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THEMATIC INSIGHT

US Spotlight: Digital Transformation and Disruption

Contents

Introduction

There can be little doubt that 2020, and now 2021, have been difficult for most industries globally. The last 18 months have delivered unprecedented disruption to both humans and businesses. Yet crises such as COVID-19 can also be catalysts for positive change and innovation. National and state-level restrictions and lockdowns forced companies in the U.S. to create new lines of business and customer capabilities by leveraging digital transformation and innovation in ways that otherwise might have taken years to plan and implement.

After the initial shock of the pandemic, organizations in the U.S. quickly reset to respond to changing consumer needs. A recent survey from MIT Technology Review Insights found that by August 2020, more than eight out of 10 U.S. organizations had made significant investments in their digital infrastructure, enabling them to shift to remote work and online business transactions.[1]

Disruptive technologies like 3D printing and robotics also played a key role in supporting COVID-19 response and recovery efforts. In the U.S., 3D printing became a critical tool to help the health-care industry overcome shortages in personal protective equipment (PPE), while airports and hospitals used robots to spray disinfecting chemicals on their facilities.[2]

In this Thematic Insight, we will look at some interesting digital economy and disruptive technologies, largely from a U.S. perspective, and consider the novel ways they have been adopted to serve employees and customers.

1 "Digital acceleration in the time of coronavirus: North America." MIT Technology Review Insights, Dec. 15, 2020.

2 Is 3D Printing the Future of Manufacturing? The American Society of Mechanical Engineers, Apr 1, 2021, Meet Violet, the Robot That Can Kill the COVID-19 Virus, TIME, April 24, 2020

Digital Economy in Focus

E-commerce

E-commerce sales in the U.S. are projected to have jumped above pre-pandemic estimates. eMarketer forecasts U.S. growth in retail e-commerce sales of 13.7% in 2021, reaching USD 908.73 billion.[3] This suggests that e-commerce now claims a larger slice of an enlarged pie, with e-commerce sales to account for 15.5% of the USD 5.856 trillion in total retail sales this year.[4] Elsewhere, Adobe has forecast that U.S. e-commerce spending will reach USD 1 trillion in 2022.[5]

Amazon remains the top U.S. e-commerce retailer, estimating that its sales account for 38.7% of all e-commerce sales in the U.S.[6] Walmart, despite seeing its U.S. business e-commerce grow 79%, remains No. 2 in the rankings and far behind Amazon.[7] Across product categories, toys, furniture and bedding, video games and auto parts were the most purchases made by U.S. consumers in March 2021 as the pandemic stretched into its second year.[8]

Digital Payments

It has been estimated that the global digital payment market is going to reach USD 215.88 billion at a compound annual growth rate (CAGR) of 13.3% in 2028.[9] Throughout the COVID-19 crisis, digital adoption in payments and retail commerce, across all payment types and demographics in the U.S., has accelerated. Use of smartphones and mobile internet, a rising preference for contactless payment methods and the growing availability of digital payment solutions and service providers all have led to heightened demand for digital payment in the U.S. Indeed, more than half of U.S. consumers have shifted their purchasing from traditional outlets to online stores during the pandemic.[10] However, the transformation still has room to go. Research by McKinsey finds that more than three-quarters of U.S. citizens use at least one form of digital payment (browser-based and in-app online purchases, in-store checkout using a mobile phone and/or QR code or person-to-person payments), but, at the same time, a report by Paysafe highlighted that approximately 33% of Americans have yet to adopt contactless payments.[11],[12]

Cloud Computing

Cloud computing involves the use of a network of connected servers that are accessed over the internet. Simply put, instead of using the local storage of your computer and running the software you have installed on that machine, you use the storage or software installed on a server that you connect to on-demand via the internet.[13] As the world becomes more digital and connected, cloud computing is increasingly embedded in every aspect of our lives. Data and software can be easily accessed 24/7 in any location that has internet access. This segment of IT services generated more than USD 300 billion globally in 2020 and shows little sign of slowing down.[14] U.S. spending on cloud services jumped to more than USD 18 billion in the first quarter of 2021, an increase of 29% from the same quarter in 2020.[15] This spending is captured by Amazon Web Services, Microsoft Azure and Google Cloud Platform, in that order, an example of another area of technology oligopoly.[16] The pandemic has accelerated the adoption of cloud computing, as remote working and video conferencing became a common day-to-day reality for many — one that will persist for many companies in future hybrid working models.[17]

3 Droesch, Blake. "How will the pandemic affect US ecommerce sales in 2021?" eMarketer, May 17, 2021.

4 Ibid.

5 Verdon, Joan. "Global E-Commerce Sales To Hit $4.2 Trillion As Online Surge Continues, Adobe Reports." *Forbes*, April 27, 2021.

6 Droesch, Blake. "Here are the top 10 US ecommerce companies for 2021—plus 6 key takeaways from our latest forecast." eMarketer, March 24, 2021.

7 Wahba, Phil. "Despite its best efforts, Walmart's e-commerce is still a fraction of Amazon's." *Fortune*, March 29, 2021.

8 Verdon, Joan. "Global E-Commerce Sales To Hit $4.2 Trillion As Online Surge Continues, Adobe Reports."

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13 "What's in The Cloud? And why everyone want's a piece of it." Analytics Vidhya, April 15, 2021.

14 Mlitz, Kimberly. "Cloud Computing — Statistics & Facts." Statista, March 30, 2021.

15 Whitney, Lance. "Cloud services spending jumps to more than $18 billion in US during first quarter." TechRepublic, May 18, 2021.

16 Dignan, Larry. "Top cloud providers in 2021: AWS, Microsoft Azure, and Google Cloud, hybrid, SaaS players." ZD, April 2, 2021.

17 Ibid.

Cybersecurity

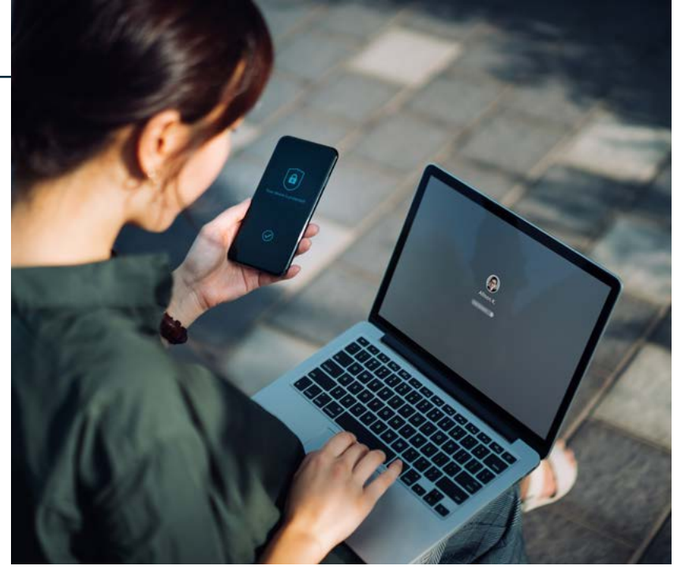
The COVID-19 crisis made cybersecurity front-page news. Cyber criminals and hacking groups exploited the widespread disruption caused by the pandemic. In 2020, the FBI recorded 791,790 complaints of suspected cybercrime, up from 467,361 in 2019, and reported attributable losses exceeding USD 4.2 billion.[18] Over two-thirds (68%) of business leaders reported feeling that security risk was increasing.[19] The main difference in the workplace in 2020-21 was the shift to working from home, which often made it easier for cyber-threat actors to take advantage of employees away from their usual institutional IT settings. The threats often arose from weakly protected home devices, unsecured channels for remote work, vulnerabilities in collaboration tools and malicious emails exploiting people's fear of the coronavirus and need for assistance.[20]

However, living through the pandemic has been a testing ground for the next possible crisis and a catalyst for further government action. President Joe Biden has signed an executive order to strengthen cybersecurity, after several high-profile hacks.[21] To facilitate this push, IBM agreed to establish a new cybersecurity center for U.S. federal clients, to help agencies navigate current and future threats.[22] In addition, in the private sector, PwC plans to invest USD 12 billion and hire 100,000 new employees in areas such as artificial intelligence and cybersecurity by 2026, clearly signaling the importance of cybersecurity.[23]

The Sharing Economy

The sharing services market consists of companies providing services that connect owners of assets with customers, giving them access for a certain period after receiving a fee.[24] According to Statista, the three most prominent categories of sharing are home-sharing, ride-sharing and office-sharing, with companies such as Airbnb, Uber, Lyft and WeWork being key players.[25]

In the U.S., 83% of people are familiar with sharing services and 56.6 million people use them.[26] This highlights the trend of U.S. consumers paying for access to an assortment of assets or services on-demand, rather than purchasing and owning the assets permanently or being tied down by long-term contracts for services. However, the pandemic also hit the sharing economy hard. Extensive travel restrictions affected the ride-share and lodging-sharing services, but as vaccines roll out and people start traveling again, there are signs of a return in demand.[27],[28] Longer term, however, the sharing economy has yet to reach a mature and stable stage, and businesses are only starting to orient themselves toward the trend of using and not owning, so the impact on business models, business scalability and scope needed to reduce costs and waste has yet to be determined.[29]



Social Media

The U.S. has one of the highest social network penetration rates in the world. According to Statista, in 2020, over 223 million Americans were actively using social networks to connect with others.[30] In the US, in 2021, YouTube and Facebook lead the online landscape, with 81% and 69%, respectively, of adults reporting using these platforms.[31] Moreover, YouTube and Reddit were the only two platforms measured that enjoyed statistically significant growth since the last Pew Research Center report in 2019, while the consumer segment of adults under 30 stood out for its use of Instagram, Snapchat and TikTok.[32]

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20 Grustniy, Leonid. "The great lockdown: How COVID-19 has affected cybersecurity." Kaspersky Daily, March 24, 2021.

21 Murphy, Hannah. "Biden signs executive order to strengthen US cyber security." *Financial Times,* May 12, 2021.

22 "IBM To Establish New Cybersecurity Center For US Federal Clients." IBM, June 2, 2021.

23 "PwC to Spend $12 Billion on Hiring, Expanding Expertise in AI, Cybersecurity." Wall Street Journal, June 15, 2021

24 "Sharing services in the U.S. — statistics & facts." Statista, May 5, 2021.

25 Ibid.

26 Ibid.

27 Rana, Preetika. "For Uber, Coronavirus Pandemic Is Still Weighing on Rides Business." *Wall Street Journal*, Nov. 5, 2020. Ekstein, Nikki. "Airbnb CEO: The pandemic will force us to see more of the world, not less" *Fortune*, Sept. 7, 2020.

28 Dean, Grace. "Uber and Lyft fares surge by up to 40% as the ride-hailing apps struggle to find enough drivers." Business Insider, June 1, 2021.

29 Radjou, Navi. "The sharing economy's next target: Business-to-business." *Fast Company*, April 14, 2021.

30 "Social media usage in the United States — Statistics & Facts." Statista, June 15, 2021.

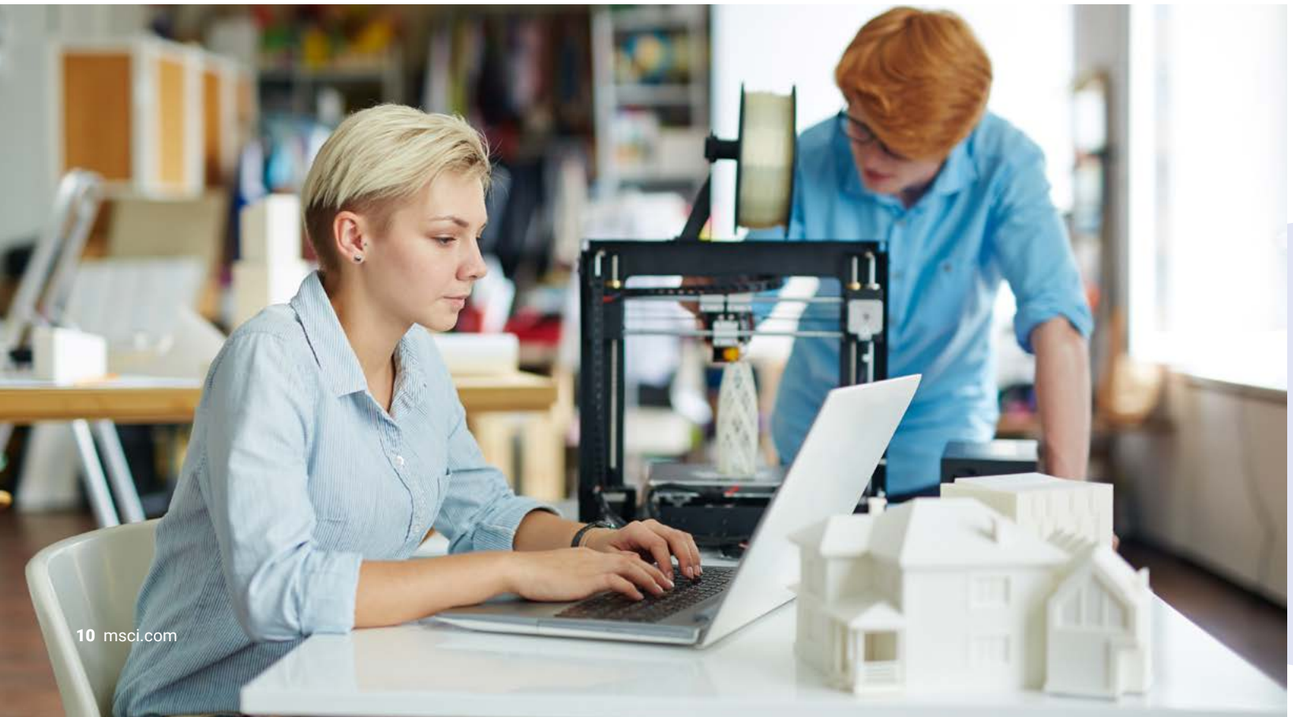
31 Auxier, Brooke, and Anderson, Monica. "Social Media Use in 2021." Pew Research Center, April 7, 2021.

32 Ibid.

Disruptive Technology

3D Printing

3D printing technology, also known as "additive manufacturing," has gained more attention. When COVID-19 disrupted availability and pricing in global medical supply chains, hospitals turned to 3D printing. The need for on-demand manufacturing has made organizations consider 3D printing even more.[33] The global 3D printing market was valued at USD 13.78 billion in 2020 and has been projected to grow at a CAGR of 21.0% from 2021 to 2028.[34] The U.S. has been a leader to date in taking advantage of additive manufacturing in different ways, recently even addressing the housing shortage by offering 3D-printed houses.[35]



Robotics

As the pandemic plays out, companies are accelerating the use of robots, and this trend is affecting almost every sector. The Association for Advancing Automation (A3) reported that orders for robots in the U.S. surged 19.6% in the first quarter of 2021, higher than growth in the same period last year.[36] This expansion reflects companies using robotics and automation to compete worldwide while filling the employment gap for factories and warehouses struggling to find qualified workers. In 2020, orders for robots from non-automotive sectors exceeded automotive robot orders for the first time.[37] The services sector (for example, health care, logistics, food and consumer goods) invested heavily in robots to meet growing online demand. Original equipment manufacturers (OEMs) like Ford, General Motors, Fiat-Chrysler and Tesla have for years invested heavily in robotics and automation. Although many manufacturing sectors, especially automotive ones, struggled in the crisis, a March 2021 report by the International Federation of Robotics (IFR) showed that robotics adoption is rising in the U.S. Robot density in the country's automotive industry hit a record of 1,287 installed units per 10,000 employees, a similar density to Germany's (1,311) and Japan's (1,248).[38] With 938 units per 10,000 employees, China is in 12th position for this metric.[39]

Internet of Things (IoT)

In the broadest sense, the term "Internet of Things" (IoT) might seem to include everything connected to the internet, but it's typically reserved for devices that connected to each other through the internet, from fitness trackers to thermostats to refrigerators to cars. By combining connected devices with automated systems, it is possible to gather information, analyze it and create action to assist with a particular task. By 2025, Statista forecasts that the total number of consumer and industrial IoT connections in the U.S. will increase to 5.4 billion, compared with 2.8 billion connections in 2019.[40] The global market is expected to reach USD 1.855 trillion by 2028, exhibiting a CAGR of 25.4% over the forecast period, while the World Economic Forum stated that "once the COVID-19 pandemic subsides, IoT growth will likely accelerate beyond previous projections."[41,42] Increasing adoption in farming and health care also is projected to boost the growth of the IoT market.[43] During the pandemic, IoT has helped to detect people with COVID-19 symptoms or infections and has assisted government officials in efficiently monitoring areas with high infection rates in the U.S.[44]

33 "3D Printing comes of age in US industrial manufacturing." PwC, April 2016.

34 "3D Printing Market Size, Share & Trends Analysis Report By Component, By Printer Type (Desktop, Industrial), By Technology, By Software, By Application, By Vertical, By Material, By Region, And Segment Forecasts, 2021-2028." Grand View Research, May 2021.

35 Chea, Terence. "3D printing's new challenge: Solving the US housing shortage." Associated Press, April 27, 2021.

36 Demaitre, Eugene. "First-Quarter 2021 Robot Sales Increase 20% Over Q1 2020, Reports A3." Robotics 24/7. May 6, 2021.

37 Ibid.

38 "US Robot Density in Car Industry Ranks 7th Worldwide." International Federation of Robotics, March 16, 2021.

39 Ibid.

40 "Number of IoT connections in North America in 2018, 2019 and 2025." Statista, February 2020.

41 "Internet of Things (IoT) Market Worth USD 1,854.76 Billion by 2028; Critical Need to Virtually Monitor Operations to Boost Growth." Fortune Business Insights, May 27, 2021.

42 "State of the Connected World 2020 Edition", Insight Report, World Economic Forum, December 2020.

43 "Internet of Things (IoT) Market Worth USD 1463.19 Billion by 2027 Backed by Rising Awareness Regarding Precision Farming to Aid Market Growth." Fortune Business Insights, May 11, 2021.

44 Umair, Muhammad, Cheema, Aamir Muhammad, Cheema, Omer, and Lu, Hua. "Impact of COVID-19 on IoT Adoption in Healthcare, Smart Homes, Smart Buildings, Smart Cities, Transportation and Industrial IoT."

Fintech

A 2020 report by EY showed that fintech is becoming mainstream globally, as consumer adoption has reached 64%, with only 4% of worldwide consumers not being aware of fintech money-transfer and payment services.[45] In the U.S., adoption of fintech by consumers and small to medium-sized enterprises (SME) is at 46% and 23%, respectively.[46] In the first quarter of 2021, U.S. fintech companies raised USD 12.8 billion, a 220% leap over the same period in 2020.[47] The pioneers of this global industry are Stripe, Klarna and Kraken.[48] Fintechs have put more pressure on legacy banks during the pandemic with the global adoption of digital transaction models across sectors. With shoppers switching to online retail and many surviving businesses requiring customers to pay first online, combined with temporary and permanent bank-branch closures, consumers and companies have turned to fintechs for solutions.[49] In the U.S., there was a surge in payments online. For instance, in the first quarter of 2021, the volume of transactions on PayPal increased by 36% over that period a year earlier, leading investors to suggest that fintech firms are one day going to take over America's financial establishment.[50]

Health-Care Innovation

Consumer adoption of telehealth has risen steeply. In the U.S., 46% of consumers are now using telehealth, partly because of canceled health-care visits during pandemic restrictions, up from 11% using it in 2019.[51] This shows that some kinds of health care can be delivered remotely after all, and is one explanation for why two-thirds of nearly 400 health-care executives expect to move their technology infrastructures to the cloud within the next year.[52],[53] Investors have taken note of these technological and operational changes in health care. In the first quarter of 2021, USD 8.5 billion was raised globally for health innovation funding.[54] Combining artificial intelligence, sensors, wearables and other technologies, "smart hospitals" aim to achieve a higher quality of health care for patients while attaining higher operational efficiency.[55] The global smart-hospital market is projected to reach USD 77.3 billion at a 21.5% CAGR pace from 2018 to 2025. [56]

45 Hwa, Gary. "Eight ways FinTech adoption remains on the rise." EY, Aug. 31, 2020.

46 Ibid.

47 Haverstock, Eliza. "The 11 Biggest Fintech Companies In America 2021" *Forbes*, June 8, 2021.

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49 "Highlights from the World FinTech Report 2021." Banking Circle, Feb. 6, 2021.

50 "Fintech comes to America at last." *Economist*, March 27, 2021.

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52 Cohen, Daniel, Furstenthal, Laura, and Jansen, Leigh. McKinsey & Co., May 5, 2021.

53 "Digital Innovation Is Essential to Meeting Healthcare Consumers' Expectations Post-Pandemic, According to Accenture Report." Accenture, June 21, 2021.

54 "With $8.5B Raised Globally in Q1, Health Innovation Funding Hits New Milestone." StartUp Health, April 7, 2021.

55 "Smart Hospital Market Revenue USD 77,299.6 Million at a 21.5% CAGR by 2025 | North America Region Expected to Register a 21.1% CAGR in Global Smart Hospital Industry." Market Research Future, Feb. 26, 2021.

56 Ibid.

Clean Energy and Smart Grids

Renewables are on the rise: while demand for all other fuels declined during the pandemic, annual clean-energy capacity addition increased 45% (by 280 gigawatts) in 2020.[57] That was the largest year-on-year rise since 1999, and equal to the installed capacity of the Association of Southeast Asian Nations (ASEAN). The International Energy Agency (IEA) forecasts similar levels of clean-energy growth for 2021 and 2022, upgraded from a forecast of more than 25% from November 2020.

In the U.S., the outlook seems favorable for clean energy, with federal tax credit extensions, as well as new U.S. emissions reduction targets and the federal infrastructure bill set to boost renewables expansion after 2022.[58] In 2020, the U.S. consumed a record amount of renewable energy (12% of total energy consumption).[59] In addition, the Biden administration approved a large offshore wind project in U.S. waters and made use of a USD 2 trillion spending package to support green investments.[60],[61] At the same time, smart grid technology is growing steadily around the world, leading to grid infrastructure upgrades that promise a range of key benefits: more efficient and reliable electricity transmission, faster restoration of electricity after power disturbances, improved operations and management costs for utilities and enhanced security.[62],[63] The global smart-grid market has been forecast to reach a market size of USD 92.11 billion in 2026, up from USD 29.34 billion in 2019, growth that translates to a CAGR of 17.8%.[64]

57 "Renewable Energy Market Update 2021." IEA, May 2021.

58 Ibid.

59 "The United States consumed a record amount of renewable energy in 2020." U.S. Energy Information Administration, June 16, 2021.

60 "Biden-Harris Administration Approves First Major Offshore Wind Project in U.S. Waters." U.S. Department of the Interior, May 11, 2021.

61 McCormick, Myles. "Biden throws weight of US government behind clean energy." *Financial Times*, April 3, 2021.

62 "Smart Grids Infrastructure Market, 2018-2030." April 3, 2021.

63 "The Smart Grid." Smartgrid.gov.

64 "The Global Smart Grid Market is Expected to Reach $92+ Billion by 2026." Research and Markets, May 11, 2021.

Conclusion

Life during the pandemic has shown the key role that digital and disruptive technologies can play in government and public health, as well as in the way we live, work and socialize. In many cases, the crisis has accelerated the adoption of these technologies as new innovations have been identified and commercialized. The evidence suggests that such trends seem unlikely to be reversed, even as the pandemic fades.

MSCI would like to thank Costas Andriopoulos, who is a Professor of Innovation and Entrepreneurship at Bayes Business School, for useful discussions and insightful analysis of this megatrend, which have greatly facilitated the preparation of this document.

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

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