

## ICTs

Effective Information and Communication Technologies (ICT) may facilitate innovation by improving information exchange and knowledge diffusion incurred in the production of innovations, foster growth by reducing production costs and increasing productivity, and expand the market for innovative products and services. While the use of ICT has grown steadily over the past decade, it substantially varies across OECD countries. Public policy can influence ICT access by strengthening a competitive environment that encourages the deployment of broadband across and within countries, supporting investment in next generation, high-capacity broadband networks, developing ICT skills, ensuring the open, free, decentralized and dynamic nature of the Internet, and ensuring security and privacy on the Internet.

### How does ICT access affect innovation?

First, effective ICT access can foster **innovation** by improving information exchange and knowledge diffusion incurred in the production of innovations:

- Better ICT access can improve **information management and sharing** within and outside the company (e.g. electronic data interchange [EDI], enterprise resource planning [ERP], customer relationship management [CRM]), and facilitate **collaboration** between and with third parties, including suppliers, consumers and research organization employees (e.g. through networking sites and collaborative tools, such as electronic conferencing tools, including discussion forum and wikis). The use of participative networks can allow firms to reach out to customers and partners in order to orient their innovation efforts and improve their products. The resulting user-centric innovations typically provide a more adequate response to the heterogeneous needs of users (von Hippel, 2005). Furthermore, ICT and broadband networks can allow firms to participate in larger research networks, which may encourage them to increase their R&D activities.
- Effective ICT access can also lower the **cost to access information** and knowledge, thereby facilitating **knowledge diffusion** and the combination of various sources of knowledge, which may result in further development of innovations. For instance, ICT helps connect elements of the global knowledge infrastructure (such as scientific databanks and large-scale science projects) in ways that may amplify their utility and impact.
- ICT can also improve **access to international capital markets**.
- However, although ICT can facilitate global collaboration and knowledge diffusion, geographical proximity still matters, especially in acquiring tacit knowledge, which cannot be codified and can only be shared through interactive, face-to-face relations.

Second, better ICT access can foster the growth of innovative ventures by reducing production costs and increasing productivity.

- ICT access and broadband-enabled trade in services allow companies to get **access to less expensive inputs and services by reaching global markets**. These services create new opportunities for business efficiency. Cloud computing is one example, where firms can adopt a pay-as-you-go model for computing resources instead of making significant up-front investments in ICT infrastructure or software. Cloud computing services can provide high-growth firms with computing resources rapidly and flexibly in response to changing needs, and allow greater scalability, which refers to the ability to handle a growing number of

activities and accept increased volume without impacting the contribution margin. Cloud computing services may also offer opportunities to access computing resources at a lower cost than firms' own ICT infrastructure (OECD, 2011). It allows immediate, on-demand access to information technology resources without the need for capital expenses in hardware and software, and thus significantly decreases entry barriers. Similar examples of cost saving can be found for legal, accounting and advertising services. Broadband-enabled global sourcing may also lead to cost reduction.

- Information technologies also reduce **transaction costs** for both business-to-business and business-to-consumer transactions. ICT lowers search costs, including the time and effort spent to determine whether a good is available on a given market, its price level and the most competitive supplier.

Third, the use of the Internet can **expand the market** for innovative businesses' products and services.

- Electronic commerce platforms on the Internet can create opportunities for **transactions that would not otherwise occur or that would not be profitable in the marketplace** by aggregating demand and by allowing a more efficient matching between supply and demand.
- The Internet can extend the **geographic reach** of the market and opens the way to transactions that could not have occurred without its existence.
- The Internet provides opportunities to develop **new products and services, new processes** (e.g. new ways of delivering products and services, and new advertisement possibilities), and enables **new business models** (e.g. online advertising or pay-per-click advertising). The Internet is the foundation for numerous new industries and services that rely solely on this technology, including, for example, the emergence of the Internet-based software industry and cloud computing.

### What policies can support ICT access?

- **Strengthening a competitive environment that encourages the deployment of broadband across and within countries, and investment in next generation, high-capacity broadband networks.** This would allow businesses to leverage the infrastructure to develop new products, services and platforms.
- **Developing ICT skills.** Investment in human capital is essential for the benefits of ICT to be fully realised. Governments can implement e-skills and digital literacy policies, and provide companies the means to develop and improve the skills that are required to exploit the opportunities offered by ICT.
- **Upholding the open, free, decentralised and dynamic nature of the Internet,** which is important to allow information and communication technologies to be platforms for innovation and knowledge.
- **Ensuring security and privacy on the Internet.** The future of the Internet economy depends on whether users, businesses and governments feel safe using the network and trust it for critical applications and services. This is all the more important, since malware and

incidents compromising the confidentiality, integrity or availability of information systems and networks are increasing.

- **Ensuring that appropriate laws and regulations are in place regarding data protection and e-commerce.** This encourages trust and the expansion of ICT usage in trading, while at the same time giving a clear warning to those who do not comply with appropriate standards.

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