all households and smart home devices, led by smart thermostats and smart doorbells, increased to 39% of all homes.¹⁰ Achim Granzen, principal analyst at Forrester Research, believes that IoT "will see a boost after the crisis - extraordinary situations like the Covid-19 crisis will expose inefficient processes and technology bottle necks, and organizations putting ad-hoc fixes in place would want to harden those going forward. IoT will play a big role in modernizing healthcare and disaster prevention, public safety and security, supply chain, and manufacturing and production".¹¹ However, it remains to be seen the extent to which the economic impact of the outbreak may force organizations to defer investment in these new technologies.



7 <https://www.bcg.com/publications/2020/is-technology-ready-new-digital-reality-post-covid19.aspx>

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9 <https://www.iotforall.com/the-growing-role-of-iot-in-covid-19-response/>; <https://www.cnbc.com/2020/03/18/hong-kong-uses-electronic-wristbands-to-enforce-coronavirus-quarantine.html>

10 <https://www.mediapost.com/publications/article/349841/some-smart-tech-grows-during-pandemic.html>

11 <https://futureiot.tech/iot-developers-to-focus-more-smart-healthcare-post-covid-19/>



Fintech

The coronavirus pandemic could end up benefiting the fintech industry by accelerating the rush to the digitization of banking and insurance¹²: There was a 72% surge in the use of fintech apps in Europe over just a week as consumers adjusted to social distancing, self-isolation and lockdowns.¹³ Numbers from App Annie showed average weekly app downloads for finance apps jumping 20% in March 2020 compared to Q4 2019.¹⁴ In particular, PayPal, Monzo and Barclays mobile apps featured as the most downloaded apps in March 2020.¹⁵

12 <https://www.finextra.com/newsarticle/35663/covid-19-aftermath-will-bring-banks-and-fintechs-together>

13 <https://www.marketwatch.com/story/coronavirus-lockdowns-and-social-distancing-fuel-surge-in-use-of-fintech-apps-2020-03-30>

14 https://www.altfi.com/article/6386_finance-apps-see-20-coronavirus-surge-with-paypal-monzo-and-barclays-taking-the-lead

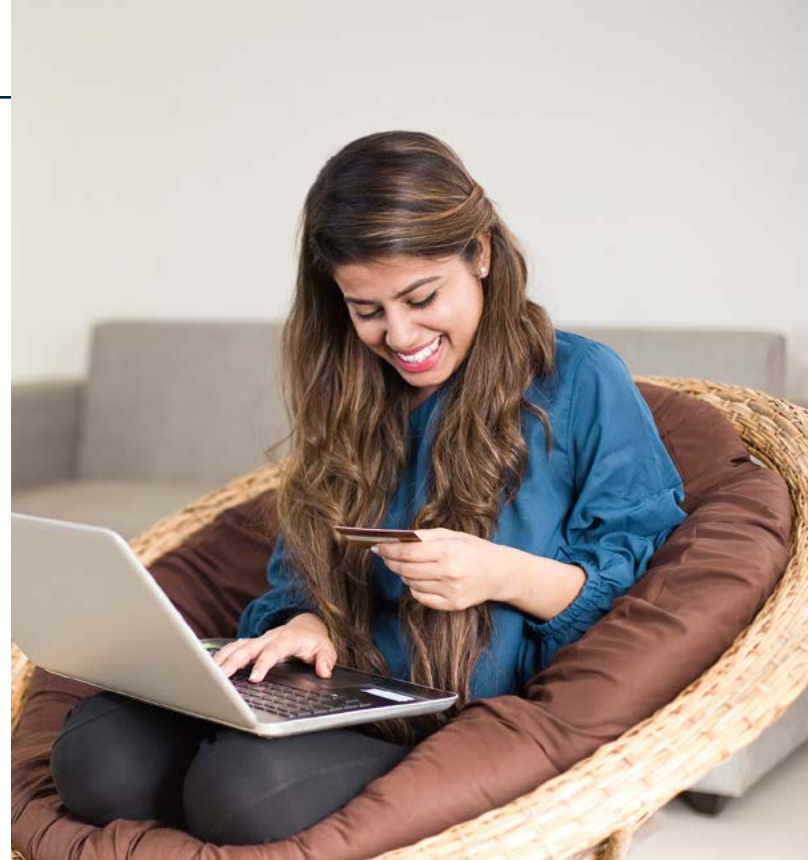
15 Ibid

However, according to research by McKinsey, transactional services and revenues from payments may decline as overall spending decreases.¹⁶ Radboud Vlaar of VC firm Finch Capital has suggested plausibly that there may therefore be consolidation among finance challengers with stronger, well-funded players acquiring cash-strapped smaller firms: "Post-crisis, disruptive winners will 'take all', as we expect surging demand from financial services for technology to master digital-only interaction, enabled by AI and big data analytics".¹⁷

Digital Payments

The announcement of the closure of non-essential retailers around the world, sparked a global surge in online shopping.¹⁸ As a result, many merchants became cashless. According to a survey in late March 2020 by Electronic Transactions Association (ETA), 27% of small businesses in the United States reported an increase in contactless payments made via smartphones and contactless cards.¹⁹ Digital transfer companies also benefited. For instance, Seattle-based Remitly, that helps people send money overseas, had customer growth up 100% from February to March, and registered a 40% growth in transaction volume.²⁰ McKinsey and Company argues that payments systems are proving resilient and reliable, as they have in earlier crises.²¹

Despite these developments, there have been bleak announcements related to the prospects for consumer spending and income levels: Barclaycard data show that consumer spending fell 36.5% in April compared with the same month last year, following a 6% drop in March.²² Also, according to the World Bank, global remittances are projected to decline by about 20% in 2020 because of the economic crisis prompted by the pandemic.²³



Healthcare Innovation

In terms of healthcare innovation, simulations, bots, and software tools have been used to trace people who came into contact with Covid-19 patients, deal with medical emergencies and work on potential vaccines or effective drug treatments. For example, Amazon and Microsoft joined the Covid-19 High Performance Computing Consortium, whose key objective is to make world-class supercomputers more accessible to COVID-19 researchers to rapidly advance scientific research for treatments and a vaccine.²⁴ This facilitates simulations being run in hours or days rather than months.²⁵ The U.S. Centers for Disease Control and Prevention have developed Clara, an automated chatbot, in collaboration with Microsoft, which can teach people about the underlying symptoms of Covid-19.^{26,27}

- 16 <https://www.mckinsey.com/industries/financial-services/our-insights/how-payments-can-adjust-to-the-coronavirus-pandemic-and-help-the-world-adapt>
- 17 <https://finadium.com/finch-capital-after-crisis-mode-fintech-disruptive-winners-will-take-all/>
- 18 <https://www.digitalcommerce360.com/article/coronavirus-impact-online-retail/>
- 19 <https://www.prnewswire.com/news-releases/small-business-owners-see-expanded-use-of-contactless-some-increases-in-sales-during-covid-19-301038612.html>
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- 21 <https://www.mckinsey.com/industries/financial-services/our-insights/how-payments-can-adjust-to-the-coronavirus-pandemic-and-help-the-world-adapt>
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- 26 <https://www.nature.com/articles/s41746-020-0280-0>
- 27 <https://www.distilinfo.com/itadvisory/2020/04/13/clara-chatbot-for-covid-19/>



Stanford researchers are working with Fitbit and Scripps Research Institute to create wearables that may help detect and contain the spread of infectious diseases such as Covid-19.²⁸ Smartphones' cameras and sensors are also increasingly being used to turn them into fast, accurate and low-cost devices for medical diagnosis - without attending a medical centre.²⁹ In the UK, less than 1% of initial medical consultations happened via video link in 2019, while under the Covid-19 lockdown, 100% took place remotely.³⁰ Moreover, the share of future Government spending on healthcare systems, drug development and preventative medicine may be increased, supporting future medical innovation.³¹

Robotics

"As epidemics escalate, the potential roles of robotics are becoming increasingly clear," an international group of researchers wrote in the journal *Science Robotics* in March 2020.³² Robotics companies have reported that businesses across all sectors are re-assessing the value that robots and automation might bring in order to decrease the number of human contacts involved in production and supply chains, as well as to manage public health and infectious diseases.³³ During the outbreak, robots have been taking on a greater share of the work: from monitoring stock levels, to helping with sanitizing in some grocery stores³⁴, using light beams to eliminate hospital viruses³⁵, and assisting with deliveries³⁶. In this context, it is not surprising that robotics companies, such as AMP Robotics, have seen a marked increase in orders.³⁷

Cybersecurity

The Covid-19 outbreak has forced very many employees to work from home. Remote workers logging into their organization systems from individual devices at home, with insecure WiFi networks and limited knowledge of online tools, have given rise to cybersecurity threats.³⁸ For instance, over 500,000 Zoom accounts have been sold for less than a penny each or even given away for free on the dark web and hacker forums.³⁹ Also, SentinelOne, an endpoint security platform, noted a 433% rise in endpoint attacks from late February to mid-March 2020.⁴⁰ This 'new normal' may continue to create more openings for cyber-attacks, business opportunities for service providers and material privacy risks to manage for increasing parts of the global economy.⁴¹

Cloud computing

The pivot to working from home has accentuated the benefits of cloud-based services: within companies, for interacting with clients and prospects, and for delivering product and services. Moreover, cloud-based services help make adjustments to match computing needs easier.⁴² At the same time, remote working has sufficiently increased

28 <https://www.stanforddaily.com/2020/05/05/stanford-researchers-working-on-wearables-for-early-detection-of-infectious-diseases/>

29 https://www.fastcompany.com/90482079/cant-go-to-the-doctor-you-already-own-a-powerful-medical-device?partner=feedburner&utm_source=feedburner&utm_medium=feed&utm_campaign=feedburner+fastcompany&utm_content=feedburner

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31 <https://www.telegraph.co.uk/business/2020/05/09/covid-19-will-spark-wave-medical-innovation/>

32 <https://robotics.sciencemag.org/content/5/40/eabb5589>

33 Ibid; <https://sifted.eu/articles/robots-post-pandemic/>

34 <https://www.forbes.com/sites/lanabandoim/2020/04/14/grocery-retail-lessons-from-the-coronavirus-outbreak-for-the-robotic-future/#131aaf9715d1>

35 <https://www.bbc.co.uk/news/business-51914722>

36 <https://www.theguardian.com/uk-news/2020/apr/12/robots-deliver-food-milton-keynes-coronavirus-lockdown-starship-technologies>

37 <https://www.nytimes.com/2020/04/10/business/coronavirus-workplace-automation.html>

38 <https://hackernoon.com/working-from-home-and-cybersecurity-in-the-time-of-the-coronavirus-4vc1322c?source=rss>

39 <https://www.bleepingcomputer.com/news/security/over-500-000-zoom-accounts-sold-on-hacker-forums-the-dark-web/>

40 <https://bigthink.com/technology-innovation/work-from-home-cybersecurity?rebellitem=8#rebellitem8>

41 The Data Abyss – Part 1 & 2, MSCI ESG Research, July 2018

42 <https://www.nytimes.com/2020/03/23/technology/coronavirus-facebook-amazon-youtube.html>

demand from the data centers that support streaming and cloud computing, which boosted memory chip prices.⁴³ By the beginning of April, prices for DRAM memory chips increased by more than 3.5% since January, according to industry tracker DRAMeXchange.⁴⁴ Companies have also realized that capacity cannot be added immediately.⁴⁵

In the long-run, remote working and dispersed offices may see sustained demand for cloud infrastructure⁴⁶, as people continue to use collaborative tools like Microsoft Teams, Atlassian, Zendesk and Adobe Document Cloud⁴⁷ and cloud-based video conferencing and distance training.⁴⁸

Clean Energy and Smart Grids

Cheap oil and the Covid-19 virus pandemic may not impede the medium-term transition to clean energy. However, short-term businesses in this sector are impacted by the dramatic economic slowdown. Projections for renewable installations have been reduced for 2020.⁴⁹ The research firm Wood Mackenzie cut its forecast for wind installations by nearly 5 gigawatts, or 6.5%.⁵⁰ An analysis by BW Research Partnership cautioned that up to 500,000 jobs in the renewable energy industry may be lost by June, including ones in solar power, biofuels, and electric cars.⁵¹ Solar Energy Industries Association, a US solar trade group, has also argued that coronavirus threatens half of the industry's



jobs.⁵² More optimistically, in China, during the coronavirus lockdown in January and February, every form of energy production dropped from prior-year performance but one: solar was up 12%.⁵³

A report by Markets and Markets published in April 2020, forecasts that the global smart grid market size is expected to grow from an estimated value of USD 26.9 billion in 2020 to USD 28.8 billion by 2021, at a CAGR of 7.1%.⁵⁴ The growth of the smart grid market is driven by increasing investments for the modernization of aging grid infrastructure. The software segment has been forecast to hold the highest market share as it is likely to be less impacted by Covid-19⁵⁵, while the hardware segment is expected to suffer during the forecast period, because of the shutdown within the global smart grid market amidst the pandemic.⁵⁶

Conclusions

The pandemic crisis has forced businesses and governments to take advantage of a rare opportunity to experiment rapidly and extensively with new technologies as they seek to cope with the global social and economic disruption. Our analysis has sought to illustrate how Covid-19 has altered the way people interact and conduct business and has led to potential opportunities for disruptive technologies to offer solutions which, aside from their long-term interest, can potentially maintain business continuity, enhance health-care outcomes and avoid service disruptions.

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His research focuses on organisational ambidexterity: how companies can excel at both incremental and radical innovation.

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- 44 <https://www.reuters.com/article/us-samsung-elec-results/samsung-first-quarter-beats-estimates-chips-likely-to-prop-up-virus-hit-second-quarter-idUSKBN21035T?feedType=RSS&feedName=technologyNews>
- 45 <https://www.marketwatch.com/story/work-from-home-routines-speed-the-shift-to-cloud-computing-services-2020-03-24>
- 46 <https://data-economy.com/microsoft-sees-12-million-new-users-on-teams-as-remote-workers-increase-during-covid-19-pandemic/>
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- 48 <https://www.weforum.org/agenda/2020/04/how-next-generation-information-technologies-tackled-covid-19-in-china/>
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- 54 <https://www.prnewswire.com/news-releases/covid-19-impact-on-smart-grid-market-exclusive-report-by-marketsandmarkets-301050081.html>
- 55 Ibid
- 56 <https://www.marketsandmarkets.com/Market-Reports/covid-19-impact-on-smart-grid-market-204540248.html>



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