Digital economy and society statistics - enterprises

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This article presents recent statistical data on several different aspects of the digital economy and society in the European Union (EU), focusing on the use of information and communication technologies (ICTs) by enterprises.

Progress in the development of the digital economy is regarded as critical to improve the competitiveness of the EU’s economy. ICTs have quickly become an integral part of how enterprises function: indeed, their extensive use has had a profound impact on how businesses are run, touching upon a range of aspects such as how they organise their production or service provision processes and their internal or external communication.

This article presents recent statistics on the use of the internet by enterprises, covering fixed broadband access, the speed of internet connections, the use of cloud computing, 3D printing and big data analysis. The widespread use of ICTs in the workplace has resulted in an increased demand for ICT specialists and the article also provides information pertaining to their recruitment, in particular the difficulties faced by some enterprises in filling these vacancies. The article closes with information on e-commerce.

Access and use of the internet

Enterprises connected to the internet via fixed broadband

In 2018, the vast majority (92%) of EU enterprises with at least 10 persons employed used a fixed broadband connection to access the internet (see Figure 1). This share has remained between 92% and 93% since 2014, suggesting that at EU level the uptake of this technology has reached saturation. With almost all enterprises connected to the internet via broadband, the attention of policymakers has more recently switched to the speed of fixed broadband connections.
The share of enterprises using the fastest internet connections tripled between 2011 and 2018

In 2018, one fifth (20 %) of enterprises in the EU-28 had an internet connection speed that was within the range of ≥ 2 Mb/s but < 10 Mb/s, with a slightly higher share (24 %) having a connection that was in the range of ≥ 10 Mb/s but < 30 Mb/s. One quarter (25 %) had a connection in the range of ≥ 30 Mb/s but < 100 Mb/s, while the fastest internet connections (at least 100 Mb/s) were enjoyed by more than one sixth (18 %) of enterprises in the EU-28. As can be seen from Figure 1, the share of enterprises using the slowest connection speeds (≥ 2 Mb/s but < 10 Mb/s) fell during successive years between 2011 and 2018 while the share using the two fastest connections (≥ 30 Mb/s) constantly increased.
The use of ICT has the potential to make significant changes to the way that enterprises are run, the adoption of ICT-based solutions within business processes is often referred to using the generic term of ‘e-business’. Figure 2 presents information in relation to one of the most basic types of e-business that is used by enterprises, namely having a website. In 2018, more than three quarters (77 %) of enterprises in the EU-28 had a website, with a much higher share for large enterprises (94 %) compared with SMEs (77 %). This share was 8 percentage points higher than it had been in 2011, when 69 % of enterprises had a website (see Eurostat datasource isoc_ci_web). Although the rate of growth for the proportion of enterprises with a website slowed and even stagnated in 2018, enterprises attach increasing importance to their internet presence, as witnessed through the uptake of relatively complex online functionalities, for example, online ordering or reservation or booking, order-tracking available online, product customisation and/or links to social media.

Figure 2: Enterprises having a website, by functionality and size class, EU-28, 2018 (% of enterprises)Source: Eurostat (isoc_ciweb)

E-business: 77 % of EU enterprises have a website

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Use of cloud computing services

More than 1 in 4 EU enterprises used cloud computing services

As cloud computing services can be delivered only via the internet, enterprises must have internet access to be able to use them. In 2018, this applied to almost all EU enterprises (97 %) with 10 or more persons employed (see Eurostat datasource isoc_ci_in_en2). While the proportion of firms with internet access was at similar near saturation levels in most Member States, more than 1 in 4 (26 %) EU enterprises reported that they used cloud computing services (see Figure 3). Compared to 2014, this represents an increase of 7 percentage points.

Significant differences can be observed across countries. In Finland, Sweden, Denmark, the Netherlands, Ireland, the United Kingdom and Belgium at least 40 % of enterprises used cloud computing in 2018. On the other hand, in Romania and Bulgaria only 10 % or fewer enterprises did so.
Cloud computing services widely used for e-mail, storage of files and office software

Of the enterprises that reported using cloud computing in 2018, some 69 % relied on a cloud solution for their e-mail (see Figure 4). Instead of setting up a server infrastructure for their e-mail system, which would have involved inter alia capital expenditure and maintenance costs, these firms opted for a cloud solution based on per-user operating costs.

Cloud computing services may meet a wide range of other business ICT needs. In 2018, nearly 7 out of 10 enterprises (68 %) using the cloud used it for storing files in electronic form. Some 53 % reported using it for office software (e.g. word processors, spreadsheets, etc.), while 48 % used it to host their database(s).

Moreover, via the cloud, enterprises access relatively more advanced end customer software applications, e.g. for finances/accounting and for managing information about their customers (customer relationship management – CRM) (38 % and 29 % respectively). In addition, 23 % reported using the (usually high-performance) cloud computing platforms for computing power in order to run their own business software applications.
Compared with 2014, the increases in the use of cloud services by enterprises with at least 10 persons employed were highest for office software (from 34% to 53% of enterprises using the cloud) and for the storage of files (from 53% to 68%). Hosting the enterprise’s database(s) and other more sophisticated purposes (financial or accounting software applications, CRM software applications and computing power for enterprise’s own software) grew less, between 9 and 6 percentage points.

It is notable that the smallest increase among all purposes within this period was reported for the use of cloud services for e-mail (from 66% to 69%) which, however, remains the widest used cloud service (see Figure 4).
Figure 5: Increase of cloud computing services in enterprises, by purpose and size class, EU-28, increase 2014-2018 (in percentage points)

Source: Eurostat (isoc_cicce_use)

Figure 5 presents the increase in the use of cloud services by purpose between 2014 and 2018 by enterprise size (in percentage points of enterprises using the cloud). In particular, the highest increases occurred for large enterprises for the use of cloud services for office software, storage of files and for e-mail (by 32, 18 and 15 percentage points respectively).

Likewise in SMEs, the use of cloud services for office software and storage of files increased most (by 18 and 15 pp respectively). However, the use of e-mail as a cloud service grew much less in SMEs (3 pp) than in large enterprises (15 pp).

The use of the more sophisticated purposes of cloud services (for hosting enterprise’s databases, financial and accounting software applications, CRM software applications and computing power) recorded smaller changes over this period for both groups of enterprises.

The share of enterprises using public cloud services was higher than that for private cloud

Service providers can deliver cloud computing services in two main ways: via public cloud servers or private cloud servers. The latter, used by 11 % of enterprises, by definition involve a single-tenant environment where the hardware, storage and network are set aside for a single enterprise. Consequently, the infrastructure guarantees high levels of security, as the service provider’s other clients cannot access the same resources. Some 11 % of SMEs and 31 % of large enterprises reported using private cloud (see Figure 6).
By contrast, public cloud infrastructures, used by 18% of enterprises, are provided for shared use by multiple clients. Essentially, they tend to be highly standardised, with limited customisation options, e.g. an e-mail server can provide many firms with the necessary cloud infrastructure to manage their e-mail systems. Public cloud computing was reportedly used by 40% of large enterprises and 17% of SMEs in the EU.

**Use of 3D printing**

Less than 1 in 20 EU enterprises used 3D printing

Use of 3D printing, also known as 'additive layer manufacturing', refers to the use of special printers either by the enterprise itself or the use of 3D printing services provided by other enterprises for the creation of three-dimensional physical objects using digital technology.

3D printers are automatically controlled, follow reprogrammable instructions generated by CAM software and have at least three axes. The difference between most 3D printers and a robot according to the ISO definition is the presence of a multipurpose manipulator. Although some hybrid 3D printers use an end effector that can either deposit material or mill it away, that would not be sufficient to make them qualify as robots.
In 2018, 4% of EU enterprises with at least 10 persons employed used 3D printing, either their own 3D printers or printing services provided by other enterprises. The largest shares of enterprises using 3D printing were observed in Finland (7%), Belgium, Denmark, Malta and the United Kingdom (all 6%). The smallest shares were reported by enterprises in Cyprus and Latvia (both 1%), followed by Bulgaria, Estonia, Greece, Hungary, Poland and Romania (all 2%) (see Figure 7).

In large enterprises, the share of 3D printing stood at 13% compared with 4% in SMEs (see Figure 8). This technology was most used in the manufacturing sector (9%), followed by enterprises in professional, scientific and technical activities (6%) and in information and communication (5%).
More than half of EU enterprises that used 3D printing used this technology for prototypes or models for internal use (57%). Less than one third used 3D printing for prototypes or models for sale (32%) or for goods to be used in the enterprise’s production process (27%). Only 17% used 3D printing for goods to be sold other than prototypes or models (see Figure 9).
Enterprises analysing big data

More than 1 in 10 EU enterprises analysed big data

In recent years, the quantity of digital data created, stored and processed in the world has grown exponentially. Each activity conducted online or by using information and communication technologies generates series of digital imprints which, given their volume, variety and velocity, are referred to as big data.

In the EU, 12 % of enterprises with at least 10 persons employed reported analysing big data in 2018 (33 % of large enterprises and 12 % of SMEs, see Eurostat datasource isoc_eb_bd). Among EU Member States, the largest shares of enterprises analysing big data were observed in Malta (24 %), the Netherlands (22 %), Belgium and Ireland (both 20 %). The smallest shares were noted in Cyprus (5 %), Hungary and Austria (both 6 %), Bulgaria and Italy (both 7 %) (see Figure 10).
Geolocation data of portable devices and data from social media were main sources of big data.

Enterprises that analysed big data used a variety of data sources. Almost half of all enterprises analysed geolocation data from portable devices e.g. portable devices using mobile telephone networks, wireless connections or GPS (49%), followed by data generated from social media e.g. social networks (45%). Less than one third of enterprises analysed own big data from smart devices or sensors (29%) or data from other sources (26%).

As shown in Figure 11, in SMEs, the use of geolocation data from portable devices and data from social media was prevailing whereas large enterprises mostly used data from the enterprise’s own smart devices or sensors and other sources.
Recruitment of ICT specialists

Enterprises can rely on their own employees to develop, adapt, maintain or support IT systems (e.g. web solutions for enterprise websites and e-commerce; enterprise resource planning; supply chain management; customer relationship management applications; or the use of cloud computing services) or they can rely on external service providers. For large enterprises it has become increasingly common to have their own dedicated IT team or department. For the data presented in this chapter, ICT specialists are defined as people whose main job involves ICT and who are capable of dealing with a wide range of tasks concerning corporate IT systems.
In 2018, 1 in 5 EU enterprises employed ICT specialists; the percentage of large enterprises employing ICT specialists (75 %) is more than 4 times higher than that for SMEs (18 %). During 2017, some 9 % of enterprises recruited or tried to recruit personnel for jobs requiring specialist ICT skills, while 5 % of enterprises reported that it was hard to fill those vacancies. These figures are heavily skewed by the large number of SMEs in the population of enterprises with at least 10 persons employed. More than two fifths (44 %) of large enterprises recruited or tried to recruit personnel for jobs requiring specialist ICT skills in 2017, while more than one quarter (27 %) of large enterprises reported that they had hard-to-fill vacancies for jobs requiring specialist ICT skills. By contrast, the corresponding shares for SMEs were 8 % and 4 % respectively (see Figure 12).

Enterprises engaged in e-commerce

E-commerce refers to the trading of goods or services over computer networks such as the internet. E-sales concern the receipt of orders by methods specifically designed for the purpose of receiving orders, either via electronic data interchange (EDI) or through websites or apps (web sales); orders received by way of manually typed e-mail messages are excluded.

1 in 5 EU enterprises made e-sales in 2017

One fifth (20 %) of all enterprises in the EU-28 made e-commerce sales in 2017, reflecting a rise of 7 percentage points compared with 2008. These e-sales accounted for 17 % of the total turnover generated in 2017. Between 2008 and 2017, the share of e-sales in total turnover rose by 5 percentage points, as the share had been 12 % at the start of the period under consideration (see Figure 13).
The share of turnover from EDI-type sales was greater than that from web sales

Enterprises which receive e-commerce orders may be divided into those making e-sales via a website or apps (web sales) and those making e-sales via EDI. Although a higher proportion (16 %) of enterprises used websites to make e-sales in 2017 than used EDI-type sales (6 %), see Eurostat datasource isoc_ec_eseln2, the share of web sales in the total turnover generated by EU-28 enterprises was relatively low, standing at 7 % in comparison with 11 % for EDI-type sales (see Figure 14).

In relative terms, the split in turnover between that generated from e-sales via EDI-type messages and that generated by web sales was most pronounced in Slovenia, where the share of EDI-type sales was almost 8 times as high as the one of web sales in 2017. In Austria, Czechia, Slovakia, Finland and Hungary, EDI-type sales accounted for a share of total turnover that was more than twice as high as that recorded for web sales. By contrast, in Cyprus, Lithuania and Greece the share of total turnover generated by web sales was higher than the share generated via EDI-type sales. In Latvia, the Netherlands and the United Kingdom the share of total turnover from web sales was as high as the one from EDI-type sales.
Slightly more turnover came from web sales to other businesses and public authorities than from business to consumer web sales.

Across the EU-28, enterprises generated 7% of their total turnover from web sales during 2017, consisting of sales via a website or apps. Figure 15 presents an analysis of how these sales were divided between different types of customer. 4% of total turnover came from web sales to other businesses and government, while 3% of total turnover came from business to consumer web sales.

In 2017, the United Kingdom, Ireland and Greece were the only EU Member States to report that a majority of their turnover from web sales was derived from business to consumer sales. By contrast, the share of total turnover that was derived from web sales made through business to business and business to government relationships was at least 2.6 times as high as the share from business to consumer relationships in Belgium, Slovenia and Slovakia.
More than twice as many enterprises used their own websites or apps than e-commerce marketplaces for their web sales.

Figure 16 presents the breakdown by type of sale of enterprises that made web sales in 2017. The information is split between those enterprises that made web sales via their own website or apps and those enterprises that made web sales via e-commerce marketplaces.

During 2017, 87 % of enterprises in the EU-28 with web sales used their own website or apps for sales, while 40 % used an e-commerce marketplace. The highest percentages of enterprises with web sales via their own website or apps were recorded in the Slovakia, Croatia and Finland (all 97 %), Estonia (96 %), Austria, the United Kingdom, Lithuania, Spain, Hungary and Czechia (94 %). The lowest shares were registered in Slovenia (67 %), Luxembourg (69 %) and Italy (74 %).

The share of enterprises with web sales that made use of e-commerce marketplaces peaked at 64 % in Italy, Cyprus and Poland (both 53 %); none of the remaining Member States recorded shares above one half. By contrast, just 10 % of enterprises with web sales in Finland sold via e-commerce marketplaces, while this share was also less than one fifth of all enterprises with web sales in Croatia (13 %), Denmark and Czechia (both 18 %).
Rapid technological changes in areas related to the internet and other new applications of ICTs pose challenges for statistics. As such, this area of statistics changes at a relatively rapid pace, compared with most other official statistics. Indeed, statistical tools are adapted to satisfy new demands for data and the ICT survey is reassessed on an annual basis in order to reflect the rapid pace of technological change.

The information presented in this article is based on the results of a Community survey on ICT usage and e-commerce in enterprises. The statistics were obtained from enterprise surveys conducted by national statistical authorities. The results of this annual survey are used to benchmark ICT-driven developments, both by following developments for core variables over time and by looking in greater depth at other aspects at a specific point in time.

While the survey on ICT usage in enterprises initially concentrated on e-commerce, internet access and connectivity issues, its scope has subsequently been extended to cover a wider variety of subjects (for example, cloud computing, social media, mobile connections to the internet, the use of e-business solutions, ICT specialists, the outsourcing of ICT functions, big data analysis and 3D printing).

Coverage

The statistical observation unit is the enterprise, as defined in Regulation (EEC) No 696/93. Note that the annual survey on ICT usage in enterprises covers enterprises that have at least 10 persons employed.

The activity coverage of the survey is restricted to those enterprises whose principal activity is within NACE Rev. 2 Sections C to N excluding Section K and Division 75, but including Group 95.1: manufacturing; electricity; gas; steam and water supply; sewerage and waste management; construction; wholesale and retail trade,
repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities; information and communication; real estate; professional, scientific and technical activities (excluding veterinary activities); administrative and support activities; and the repair of computers and communication equipment.

The data collected can be analysed according to enterprise size classes (defined in terms of persons employed), with information presented for SMEs (50-249 persons employed) and large (250 or more persons employed) enterprises.

The data are organised in Eurostat’s online database according to the year in which the survey was conducted. Most data refer to the situation during the early part of the same year as the survey. However, data on ICT specialists and on e-commerce refer to the calendar year preceding the survey (in other words, to 2017 for the 2018 survey).

**Context**

Broadband technologies are considered to be important when measuring access to and use of the internet, as they offer users the possibility to rapidly transfer large volumes of data and keep access lines open. Indeed, the take-up of high-speed and superfast broadband are considered as key indicators within the domain of ICT policymaking. While digital subscriber lines (DSL) remain the main form of delivery for broadband technology in the EU, alternatives such as cable, satellite, fibre optics and wireless local loops are becoming more widespread.

In May 2015, the European Commission adopted a digital single market strategy (COM(2015) 192 final) as one of its top 10 political priorities for the period 2015-2019. The digital single market strategy had 16 initiatives that covered three broad pillars: promoting better online access to goods and services across Europe; designing an optimal environment for digital networks and services to develop; ensuring that the European economy and industry takes full advantage of the digital economy as a potential driver for growth. In the European Commission’s work programme for 2017 Delivering a Europe that protects, empowers and defends (COM(2016) 710), the European Commission proposed to advance swiftly on proposals that had already been put forward and to undertake a review of the progress made towards completing the digital single market. In May 2017, the European Commission published a mid-term review of its digital single market strategy, which took stock of the situation, while outlining actions in relation to online platforms, the data economy and cybersecurity.

The European Commission is working on a number of initiatives to boost ICT skills in the workforce, as part of a broader agenda for better skills upgrading, anticipating skills demand and matching skills supply to demand. In order to increase the supply of ICT specialists, the European Commission has launched a Grand Coalition for Digital Jobs, an EU-wide partnership that seeks to use European structural and investment funds to alleviate difficulties related to the recruitment of ICT specialists.

On 10 June 2016, the European Commission adopted a new Skills Agenda for Europe which seeks to promote a number of actions to ensure that the right training, the right skills and the right support is made available to people in the EU so that they are equipped with skills that are needed in a modern working environment, including the promotion of digital skills.

**Other articles**

- E-commerce statistics
- Cloud computing - statistics on the use by enterprises
- E-business integration
- ICT specialists - statistics on hard-to-fill vacancies in enterprises
- Social media - statistics on the use by enterprises
• Internet advertising of businesses - statistics on usage of ads
• ICT security in enterprises
• Digital economy and digital society statistics at regional level
• Digital economy and society statistics - households and individuals

Main tables
• Digital economy and society see:
  ICT usage in enterprises (t_isoc_e)
  Digital skills (t_isoc_sk)
  ICT sector (t_isoc_se)

Database
• Digital economy and society, see:
  ICT usage in enterprises (isoc_e)
    Summary of EU aggregates (isoc_ci_eu_en2)
    E-commerce (isoc_ec)
    Connection to the internet (isoc_ci)
    Websites and use of social media (isoc-cism)
    E-business (isoc_eb)
  Digital skills (isoc_sk)

Dedicated section
• Digital economy and society

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• Science, technology and innovation in Europe — 2013 edition — Pocketbook
• News releases
• Statistical articles

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