



Digital Innovation: Seizing Policy Opportunities

Executive summary

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To an ever-increasing extent, innovation is digital. Most innovations today are new products, processes or business models at least partly enabled by digital technologies or embodied in data and software. Innovation processes themselves are changing in an era of digital transformation, with the use of AI-based analytics that allow for large-scale experiments in research and new virtual simulation and prototyping techniques for developing new products.

This report describes how the digital transformation is changing innovation processes and outcomes, highlighting general trends across the economy and factors behind sector-specific dynamics. In view of such changes, the report evaluates how policy support to innovation should adapt and in what directions. It also explores novel innovation policy approaches implemented by countries to promote digital technology adoption and collaborative innovation.

Digital transformation affects innovation in all sectors, but in different ways

The digital transformation changes innovation because of the significant reduction in the cost of producing and disseminating knowledge and information – innovation’s key ingredient – that can be digitalised. Smart and connected products are very different from the tangible products that typified the previous industrial era.

Four pervasive trends characterise innovation in the digital age. First, data are becoming a key input for innovation. Second, innovation activities increasingly focus on the development of services enabled by digital technologies. Third, innovation cycles are accelerating, with virtual simulation, 3D printing and other digital technologies providing opportunities for more experimentation and versioning. Fourth, innovation is becoming more collaborative, given the growing complexity of and interdisciplinary needs for digital innovation.

Impacts of the digital transformation differ significantly, however – both among and within sectors – in three main respects. First, the scope of opportunities for innovation in products,

processes and business models that digital technologies offer differ among sectors. Second, sectors need different types of data for innovation, and so the challenges faced for their exploitation differ. Third, the conditions for digital technology adoption and diffusion also vary, for instance due to differences in capabilities to take up those technologies and the level of maturity of sector-specific digital technology applications.

Key recommendations

Changes in the characteristics of innovation in the digital age require that governments change existing innovation policy instruments and mixes to respond to emerging challenges. Four new challenges for policy making that need to be addressed as a priority include the following:

1. *Develop policies addressing data access.* This now has to be a major priority in all countries. These policies are critical, as data have become a core input to innovation and data access directly affects a wide range of policy domains, such as innovation support policies, public research policies and competition policy. There is no simple approach to data access policies, as opportunities and challenges differ across data types. A general principle is that data access policies should ensure the broadest possible access to data and knowledge so as to favour competition and innovation, while respecting constraints regarding data privacy, ethical considerations, economic costs and benefits, and intellectual property rights considerations. Policies should take into consideration the diversity of data types as well as the diversity of interests and objectives served by providing different forms of data access and data rights to their owners.
2. *Strengthen the responsiveness and agility of policies in view of rapidly changing contexts,* offering more opportunities for small-scale policy experimentation to be scaled up or abandoned depending on assessed impacts. The use of digital tools to design and monitor policy targets can also spur faster and more efficient decision making. Mission-oriented programmes setting a goal but not the means to achieve it can also increase flexibility.
3. *Support technology development that responds to societal challenges and engage with citizens* to increase trust and address public concerns regarding new digital technologies, setting the necessary (anticipatory) regulations to ensure that new technologies and applications do not harm the public interest.
4. *Consider the global nature of some of the pressing challenges affecting innovation* (e.g. data access) when designing and reforming national policies; this will involve favouring cross-country co-operation and joint action.

Other innovation policy domains would also need to be revisited to better respond to new challenges:

- *Facilitate digital technology diffusion to promote inclusion in the digital age.* Demonstration facilities, test beds and regulatory sandboxes (i.e. a mechanisms to test new products or business models with reduced regulatory requirements) are innovative tools used to encourage digital technology experimentation and adoption.
- *Support service innovation to fully benefit from the potential of digital technologies.* Revise existing support initiatives that *de facto* exclude services innovation from targeted activities, and design new programmes to address emerging needs.

- *Encourage collaboration for innovation.* Strengthen the role of knowledge intermediaries in promoting interaction and collaboration among different actors. New models for collaborative innovation could be explored, such as data-sharing initiatives, crowdsourcing, and platforms for collaboration and co-creation.
- *Promote the digitalisation of public research.* Priorities include strengthening researchers' digital skills, ensuring appropriate investments in digital tools and infrastructures for research, and setting incentives for interdisciplinary research.
- *Build digital skills, including in the field of data analytics.* Innovation authorities should collaborate with education and research authorities to identify the new skills needed in this era of digital transformation.

Data access policies, policies promoting digital technology adoption and diffusion, and policies to support the development of sectoral applications of digital technologies (where market conditions inhibited the development of private sector-led solutions) all require taking a sectoral approach when designing new initiatives, since the challenges and needs faced by sectors in these areas vary significantly.

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Synthesis of the report

