

Digital Transformation & Innovation: the Impacts of Covid-19

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Introduction

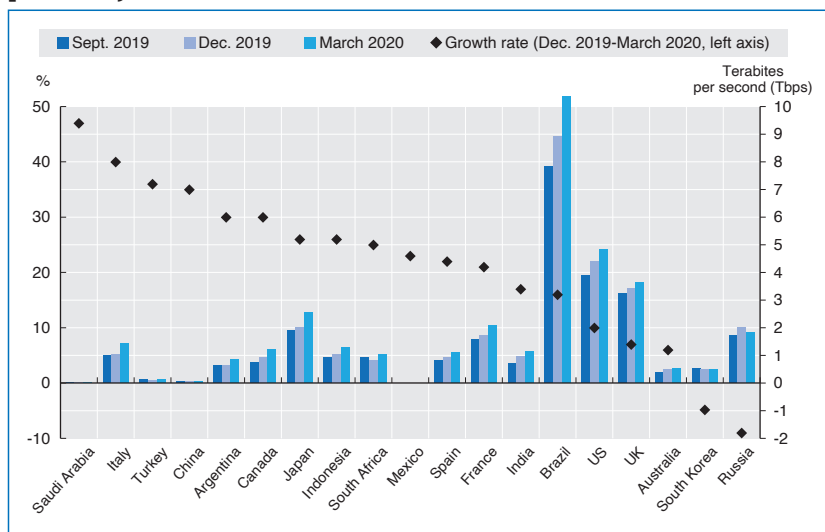
When the Covid-19 pandemic broke out at the start of 2020, citizens, businesses and governments were forced to move online, further accelerating the digital transformation that has been underway for several decades. Many employees started working from home; firms adopted digital business models to maintain operations and preserve revenue flows; face-to-face government services moved to digital platforms; digital tools were introduced to help “track and trace” the development of the pandemic and enable appropriate policy responses (https://read.oecd-ilibrary.org/view/?ref=129_129655-7db0lu7dto&title=Tracking-and-Tracing-COVID-Protecting-privacy-and-data-while-using); and researchers employed artificial intelligence (AI) to learn more about the virus and accelerate the search for vaccines and treatments. Due to these rapid shifts, data flows surged resulting in Internet traffic increasing in some countries by up to 60% following the outbreak (https://read.oecd-ilibrary.org/view/?ref=130_130768-5vfgoglwswy&title=Keeping-the-Internet-up-and-running-in-times-of-crisis) (Chart 1).

The pandemic has opened a new phase of digital transformation. Although some online activity may decline as Covid-19 vaccines and treatments diffuse across the economy, thus enabling greater

in-person interactions, it is likely to remain higher than before in areas for which the pandemic has acted as a catalyst, including telework, e-commerce, e-health, digital government services and e-payments. Evidence from Italy shows, for example, that teleworking in key sectors fell from its peak during the lockdown but remained higher than before the pandemic once the economy opened up (*OECD Digital Economy Outlook 2020*, <https://doi.org/10.1787/bb167041-en>). A recent McKinsey study notes that teleworking will remain high in certain occupations and sectors, as the pandemic helped break through cultural and technological barriers that had prevented it in the past (“What’s next for remote work: An analysis of 2000 tasks, 800 jobs, and nine countries”, McKinsey & Company, November 2020). Moreover, a July 2020 survey for the United Kingdom suggests that many firms that adopted digital tools and processes during the pandemic expect to maintain these post-crisis (“The Business Response to COVID-19: the CEP-CBI survey on technology adoption” by Capucine Riom and Anna Valero, *A CEP COVID-19 Analysis*, Paper No. 9, Centre for Economic Performance, London, September 2020).

Clearly, digital technologies have supported economic resilience during the coronavirus crisis, preventing large parts of the economy from coming to a complete standstill. However, this resilience is based on a range of digitalization policies, some of which are still evolving, and many of which have implications at the international level. These policies will require even greater attention as the digital transformation deepens and economies become more reliant on it. A number of elements are key in ensuring that digital transformation continues to support economic resilience.

CHART 1
Bandwidth produced at Internet exchange points, 2020



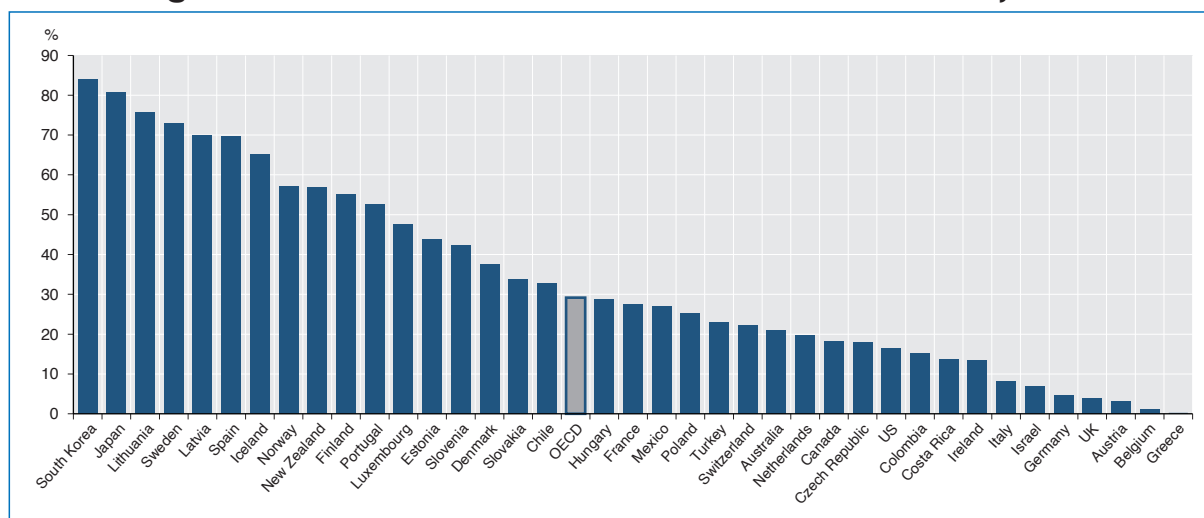
Source: *A Roadmap toward a Common Framework for Measuring the Digital Economy*, OECD, 2020, <http://www.oecd.org/sti/roadmap-toward-a-common-framework-for-measuring-the-digital-economy.pdf>

The Importance of Connectivity

The first is **fast, reliable and universal connectivity**. While the digital divide has long been recognized as an important challenge, the Covid-19 crisis further underscored the importance of digital technologies in facilitating interactions between people, organizations and machines, and in enabling the use of connected devices in critical contexts, including health, education, manufacturing and transport. Many of these uses require high-speed, symmetrical (i.e. upload and download) connections. However, by June 2020, high-speed fiber networks accounted for just over 29% of all fixed broadband subscriptions in the OECD (Chart 2).

CHART 2

Percentage of fiber connections in total fixed broadband, June 2020



Source: OECD, Broadband Portal, <https://www.oecd.org/sti/broadband/broadband-statistics/>

Japan was the only large OECD country above the OECD average, at just over 80% of all connections.

Important gaps in connectivity remain in all OECD countries, both across socio-economic groups, including age, income, education, and gender; and across regions, particularly in rural and remote areas, limiting the benefits of digitalization and potentially deepening overall inequalities. Faced with a future where jobs, education, health, government services and even social interactions may be more dependent on digital technologies than ever before, it will be essential to ensure widespread, affordable, fast and trustworthy connectivity for all. This is also important at the international level, where connectivity can be an enabler of the development of the digital economy and a catalyst for inclusive growth, innovation and sustainable development.

Diffusion & Uptake of Digital Technologies

Second, **greater diffusion and uptake of digital technologies across businesses and in the public sector.** These technologies offer a large potential for productivity growth, linked, for example, to business process innovation, automation of routine tasks, more efficient interactions with suppliers and customers and the use of data in the innovation process. New digital business models are also important and can provide for greater agility and resilience. However, stark differences remain across countries and businesses, in particular between large firms and small and medium-sized enterprises (SMEs). For example, while more than one-third of large firms in OECD countries engage in big data analysis, only just over 10% of small firms do (*OECD Digital Economy Outlook 2020*, <https://doi.org/10.1787/bb167041-en>). Evidence for the UK suggests that the Covid-19 crisis accelerated the uptake of digital tools by firms: the above-cited survey by Riom and Valero showed that in the period from late-March to late-July 2020, over 60% of firms adopted new digital technologies and management practices, and around a third invested in new digital capabilities. However, firms that had previously already adopted digital tools were more likely to adopt even more of them.

The risk is that the Covid-19 crisis may exacerbate existing gaps in uptake and use, in particular between large firms and SMEs, but also between sectors, regions and countries. If not addressed, such uneven diffusion may have important implications for firms' productivity performance as the pandemic continues to accelerate digitalization. It could potentially widen the productivity gap between digital adopters and digital laggards, enhance the vulnerability of laggards, increase inequalities at the global level, and reduce overall economic resilience. Greater policy efforts will therefore be needed to boost adoption and diffusion of digital tools, in particular for SMEs, but also in the public sector and across countries.

Safe & Trustworthy Digital Environment

Third, given the growing reliance of the economy on digital tools, greater attention is needed to **ensure a safe and trustworthy digital environment**, notably with respect to digital security, but also for privacy, data, consumer protection and the protection of vulnerable groups like children. It is crucial that the on-going digital transformation, while being a fundamental element for resilience, does not become a new source of instability.

Digital security, in particular, has long been a key challenge for the digital economy, but the Covid-19 outbreak increased the opportunities for cybercriminals and further raised its importance (*Seven lessons learned about digital security risk during the COVID-19 crisis*, <https://www.oecd.org/coronavirus/policy-responses/seven-lessons-learned-about-digital-security-during-the-COVID-19-crisis-e55a6b9a/>). Coronavirus-related scams and phishing campaigns have spread as malicious actors took advantage of the massive number of people and organizations switching to telework and using new tools for the first time without always adopting basic digital security hygiene (e.g. patching, use of strong and different passwords, regular backups, etc.).

In 2020, most governments in OECD countries had adopted whole-of-government digital security strategies. However, too often, these

strategies lack an autonomous budget, evaluation tools and metrics, and are not integrated with overall national digital plans. Overall, there is a need for policymakers to approach digital security more holistically to ensure the resilience of an increasingly digitalized economy, including in critical sectors such as the financial system. Such holistic approaches could encompass policies in the areas of enhancing the digital security of products and of critical activities and critical infrastructures, encouraging innovation in digital security and developing digital security skills and a security culture in sectors such as health, banking, telecommunications or energy; for specific businesses, notably SMEs; and in the public sector. Governments have an important role to play in the detection and identification of significant potential threats, providing early warning to businesses and households, and working at the international level with other governments to address such threats. Partnerships among governments and the private sector are also key to share information on threats and vulnerabilities and agree on resilience measures to ensure continuity, especially in critical sectors (*Recommendation of the Council on Digital Security of Critical Activities*, <https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0456>).

Data Access & Sharing

Fourth, data increasingly underpin digital transformation and have become an important source of value, for example for decision-making and production. **Data access and sharing** have become fundamental for many social and economic activities. In the context of the Covid-19 crisis, leveraging and opening up data has been center-stage in establishing effective frontline responses to the crisis. As data become a social and economic asset, policymakers are facing a number of issues from the perspective of economic resilience.

Data increasingly underpin trade in the digital age and any measures affecting data flows are likely to have trade consequences. Such measures may, for example, result from data-related regulation, such as local storage requirements, personal data protection agreements or trade agreements that cover cross-border data flows. A number of existing measures already make some cross-border data flows conditional or ban others altogether (“Trade and Cross-Border Data Flows” by Francesca Casalini and Javier López González, *OECD Trade Policy Papers*, No. 220, 2019, <https://doi.org/10.1787/b2023a47-en>).

Protecting data also requires managing risk. The benefits of storing, using, accessing and sharing data come with potential risks that may arise from any of these activities, and risks need to be managed well to maximize benefits. This balancing act involves costs and legitimate private, national, and public interests, in particular the rights and interests of the stakeholders involved in producing and using data. Privacy and Intellectual Property Rights (IPRs) need to be protected and enforced; otherwise incentives to produce and exchange data and to invest in data-driven innovation may be undermined, in addition to the direct harm that may occur to rights holders (*Enhancing Access to and Sharing of Data: Reconciling Risks and Benefits for Data Re-use across Societies*, <https://doi.org/10.1787/276aaca8-en>).

Data may also not be equally distributed or accessible. Concentration of data is visible, for example, in countries with many domestically hosted sites and high numbers of co-location data centers, often countries with a large population and uniform policies.

Concentration is also present at sectoral and/or firm level, with some companies holding disproportionately more data than others. The same companies also tend to concentrate the capacity needed to create value – information and knowledge – from data. Information and knowledge asymmetries may in turn affect the distribution of power, with shifts: 1) away from individuals to organizations (including consumers to businesses, and citizens to governments); 2) from traditional businesses to data-driven businesses; 3) from governments to data-driven businesses; and 4) from lagging economies to data-driven ones. These shifts could help drive productivity, but could also result in new divides, with implications for social cohesion and economic resilience (*Data-driven Innovation: Big Data for Growth and Well-being*, <https://dx.doi.org/10.1787/9789264229358-en>).

National data strategies can help realise the potential of data, including through sharing and reuse. Strategies aimed at balancing the issues mentioned above and achieving a social contract that unleashes the potential of data are uncommon today. However, some countries are in the process of developing such a strategy, and some data-related aspects are already addressed in open government data strategies as well as in national digital economy and/or security strategies, and others are on the verge of being addressed in emerging national privacy strategies (*Enhancing Access to and Sharing of Data: Reconciling Risks and Benefits for Data Re-use across Societies*, <https://doi.org/10.1787/276aaca8-en>). Building on these existing strategies, governments could consider developing consolidated broader data strategies as a comprehensive and coherent approach to leverage the potential of data for value creation while addressing the related challenges (*Going Digital: Shaping Policies, Improving Lives*, OECD Publishing, Paris, 2019, <https://www.oecd.org/publications/going-digital-shaping-policies-improving-lives-9789264312012-en.htm>).

At the national and international levels, further policy initiatives are needed to boost data access and sharing, including across borders, while addressing challenges associated with the protection of privacy, intellectual property rights and data governance and stewardship. Sharing data across borders can also facilitate collaboration between governments to improve their policy-making at the international level. They can help strengthen collective commitment and efforts across borders to support greater public sector transparency, and contribute to addressing global challenges as defined for instance by the Sustainable Development Goals (SDGs) or during global pandemics.

Skills for the Digital Economy

Fifth, as more people and firms “go digital”, governments must work to ensure that all workers can adjust to the changing work environment and are equipped with the **skills necessary to succeed in the digital economy** and make full use of the new tools. Individuals with a well-rounded skill set in terms of literacy, numeracy and problem solving can use digital tools more efficiently, carry out more sophisticated activities online, avoid online fraudulent activities and better adapt to digital transformations. There is also a growing consensus that transversal skills, such as thinking critically and creatively, making informed decisions while using technology and behaving collaboratively, are critical for the digital economy. Investing in skills can help ensure that the benefits of digital technologies are

widely shared and prevent workers from falling behind, thus helping address inequalities and contributing to economic resilience.

Innovation for the Digital Economy

Sixth, the strength of the digital economy draws on **rapid, ongoing innovation**. Innovations in cloud computing, mobile applications, AI and elsewhere are booming and have played an important part in the response to Covid-19. Governments are also devoting much attention to innovative digital technologies such as distributed ledger technologies and 5G infrastructure, the latter of which is critical to support enhanced mobile broadband, growing communications between machines using Internet of Things (IoT) devices, and AI applications. Distributed ledger technologies, such as blockchain, are also attracting increasing policy attention and have the potential to transform many industries and markets. Quantum computing is another technology with great potential for the ongoing digital transformation, with the United States, China and the European Union leading on the relevant R&D expenditure.

The virtuous circle between digital innovation and digital transformation will be a fundamental driver of new business models and markets, and digital technologies hold the potential to strengthen the science and research systems that are proving so critical to countries' response and recovery from crisis situations like Covid-19. Moreover, they can support economic resilience. Yet countries are also recognizing that the way in which these technologies are adopted can pose risks to human-centered values. This is giving added impetus to their efforts to move governance systems up-stream to shape strategic directions that can maximize the benefits of new technologies and address the challenges at an early stage. Given the inherently global reach of many of these digital technologies, coordination is needed at the international level, where the OECD's *AI Principles* (<https://www.oecd.org/going-digital/ai/principles/>) and the ongoing efforts to implement these principles and the recently established Global Partnership on AI (<https://gpai.ai/>) are just two examples of countries collaborating to ensure the trustworthy development and use of technologies.

Regulation & Governance

Seventh, the fast pace of change requires more agile and iterative forms of regulation, i.e. more outcome-focused and less reliant on specific prescriptive rules and processes. Instead, they need to be more agile through risk-based discretion, with increased emphasis on the professionalism of regulators and the use of near real-time data flows that allow calibration and adjustment. In many jurisdictions this evolution is difficult due to regulatory barriers resulting from rigid, outdated rules and procedures, which particularly penalize small businesses that inherently have less ability to cope than larger ones.

Closely related, **governance**. The Covid-19 crisis has revealed our dependence on digital technologies and their increasing importance and impact on the economy and society. Nonetheless, while many countries have a national digital strategy or an equivalent policy in place, most are still narrow in scope (*OECD Digital Economy Outlook 2020*, <https://doi.org/10.1787/bb167041-en>). The growing role of digitalization requires a whole-of-government policy approach to

digital transformation, as advanced in the OECD's Going Digital project (*Going Digital: Shaping Policies, Improving Lives*, OECD Publishing, Paris, 2019, <https://www.oecd.org/publications/going-digital-shaping-policies-improving-lives-9789264312012-en.htm>), with comprehensive strategies to address a range of inter-related policy issues, ensuring coherence and coordination of policies. The Covid-19 crisis has amplified all aspects of the digital transformation, and although the trajectory of the crisis and its consequences remain unclear, policymakers must nevertheless seize this opportunity to prepare for an increasingly digital future.

Conclusion

In sum, regardless of how the crisis and its aftermath unfold, there is no doubt that digital technologies will continue to transform the way we live and work. Teleworking, for example, is likely to remain more common than before the crisis, with a potential to increase productivity (*Productivity gains from teleworking in the post COVID-19 era: How can public policies make it happen?*, OECD, 2020, https://read.oecd-ilibrary.org/view/?ref=135_135250-u15liwp4jd&title=Productivity-gains-from-teleworking-in-the-post-COVID-19-era), although it also carries risks for innovation, as this relies heavily on the exchange of tacit knowledge, and for worker satisfaction that benefits from interacting with people. At the same time, the emergence of 5G and the IoT will further accelerate the production of data, adding urgency to ongoing policy discussions around data governance, privacy and digital security, and coherent and strategic decision-making across the whole of government. This may become even more acute as firms weigh the costs and benefits of increasing automation, especially in manufacturing facilities, to increase resilience against future health crises and reap efficiencies that will be needed to reduce environmental footprints. In doing so, the importance of data flows among firms is growing and needs to be considered by policymakers. Moreover, governments also need to consider the implications for business dynamics and competition in the digital economy.

Progress in all of the areas discussed above will require increased international co-operation to strengthen the international policy and regulatory frameworks supporting the digital economy, such as those related to data governance, privacy and digital security, and ensure their interoperability. Progress at the international level can also help ensure that standards, rules, regulations and norms are agreed and implemented across borders as consistently as possible, enhancing trust, reducing fragmentation and supporting common values.

NOTE: This paper draws on the following OECD report: *Fostering Economic Resilience in a World of Open and Integrated Markets: Risks, Vulnerabilities and Areas for Policy Action, Report Prepared for the 2021 UK Presidency of the G7*, <https://www.oecd.org/newsroom/OECD-G7-Report-Fostering-Economic-Resilience-in-a-World-of-Open-and-Integrated-Markets.pdf>. The opinions expressed and arguments employed herein do not necessarily reflect the official views of the member countries of the OECD. **JS**

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