



THEMATIC INSIGHT

Looking Over The Horizon

A dynamic landscape for disruptive technologies



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Introduction

By definition, disruptive technologies may shift how consumers shop, interact and communicate – as well as the way organizations and industries operate. Old systems and habits disappear; superior solutions replace them. Post the pandemic, disruptive technologies, such as robots and 3D printing, have shown their utility and efficacy: helping address people shortages¹, supporting large-scale manufacturing,² and providing digital solutions to proceed with everyday activities safely.³ The pandemic thus accelerated technological transformation in many aspects of business and society.

So a natural question is: as the post-pandemic world gets used to a "new normal" way of life, what can we expect next for disruptive technologies?

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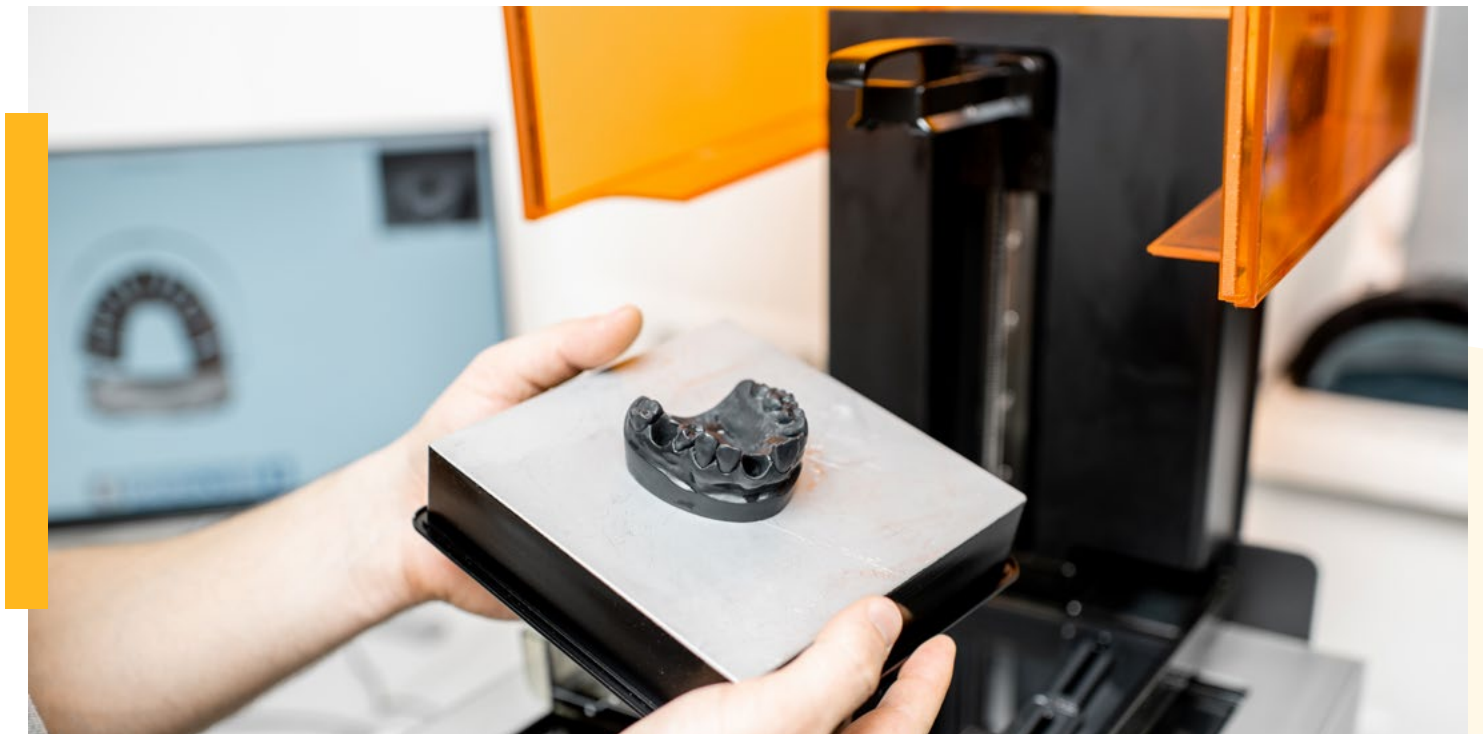


3D Printing

3D Printing illustrated its capabilities for scale manufacturing in the pandemic with the production of critically short medical supplies.⁴ By 2029, the global 3D printing industry has been projected to reach a value of USD 84 billion from USD 18 billion in 2022.⁵ Even beyond the shadow of covid, the key industry for 3D printing adoption and new product generation has been medicine.⁶ As one illustrative example, Skåne University Hospital in Sweden 3D printed a plastic body implant to repair a patient's skull after a massive head injury.⁷ The 3D printing industry is also starting to help with solutions

to reduce the problem of plastic waste. For instance, a pilot program in Tallinn, Estonia collected and repurposed cigarette ends as 3D printing material.⁸

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- 7 Forbes. 2022. <https://www.forbes.com/sites/carolynschwaar/2022/03/31/3d-printing-is-ready-to-tackle-plastic-body-implants/>
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Internet of Things

The Internet of Things, or IoT, is a network of Wi-Fi-enabled objects that all connect to the internet and exchange data in real-time via embedded sensors.⁹ Since the pandemic, more and more people have used IoT to monitor and analyse their health data.¹⁰ IoT has also become popular via smartphone integration to control many (domestic) IoT devices through them (heat, light, entry systems, domestic appliances).¹¹ The global 5G IoT market has been estimated to reach USD 111.2 billion by 2028,¹² enabled by improved speeds of 5G broadband and better IoT sensors.¹³ Apart from the personal and domestic impact on our lives (through wearable devices, upgraded telehealth, smart homes and cities), IoT systems are now also helping save water in agricultural settings where droughts are a threat¹⁴, and assisting cities in reacting to extreme weather conditions.¹⁵

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Cloud Computing

Cloud computing relieves companies from the burden of building their own IT infrastructure in their digitalization process, by giving access to computing resources hosted by third parties on the internet.¹⁶ These cloud-based resources can range from storage and standard office applications to additional processing power and even advanced AI/ML services.¹⁷ During Q2 2022, the four biggest cloud computing providers were Amazon Web Services (34% market share), Microsoft Azure (21%), Google Cloud (10%) and Alibaba (5%).¹⁸ The market is projected to hit USD 1.6 trillion by 2030, with a CAGR in excess of 17% from 2022 to 2030.¹⁹ Cloud computing is now far more prominent after Covid-19, when it was critical to remote working adjustments. The latest trends in cloud computing are multi-cloud and hybrid computing. Multi-cloud results from the multiple and vast needs of companies that require multiple cloud vendors, for diversification or as part of a plan to control pricing/costs in an already concentrated supplier market.²⁰ Hybrid cloud computing refers to having both public cloud deployments (for data required regularly and remotely), a more affordable solution, and private cloud, offering more data storage and security (for more sensitive data).²¹

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Fintech and _____ Digital Payments

The Covid-19 pandemic impact on society generated an unparalleled test environment for many fintechs: billions of people locked down without easy access to conventional banking and payment services.²² Fintechs supported consumers and businesses to make contactless payments and equipped them with digital wallets, banking and cross-border transacting.²³ Small business owners, entrepreneurs and individuals all rapidly adopted online banking platforms and many discovered they could manage their money more efficiently and cost-effectively.²⁴ A report from Research and Markets predicted that the global FinTech market will reach USD 31.5 billion by 2026.²⁵ That would be more than eleven times its size in 2016 (USD 2.7 billion).²⁶

Yet these developments are not without risks. Some economists have warned that the lack of strict regulations for fintechs, along with the

increasing adoption of embedded solutions and innovative payment systems²⁷ as well as digital assets and cryptocurrencies by traditional banks could lead all too soon to a future crisis²⁸. With crypto already having 300 million individual users in 2022²⁹, education and risk transparency has become more important than ever.³⁰

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26 Ibid.

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28 Reuters. 2022. <https://www.reuters.com/business/finance/us-bank-regulator-warns-crisis-risk-fintech-proliferation-2022-09-07/>

29 GlobalPayments. 2022. <https://www.globalpayments.com/insights/2022/04/25/who-isnt-talking-about-cryptocurrency-right-now>

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Healthcare Innovation

The Covid-19 pandemic put pressure on traditional medical systems and healthcare providers around the globe for faster, better, more flexible, and more scalable provision. A recent report from the U.S. Department of Health and Human Services found a 63-fold increase in the use of telehealth by Medicare beneficiaries, to approximately 52.7 million encounters in 2020 from 840,000 annual encounters in 2019.³¹ Two years further on and patients and providers continue to see telehealth solutions as a desirable option due to its convenience and effectiveness.³² With the patient at the center of care, hospitals and health systems are also turning to cloud computing, 5G, process automation, data and analytics, and AI to enhanced services and

operations.³³ Healthcare innovation is expanding from VR for surgical training³⁴ to remote patient monitoring devices³⁵ so the home becomes a front line for active healthcare.³⁶

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36 Fierce Healthcare. 2022. <https://www.fiercehealthcare.com/tech/forrester-here-are-4-key-frontiers-for-healthcare-innovation-over-next-decade>

Robotics

Robots were historically considered as programmable machines that can carry out a task.³⁷ In 2005, a remarkable 90% of all robots were used for assembly in automotive factories³⁸ but more than 15 years later that percentage is well below 50%. They are employed in many other industrial and domestic environments: from cleaning and sanitizing airports, to delivering food and packages, and from stacking warehouses, delivery logistics and self-driving vehicles, to space exploration. During the pandemic, robots became essential in healthcare, manufacturing and public services. Within a long-term trend towards automation and technological innovation, robot demand has continued to rise: 2021 was the most successful year ever for the robotics industry.³⁹ The robotics market size has been estimated to reach USD 215 billion by 2030, with a CAGR of almost 23%.⁴⁰ Service robots like Rice (a hotel room service robot) are in use⁴¹, although we are far from the 1990's vision of them being as ubiquitous as a kettle in homes.⁴² Much recent discussion on the future of robotics has focused on collaborative robots that can work autonomously. With the use of AI,⁴³ robots can employ computer vision to react quickly to and navigate their working environment more flexibly⁴⁴ alongside natural language processing and voice recognition that allows better integration with human workers and owners.⁴⁵



Cybersecurity

The "Hiscox Cyber Readiness Report 2022"⁴⁶ found that IT professionals in seven out of eight countries were more worried more about cyberattacks than the COVID-19, financial crisis or skills shortages.⁴⁷ Approximately half of all US businesses in the Hiscox sample (47%) had suffered an attack in the past year.⁴⁸ The EU Agency for Cybersecurity shows that the prime threat for organizations is now ransomware, where attackers encrypt an organization's data and demand a payment to give the access back.⁴⁹ With remote working now a staple, attackers have been taking advantage of this change to target businesses' systems, with 43% of all data breaches involving small and medium size companies.⁵⁰ According to Statista, the revenue in the global cybersecurity market is projected to reach USD 160 billion in 2022, with an annual growth rate of over 13% in the subsequent five years. That would result in an almost USD 300 billion market size by 2027.⁵¹ Another reason why cyberattacks are one of many companies' biggest concerns is because of the rise of on-demand access to ubiquitous and large data sets as part of their "cloud-based service model".⁵² The same technology (AI, machine learning,

software democratization, cloud) that has supported business growth via the cloud and data/analytics model has also been adopted to malicious ends by hackers⁵³. The shortfall in cybersecurity talent, knowledge, and expertise is not making it easier for corporates to be prepared in the face of such threats.⁵⁴

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54 Ibid.

Clean Energy and Smart Grids

The cost of clean energy has fallen, leading to an acceleration of its production, with the proportion coming from solar and wind energy last year double what it was when the Paris Agreement was signed.⁵⁵ Global clean energy spending is expected to reach USD 1.4 trillion in 2022.⁵⁶ Electric vehicles weekly sales are now the same as annual sales a decade ago.⁵⁷ From the low base, however, even this record spending is still insufficient to hit the pathways to tackle the energy crisis.⁵⁸ Nevertheless, some countries are taking action to reach net zero. Germany is aiming for a 100% green power reform by 2035⁵⁹, and Biden's administration in the United States is supporting investment in battery factories, solar panel manufacturing and related mining.⁶⁰

According to the IEA, a smart grid is "an electricity network that uses digital and other advanced technologies to monitor and manage the transport of electricity from all generation sources to meet the varying electricity demands of end users".⁶¹ Despite all the potential benefits of smart grids (fault detection, automated fault remediation, energy

efficiency, etc⁶²) many smart grid projects were disrupted during the pandemic⁶³ so that 2021 investment growth was 6%.⁶⁴ However, according to Fortune Business Insights, the global smart grid market should grow to USD 140 billion in 2028 from USD 35 billion in 2021 (a CAGR of almost 22%).⁶⁵ Such projections are predicated on the current favourable governmental regulatory frameworks, rising corporate/public concerns on environmental protection and investments in the digital electricity infrastructure development.⁶⁶

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Conclusion

Many disruptive technologies are growing in adoption as people lean more and more upon digital applications in their daily lives. This penetration was accelerated during the Covid-19 pandemic and now many businesses are under pressure to increase use to sustain their competitive advantage. Another clear trend is that the lines between different disruptive technologies are being blurred. For example, as robots become increasingly cloud-connected, they are more prone to cyber-attacks. Technology convergence will be a key aspect of the future of disruptive technologies and their safe adoption by consumers and businesses.

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