

Integration of Digital Technology

Digital Economy and Society Index Report 2019
Integration of Digital Technology

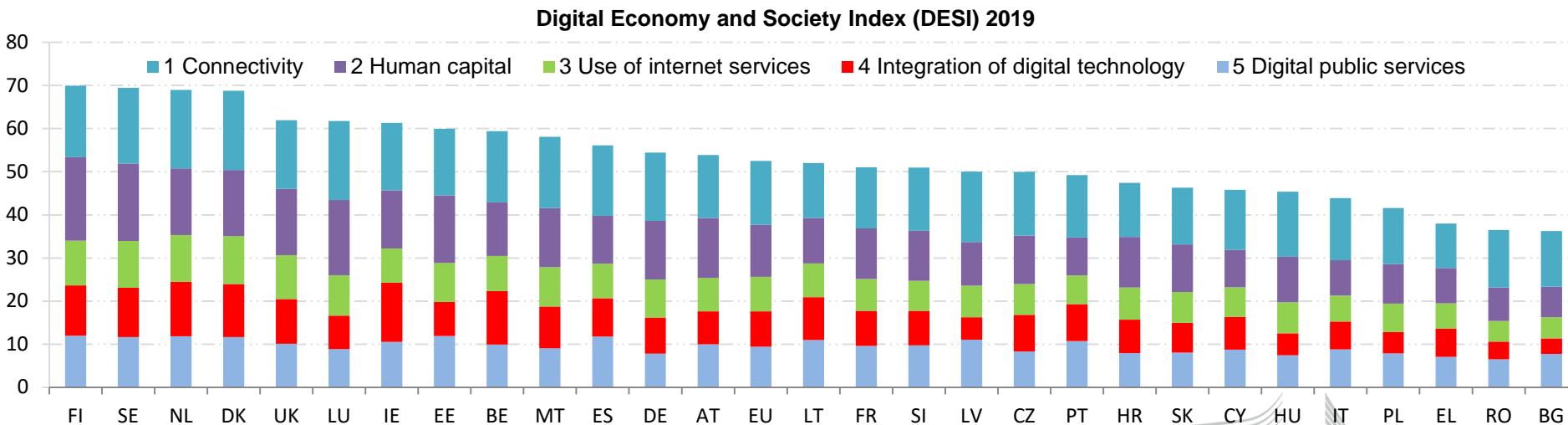
The Digital Economy and Society Index (DESI) is a composite index that summarises relevant indicators on Europe's digital performance and tracks the progress of EU Member States in digital competitiveness.

Finland, Sweden, the Netherlands and Denmark, have the most advanced digital economies in the EU followed by the UK, Luxembourg, Ireland and Estonia.

Bulgaria, Romania, Greece and Poland have the lowest scores on the index.

The five dimensions of the DESI

1 Connectivity	Fixed broadband, mobile broadband, fast and ultrafast broadband and prices
2 Human capital	Internet user skills and advanced skills
3 Use of internet	Citizens' use of internet services and online transactions
4 Integration of digital technology	Business digitisation and e-commerce
5 Digital public services	e-Government and e-health



Source: DESI 2019, European Commission

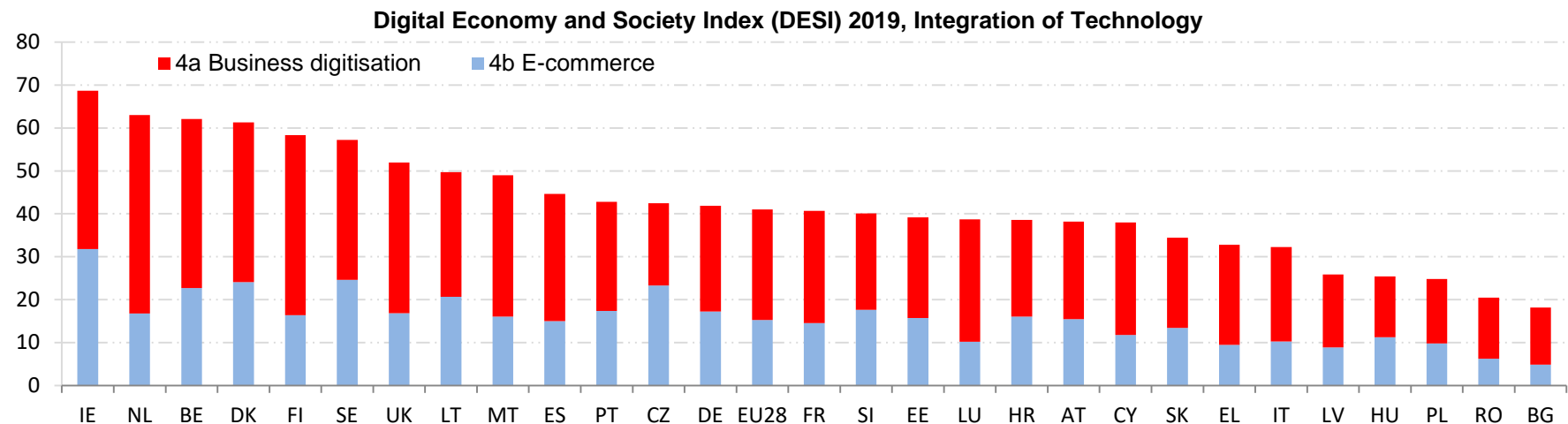
On **Integration of digital technology**, Ireland scored highest, followed by the Netherlands, Belgium and Denmark. Bulgaria, Romania, Poland and Hungary scored lowest.

Integration of digital technology covers (a) 'business digitisation' and (b) 'e-commerce'.

'Business digitisation' has four indicators (as the % of enterprises using): electronic information sharing, social media, big data analysis and cloud solutions.

e-Commerce includes three indicators: the percentage of small and medium-sized enterprises (SMEs) selling online, e-commerce turnover as a percentage of total turnover of SMEs, and the percentage of SMEs selling online cross-border.

Integration of Digital Technologies indicators in DESI 2019		EU
4a1 Electronic information sharing		34%
% enterprises		2017
4a2 Social media		21%
% enterprises		2017
4a3 Big data		12%
% enterprises		2018
4a4 Cloud		18%
% enterprises		2018
4b1 SMEs selling online		17%
% SMEs		2018
4b2 e-Commerce turnover		10%
% SME turnover		2018
4b3 Selling online cross-border		8%
% SMEs		2017



The EU Member States that have exploited **e-commerce** opportunities the most are Ireland, Sweden and Denmark, whereas the Netherlands and Finland are leading in the adoption of **e-business** technologies.

Enterprises are implementing both e-business and e-commerce solutions.

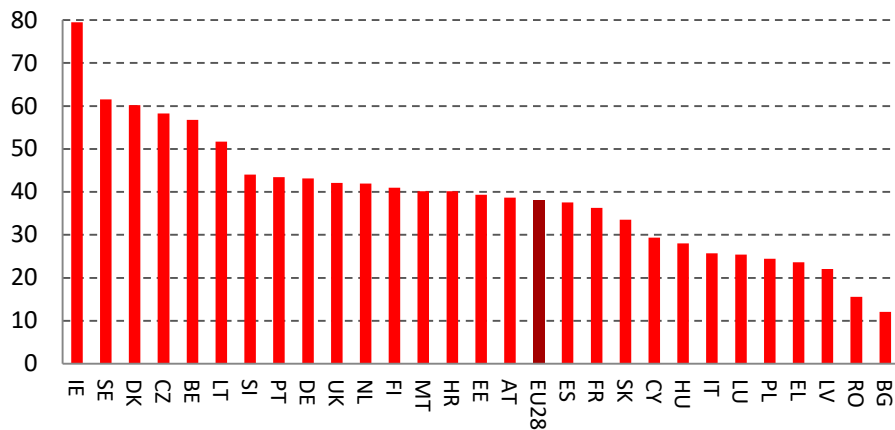
Regarding e-commerce, Ireland, Belgium and Czechia are among the top five countries in all the three indicators mentioned previously. Denmark is leading regarding the share of enterprises selling online, whereas Sweden ranks 3rd. Sweden is positioned 4th and Denmark 5th concerning the share of e-commerce turnover in total turnover.

In Bulgaria, Romania and Latvia, SMEs are yet to exploit the many opportunities in e-commerce.

When it comes to e-business technologies, the leading countries are the Netherlands (2nd among EU Member States in three indicators: electronic information sharing, social media and big data analysis; 3rd in cloud solutions), Finland (forerunner in the use of cloud solutions) and Belgium (first in electronic information sharing).

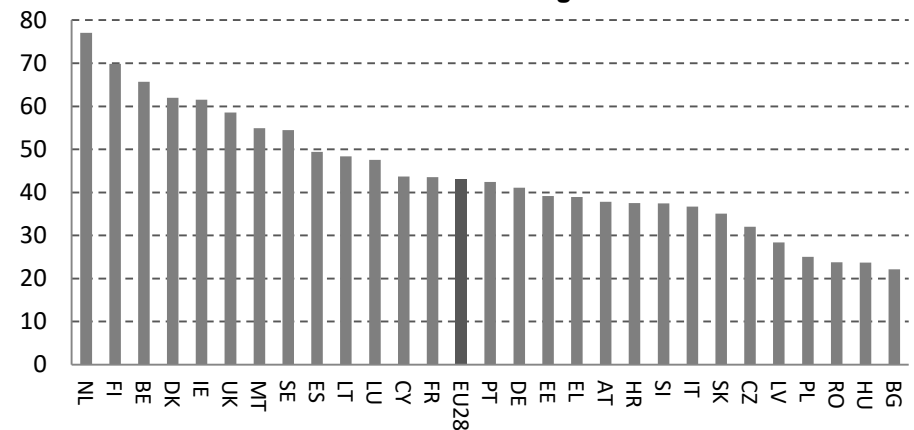
Bulgaria, Hungary, Romania, Poland and Latvia are lagging behind in the adoption of e-business technologies.

DESI 2019 - e-Commerce index



Source: European Commission services based on Eurostat data

DESI 2019 - Business digitisation index



Source: European Commission services based on Eurostat data

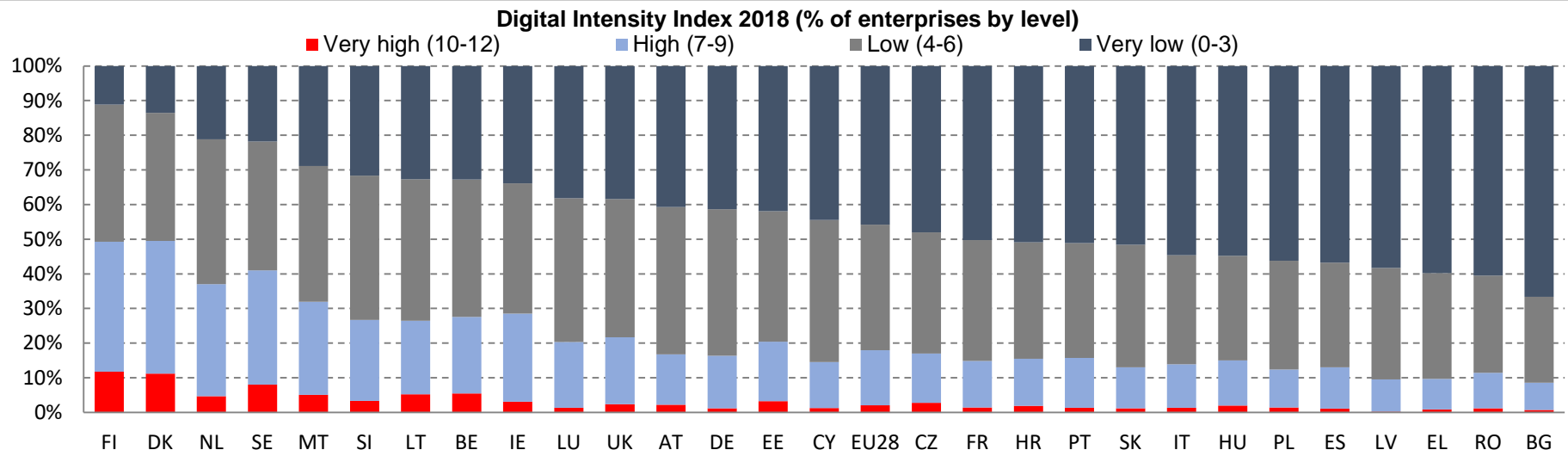
Less than **a fifth of companies** in the EU-28 are **highly digitised**, but the situation across countries is varied, ranging from 50 % of companies in Finland and Denmark to only 10 % in Bulgaria, Greece and Latvia.

The Digital Intensity Index (DII) measures the availability at firm level of 12 different digital technologies: internet for at least 50 % of people employed; recourse to ICT specialists; fast broadband (30 Mbps or above); mobile internet devices for at least 20 % of people employed; a website or homepage; a website with sophisticated functions; social media, paying to advertise on internet; buying medium-high cloud computing services, sending e-invoices suitable for automated processing; e-commerce web sales accounting for at least 1 % of total turnover; and business-to-consumer (B2C) web sales of over 10 % of total web sales.

The value for the index therefore ranges from 0 to 12.

Finland and Denmark are the only countries in the EU where the percentage of firms with a very high DII (i.e. possessing at least 10 out of the 12 monitored digital technologies) is above 10 %, followed by Sweden with 8 %.















































By contrast, in some countries such as Bulgaria, Romania, Greece, Latvia, Spain, Poland Hungary and Italy the majority of businesses (over 55 %) have had low investments in digital technologies (i.e. have a very low DII), often having just a simple website and a few computers.



Source: Eurostat

Digital transformation of European businesses is driven by **fast broadband connections, social media** and **mobile applications**.

The table below shows the degree of penetration and speed of adoption of the different technologies monitored by the DII. Large companies are more digitised than SMEs. While some dimensions seem to be reaching saturation (e.g. having a simple website), at least for large companies, for most dimensions there is still room for improvement.

Key indicators tracking digitisation processes	Year	% of EU28 enterprises			Variation 2018 on 2017 or 2016	
		Large	SMEs		Large	SMEs
Enterprises having a web site or homepage	2018	 94%	 77%	(a)	 0%	 0%
Access to ICT specialist skills	2018	 90%	 65%		 1%	 1%
Website has some interactive functionalities	2018	 74%	 57%		 0%	 -1%
Website has references to the enterprise's social media profiles	2018	 63%	 37%		 3%	 3%
>50% of the persons employed use computers & Internet	2018	 52%	 43%		 2%	 3%
Fastest broadband connection is at least 30 Mb/s	2018	 75%	 43%		 6%	 5%
>20% of workers with portable devices for business use	2018	 42%	 34%	(a)	 3%	 2%
Pay to advertise on the internet	2018	 38%	 26%		 4%	 1%
Selling online (at least 1% of turnover)	2018	 38%	 17%		 -1%	 -1%
Sending eInvoices suitable for automated processing	2018	 47%	 23%	Not comparable with 2017 or 2016		
Buy medium-high Cloud Computing services	2018	 39%	 17%	(a)	 9%	 4%
Exploit B2C eCommerce	2018	 9%	 8%	(b)	 1%	 0%

(a) Variation on 2016

(b) Enterprises where web sales are more than 1% of total turnover and B2C web sales more than 10% of the web sales

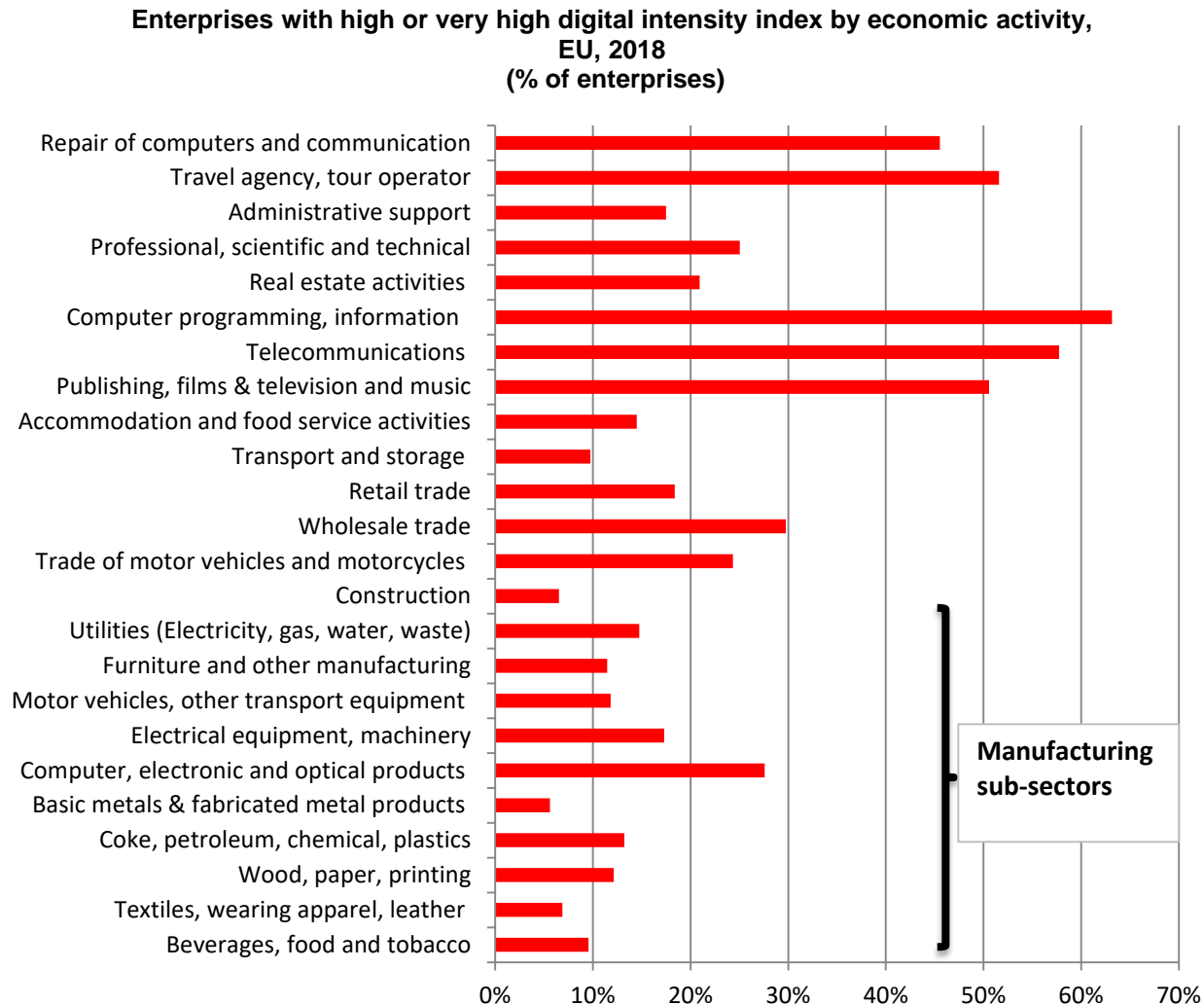
Source: European Commission services based on Eurostat data

The **digitisation of economic sectors** is progressing at different pace, according to their own specific needs and starting points.

The different segments of the ICT sector (from telecoms to the manufacture of computers) tend to be the most digitised sectors of the economy. However, other sectors such as travel agencies and the media sectors are also highly digitised.

Some sectors are still impervious to digital changes: for example, in the construction sector only 6.5 % of the enterprises have a high or very high DII, while for transport and storage almost 10 % of enterprises have high or very high DII.

The distribution of the DII by economic activity is similar across EU countries. Denmark, Finland and Sweden are over performing in many of the sectors. Some positive exceptions of higher digitisation exist in the following sectors: "travel agency; tour operator reservation service and related activities" (Slovenia, Lithuania, Romania, Hungary, Estonia, the Netherlands and Czechia), "professional scientific and technical activities" (Finland, Slovenia and Lithuania), "real estate activities" (Finland, the Netherlands and Ireland) and "transport and storage" (Malta).



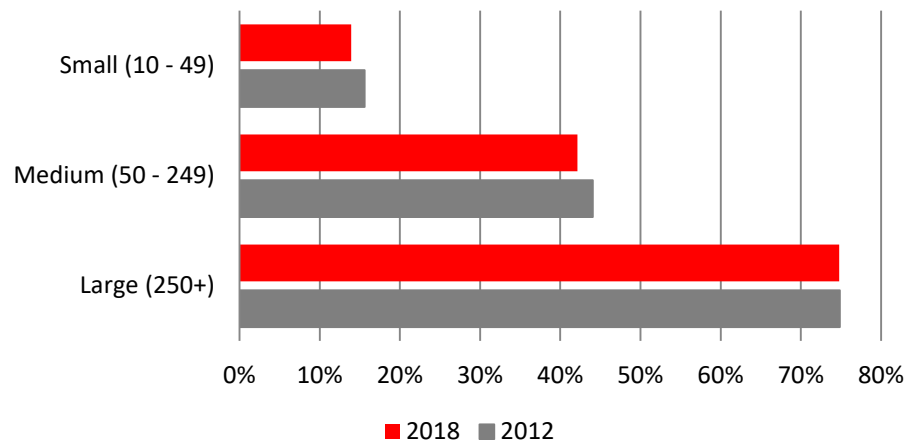
Source: European Commission services based on Eurostat data

The adoption of digital technologies varies strongly according to **company size**. There are still many areas for **SMEs**, where opportunities for digitisation can be exploited.

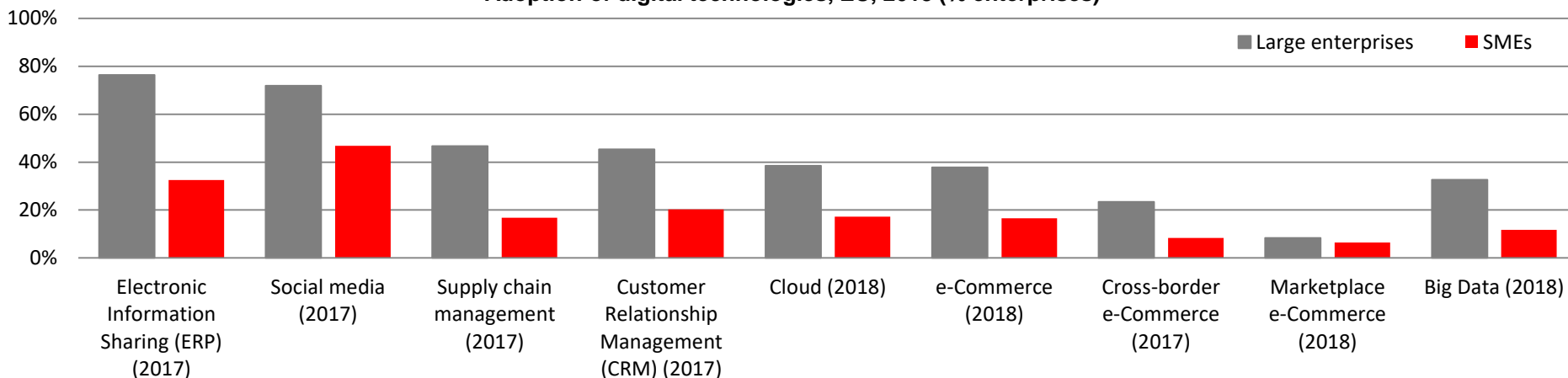
Large enterprises have a scale advantage, thus 75 % of them employ internal ICT specialists. The share of SMEs employing ICT specialists decreased slightly (1.6 percentage points) during the last six years, however the share of SMEs where ICT tasks were carried out by external personnel increased since 2015 (1.7 percentage points)

Electronic information sharing through Enterprise Resource Planning (ERP) software is much more common in large companies. SMEs are active on social media (47 % use any type of social media, 2017) and, to a limited extent, they try to exploit e-commerce opportunities by selling through online marketplaces (6.5 % of SMEs versus 8.3 % of large enterprises). Nevertheless, there are many technological opportunities yet to be exploited by SMEs such as cross-border e-commerce, cloud services and customer relationship management.

Enterprises employing ICT specialists, EU , 2012-2018, (% of enterprises)



Adoption of digital technologies, EU, 2018 (% enterprises)



Source: Eurostat

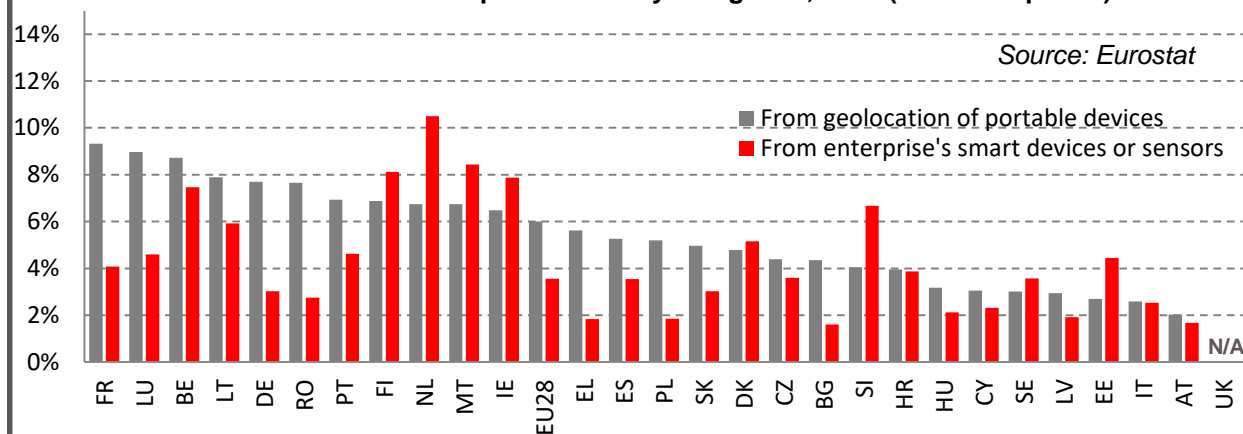
More than 12 % of enterprises analyse big data. Malta performs the best, with almost 25 % of Maltese enterprises analysing big data.

Enterprises all around the EU are constantly evolving and aligning with the trends and technologies for collecting, storing and analysing data. Companies use big data for analysing in large volumes, producing near or real time results from data that comes in different format types. Large companies have the lion's share in big data processing (33 %), while SMEs have still room for improvement (12 %) to take advantage of the benefits that big data can bring.

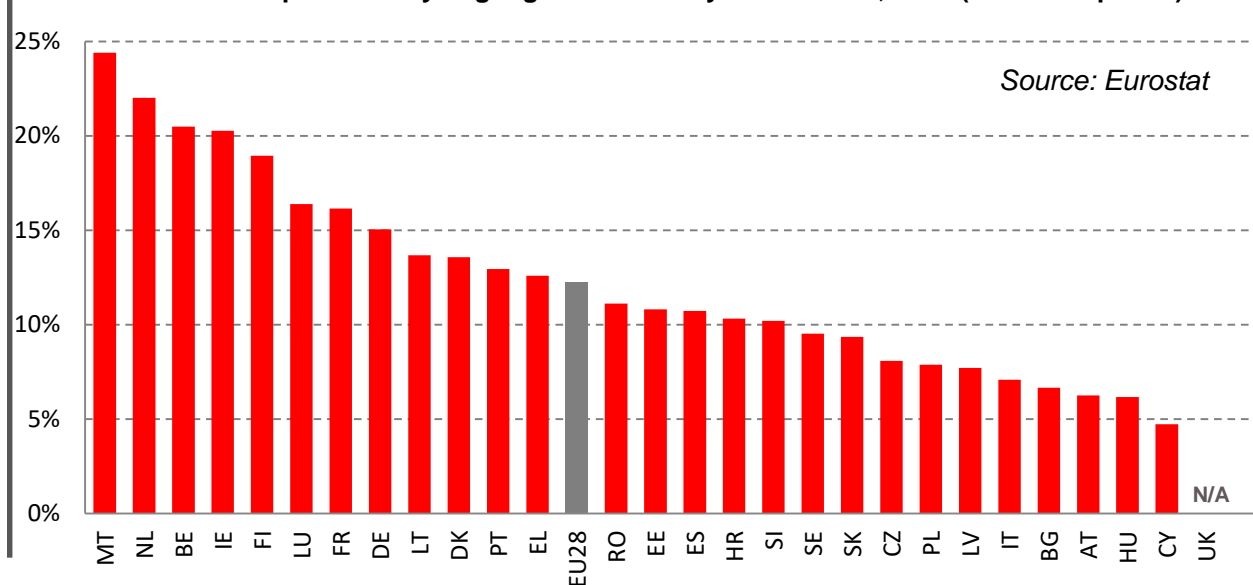
Nearly 6 % of enterprises analyse big data from geolocation of portable devices, while almost 4 % analyse data from their smart devices or sensors.

In Malta, almost one fourth of enterprises use big data. The Netherlands, Belgium and Ireland follow closely, with more than 20 % of enterprises taking advantage of big data. On the other hand, enterprises in Cyprus, Hungary, Austria and Bulgaria barely use big data.

Sources used from enterprises to analyse big data, 2018 (% of enterprises)



Enterprises analysing big data from any data source, 2018 (% of enterprises)



* The UK did not participate in the exercise for 2018

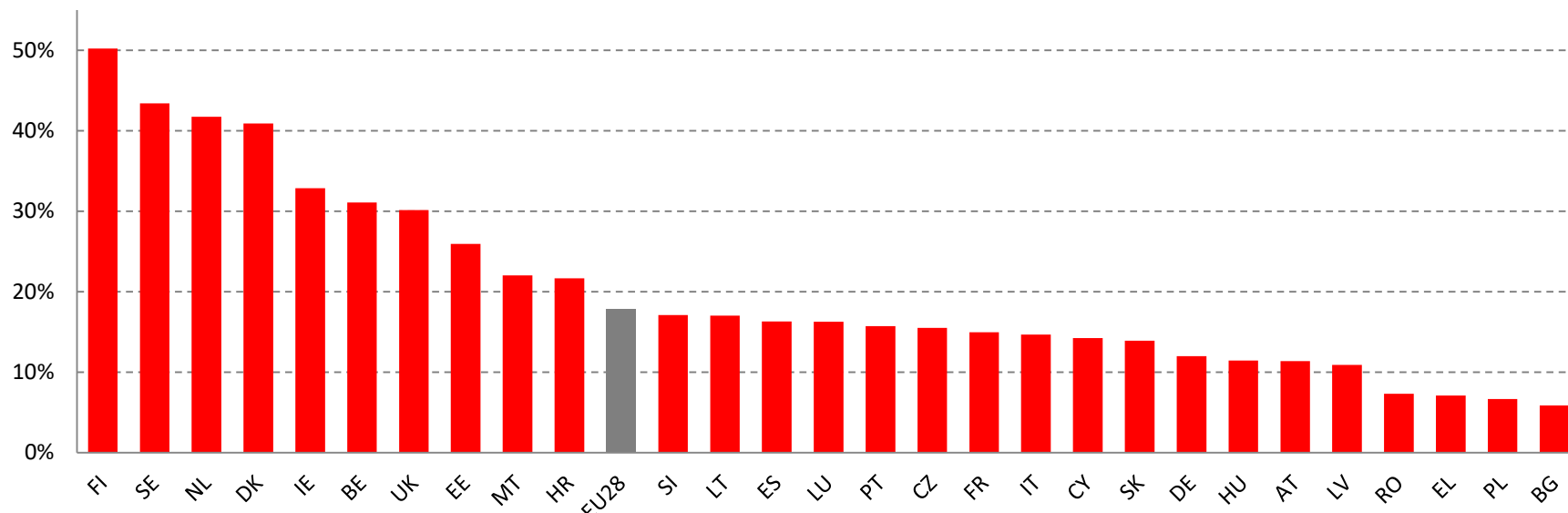
26.2 % enterprises invest in cloud computing services, with 17.8 % investing in cloud computing services of medium-high sophistication.

26.2 % of European enterprises purchase cloud computing services and incorporate cloud technologies for improving operations while reducing costs, representing an increase of 25 % compared to 2016. The cloud uptake of larger companies (55.6 %) is higher than SMEs (25.3 %) in 2018.

17.8 % of companies use medium-high sophisticated services (i.e. hosting of the enterprise's database, accounting software applications, Customer Relationship Management (CRM) software and computing power). There is a bigger proportion of larger enterprises following this trend (38.5 %) than SMEs (17.2 %).

Finnish enterprises are leaders in incorporating cloud services of medium-high sophistication. 50 % of Finnish enterprises buy such services, having recorded a 50 % increase between 2014 and 2018. Sweden, the Netherlands and Denmark follow with more than 40 % of enterprises using these services. However, the gap between top and low performers remain large, with Bulgaria, Poland, Greece and Romania performing below 10 %.

Cloud computing services of medium-high sophistication, 2018 (% of enterprises)



Source: European Commission services based on Eurostat

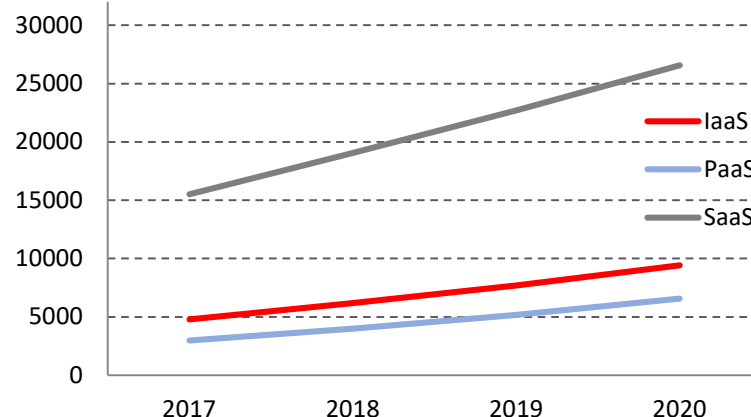
Revenues generated from public cloud services within the EU market increased by **25 %** compared to 2017. They are expected to grow by **45 %** in average between 2018 and 2020.

Total revenues generated by public cloud services, i.e. Infrastructure as a service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS), across the EU market increased by 25 % between 2017 and 2018. They are expected to continue to grow by 45 % between 2018 and 2020.

In 2018, SaaS represented almost two thirds of total public cloud revenues generated within the EU market. It is forecasted to continue until at least until 2020. In 2018, IaaS and PaaS represented 21 % and 13 % of total public cloud revenues generated within the EU market.

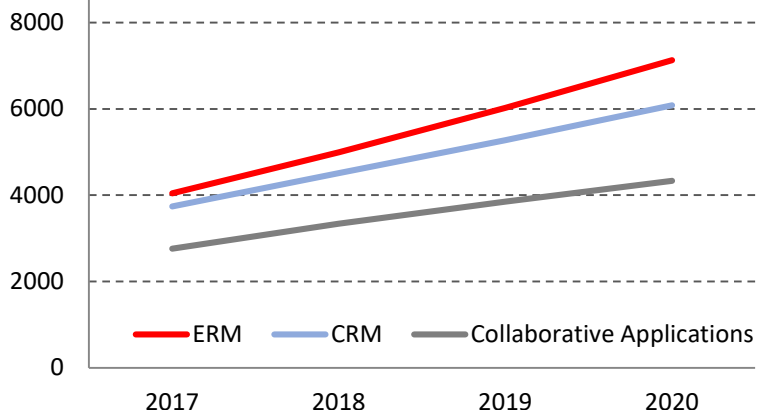
Between 2018 and 2020, it is forecasted that IaaS and PaaS will respectively grow at 52 % and 64 % both at a higher rate than SaaS over the same period (39 %).

EU public cloud service revenues per category, 2017 - 2020 (EUR million)



Source: European Commission services based on IDC

Revenue of the top 3 SaaS Applications in share of total SaaS EU revenues, 2017 - 2020 (EUR million)



Source: European Commission services based on IDC

Between 2017 and 2018, of the three applications contributing the most to SaaS revenues across the EU market, the revenue rates for each increased by the following percentages:

23 % for Enterprise Risk Management (ERM); 20 % for Customer Relationship Management (CRM) and; 21 % for Collaborative Applications.

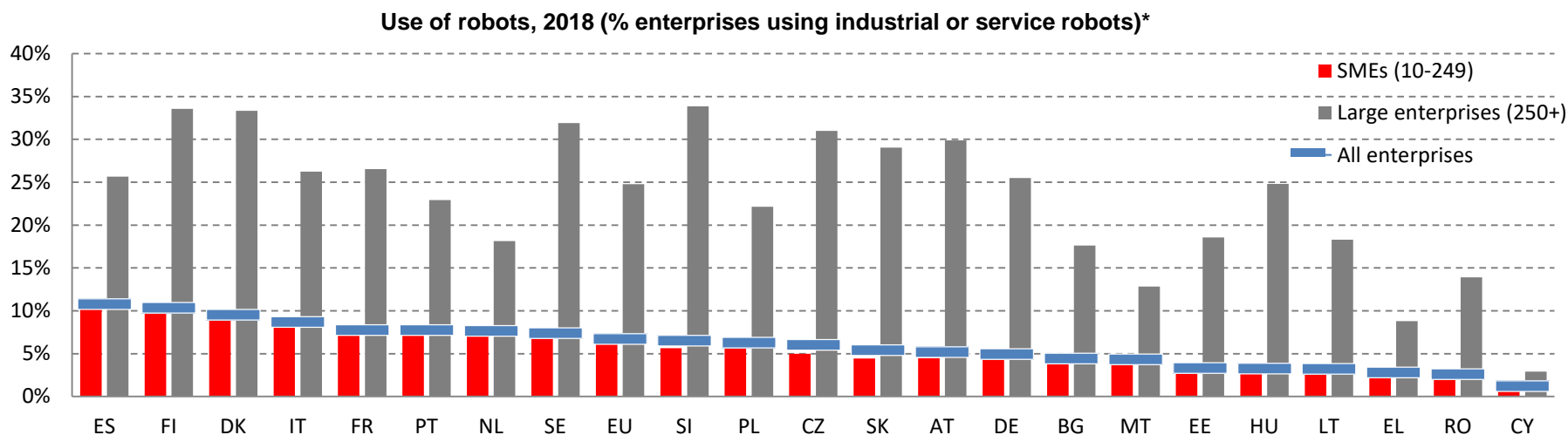
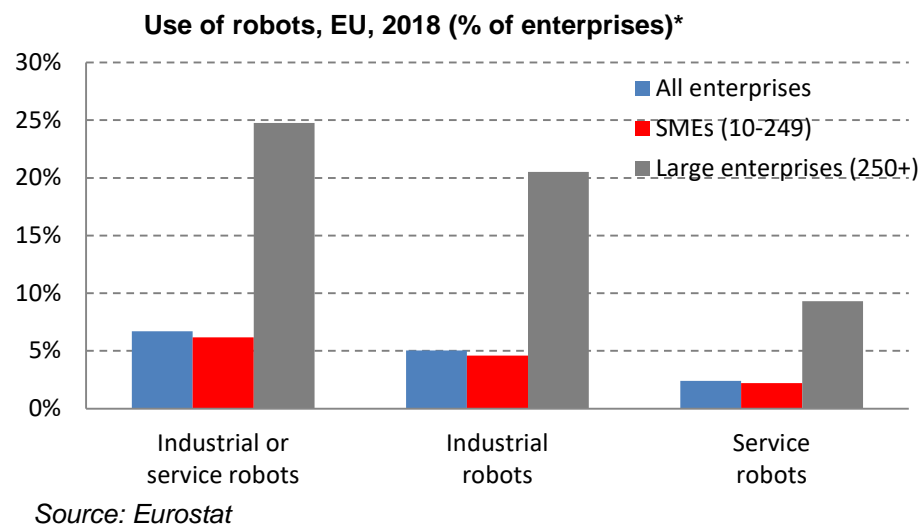
They are expected to remain the most prominent ones applications that contribute to total SaaS revenues until at least 2020 with respective revenue growth rates of 43 %; 35 % and; 30 % between 2018 and 2020.

In 2018, software security, as a SaaS application, contributed EUR 1169.8 million to total SaaS revenues within the EU market. The revenue growth rate is expected to be at 37 % and therefore growing faster than CRM and collaborative applications but still slower than ERM over the 2018 to 2020 period.

Use of **robots** is low on an EU level, with 6.7 % of all enterprises using industrial or service robots. The share of large enterprises that use robots is four times higher than the share of SMEs.

The adoption of robotics is quite low in all EU Member States for which data are available (Belgium, Croatia, Ireland, Latvia, Luxembourg and the UK did not cover this optional module in 2018), with a take-up rate in all enterprises ranging from 10.8 % in Spain to 1.2 % in Cyprus. Only Western European countries are above the EU average of 6.7 %. The share of enterprises using robots is below 4 % in Estonia, Hungary, Lithuania, Greece, Romania and Cyprus.

The use of robots varies strongly according to company size. Almost 25 % of large enterprises use both industrial and service robots, while the take-up rate for SMEs is four times less at only 6.2 %. More than 30 % of large enterprises use robots in Slovenia, Finland, Denmark, Sweden and Czechia. The use of industrial robots is more than twice that of service robots both in large enterprises and in SMEs.



* Data not available in six EU Member States

Source: Eurostat

More than 4 % of enterprises use 3D printing services for internal use or for products for sale.

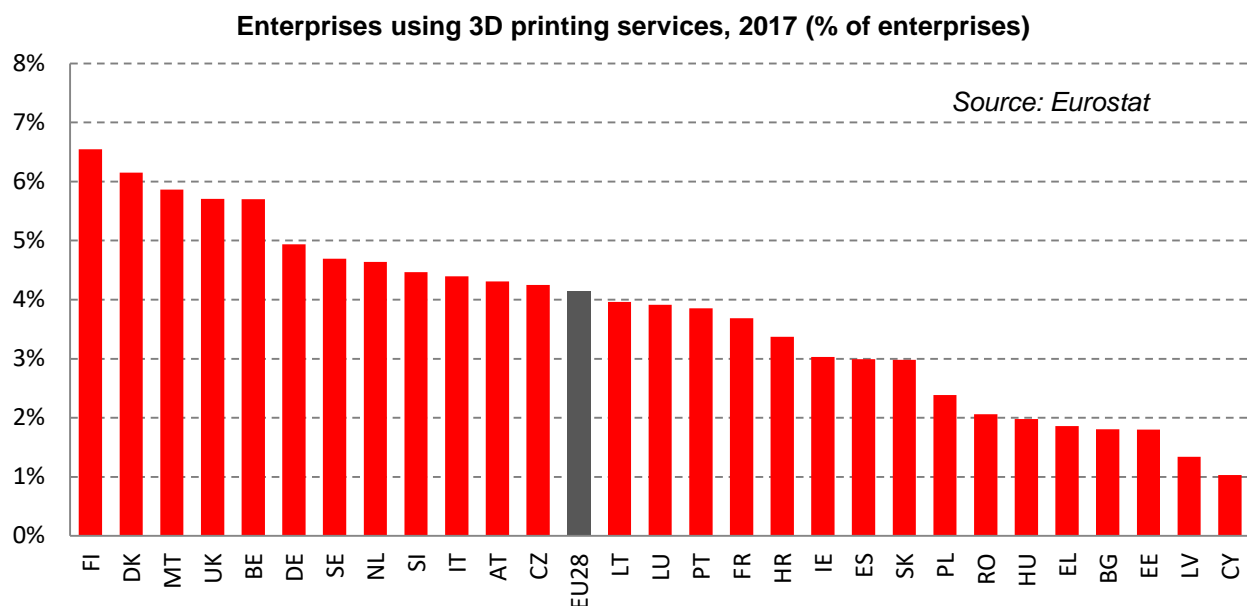
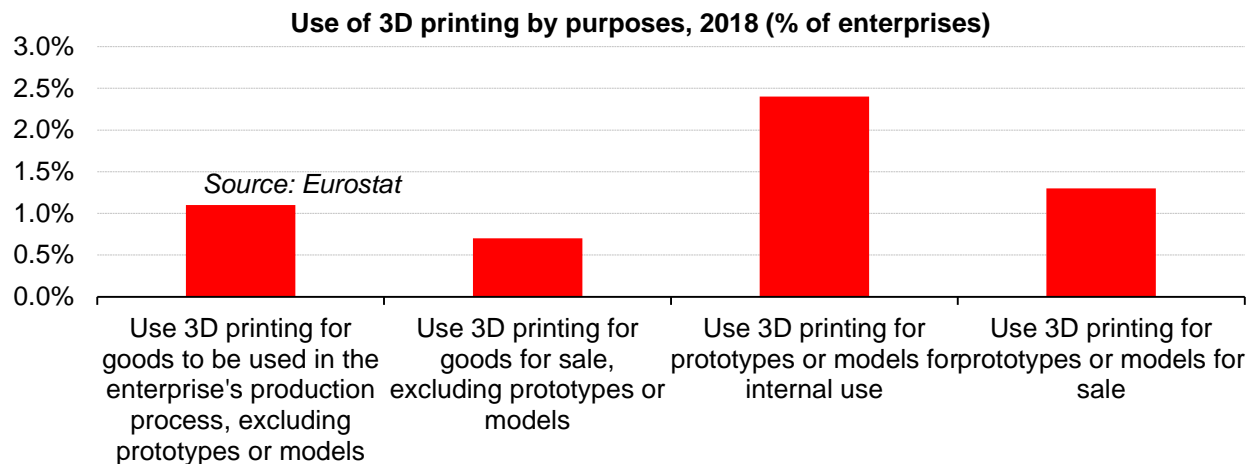
3D printing evolves and its use extends beyond the manufacturing sub-sectors. Enterprises invest in 3D printing technologies and services for improving production and product sales.

During 2018, 1.1 % of enterprises used 3D printing services for producing goods to be used in the enterprises' production process, while 0.7 % used them for printing goods for sale. 2.4 % of enterprises used 3D printing for producing prototypes or models for internal use, while 1.3 % used them for printing prototypes or models for sale purposes.

3D printing is a new technology that is not commonly used by all the enterprises. Almost 4 % of SMEs used 3D printing. Larger enterprises make greater use of 3D services (13.4 %).

More than 6 % of Finnish and Danish enterprises use 3D printing services, while less than

1.5 % of Latvian and Cypriot enterprises use these services.



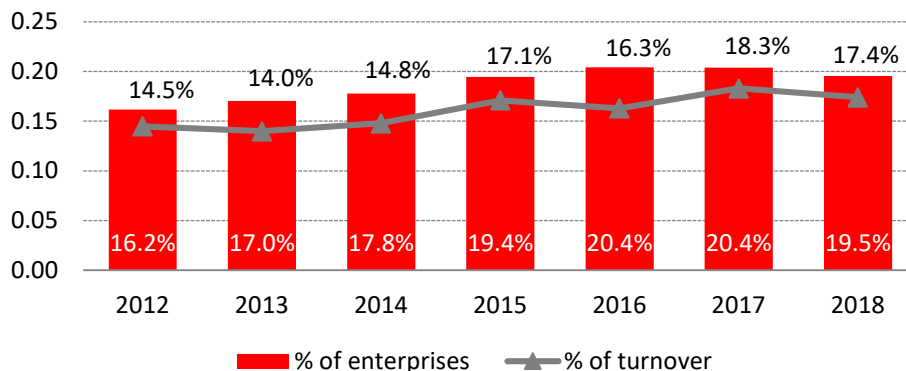
e-Commerce: only 20 % of companies make electronic sales, representing slow progress in this area. **Larger enterprises** are better at exploiting e-commerce possibilities.

One out of five enterprises in the EU-28 made electronic sales in 2017. The percentage of turnover on e-sales amounted to 17.4 % of the total turnover of companies with 10 or more persons employed.

In the EU-28, between 2012 and 2018, the percentage of companies selling online increased by 4.2 percentage points and the companies' turnover realised from e-sales increased by 2.8 percentage points.

** This indicator is slightly different from the 'enterprises selling online' indicator, which concerns businesses that received orders via computer mediated networks with the sales representing at least 1% of the total turnover..*

Trends in e-commerce, EU
(% of enterprises, % of turnover)



Source: Eurostat

e-Sales and turnover from e-sales , by firm size, between 2012 and 2018 (% of enterprises, %of turnover)

	Enterprises with e-sales (turnover >1%) (%)			Turnover from e-commerce (%)		
	2012	2015	2018	2012	2015	2018
All enterprises	16.2%	19.4%	19.5%	14.5%	17.1%	17.4%
Large (250+)	39.3%	42.8%	42.5%	20.7%	23.7%	24.1%
SMEs (10-249)	15.5%	18.8%	18.9%	7.8%	9.4%	10.1%

Source: Eurostat

The share of companies conducting e-sales and the turnover from e-sales varies significantly according to size.

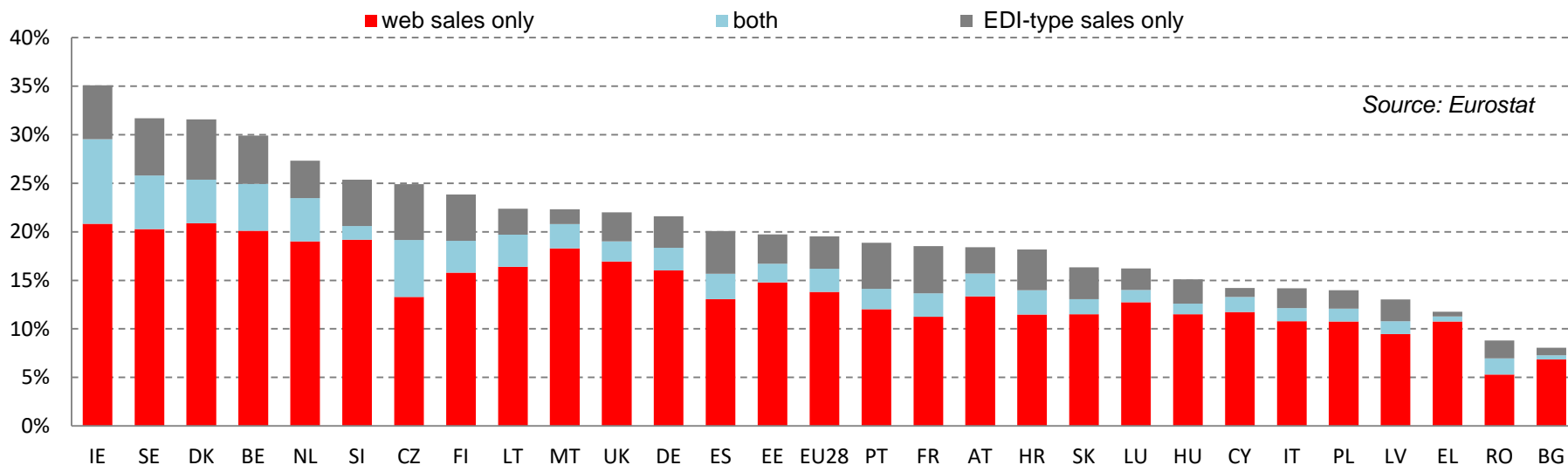
The share of SMEs making e-sales (18.9 %) is less than half compared to the share of large enterprises (42.5 %). Similarly, the share of the e-sales' turnover on the total turnover by SMEs (10.1 %) is less than the half of the share generated by the large ones (24.1 %).

Different types of e-commerce: Web and EDI-type.

e-Commerce can be broadly divided into two types: web sales and Electronic Data Interchange (EDI-type) sales, referring to the way customers place orders for products. The EDI type is the exchange of data between information systems, through a dedicated channel and according to a defined standard. It does not require human intervention except in exceptional cases.

The percentage of enterprises selling online (web or EDI type) ranged from 8 % in Bulgaria to 35 % in Ireland, followed by Sweden (32 %). Web sales, made through the enterprise own website or through third parties one (including marketplace), is the most common option for e-sales. Around 14 % of the enterprises sell through a website, 2 % exploit both channels, while slightly more than 3 % make use of EDI-type sales.

e-Sales broken down by web sales and EDI-type sales, 2018 (% of enterprises)



Enterprises selling online **are slowly increasing their share of sales to consumers (B2C).**

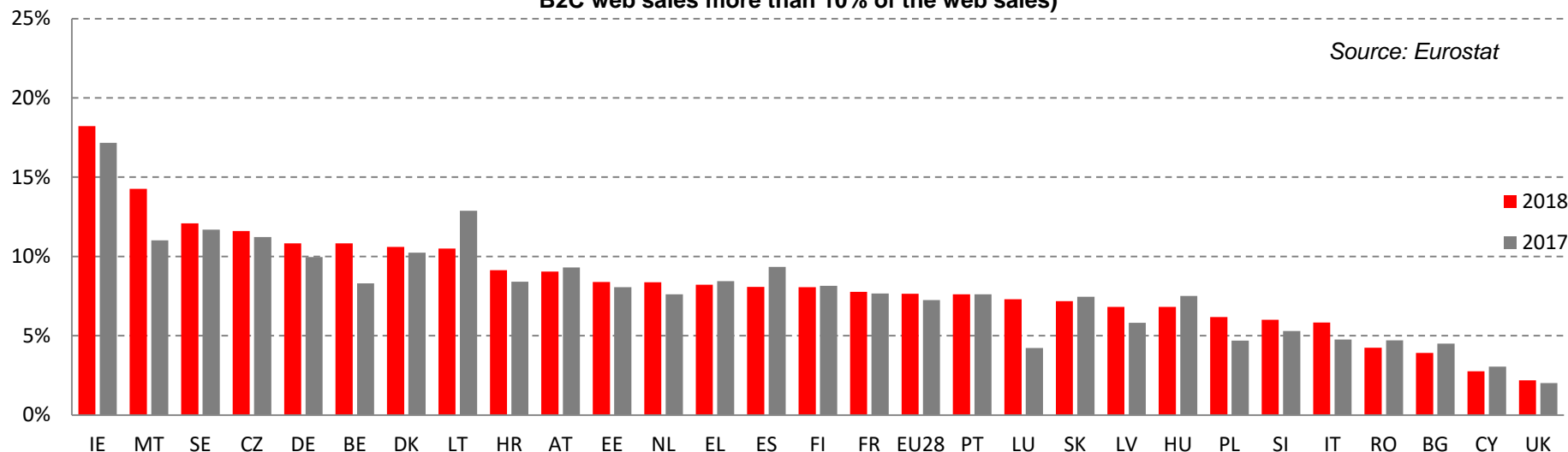
Among the EU-28, the percentage of enterprises exploiting the opportunities of e-sales to consumers (with web sales more than 1% of total turnover and B2C web sales more than 10 % of their web sales) ranged from 2.2 % in the UK to 18.2 % in Ireland. Most of the Member States increased their B2C e-sales compared to 2017. Belgium and Malta improved the most.

Large enterprises and SMEs increased their B2C share of e-sales by 21 % and 20 % respectively compared to 2015.

Enterprises exploiting the "Business to Consumers" opportunities of web sales, between 2015 and 2018 (% of enterprises)

	2015	2016	2017	2018
All enterprises	9.6%	10.5%	11.3%	11.5%
Large (250+)	13.3%	13.6%	15.8%	16.1%
SMEs (10-249)	9.5%	10.4%	11.1%	11.4%

Enterprises exploiting the "Business to Consumers" opportunities of web sales, 2017-2018 (% of enterprises with B2C web sales more than 10% of the web sales)



Source: Eurostat

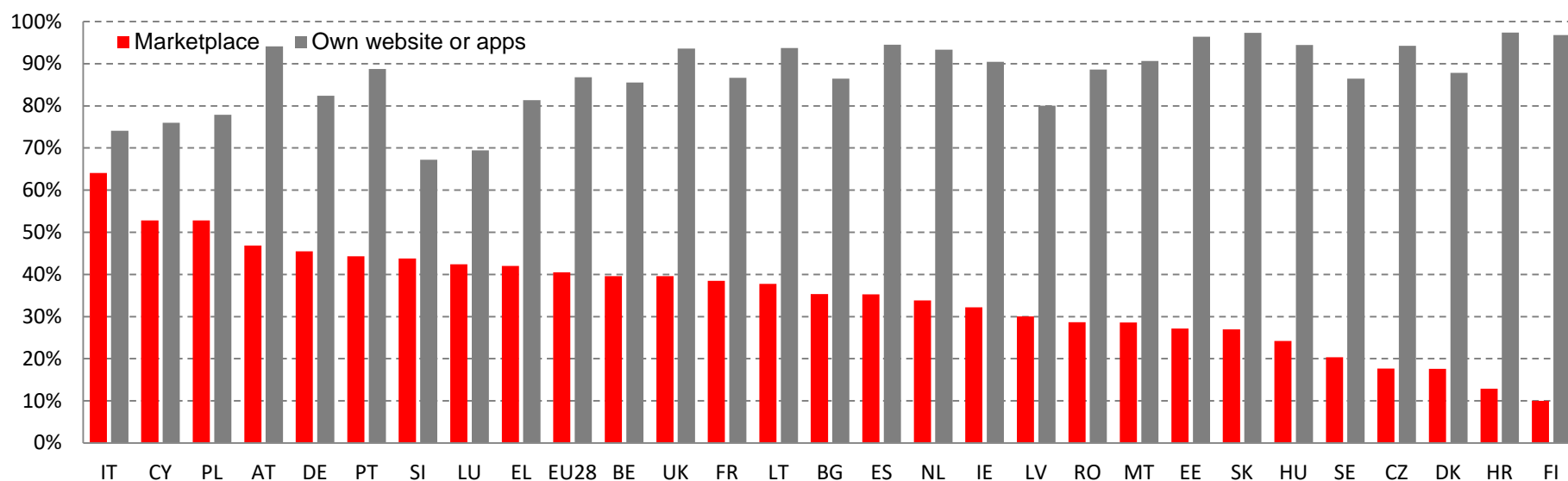
Businesses are starting to become active on **online marketplaces**. More than twice as many companies with web sales sell on their **own website or apps** than in marketplaces.

As regards web sales, it is necessary for an enterprise to disentangle its web sales made through a marketplace, available on external websites, from those done through its own website. e-commerce marketplaces and general online platforms may facilitate economic growth by enabling sellers to access new markets and reach new customers at lower cost. This option has been exploited at EU level by 40 % of enterprises with web sales against 87 % using their own website or apps.

Altogether 13 EU Member States reported that over 90 % share of enterprises with web sales via own sites, with Croatia, Slovakia, Finland and Estonia are leading in this group of countries.

Companies in Finland, Croatia, Denmark and Czechia have the lowest percentages of web sales via marketplaces (below 20 %). Selling online via marketplaces was the most common option in Italy (64 %), Cyprus and Poland (both 53 % of enterprises with web sales).

Web sales broken down by own website or apps and marketplace, 2018 (% enterprises with web sales)



Source: Eurostat

The share of turnover from web sales via companies' **own website or apps** is greater than that from web sales via **marketplaces**.

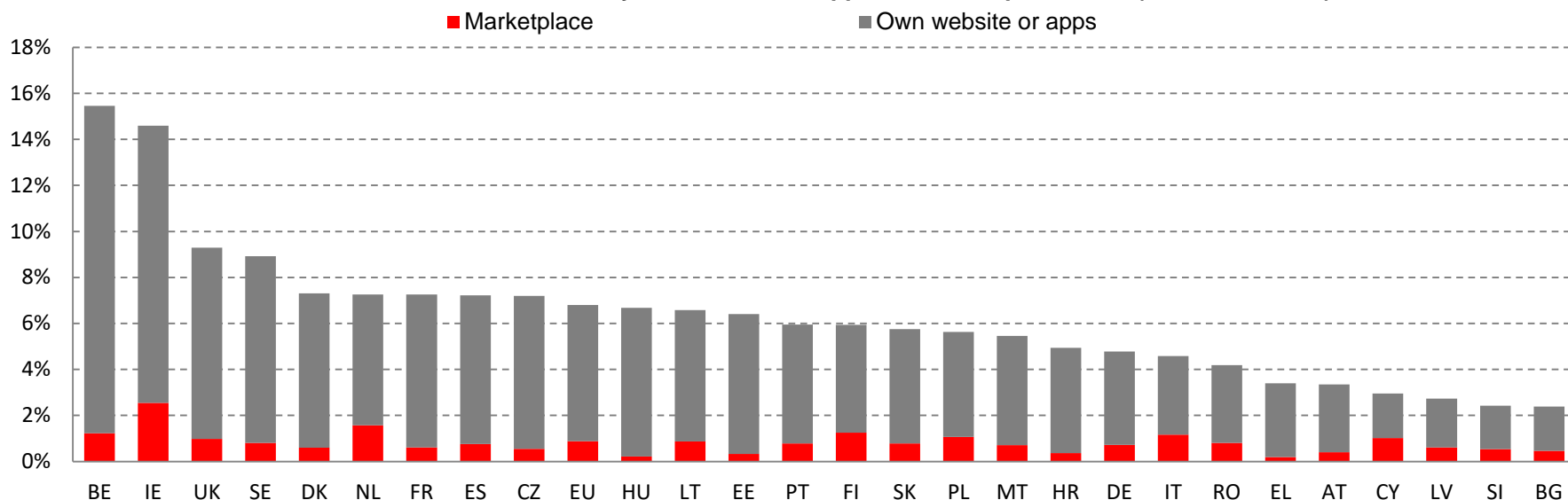
In the EU-28, companies gained 7 % of their total turnover from web sales. 87 % of it (equal to 6 % of total turnover) was gained from web sales via own website or apps and only 13 % (equal to 1 % of total turnover) from sales via online marketplaces.

Turnover from sales on own websites or apps had the highest share in total turnover in Belgium (14.2 %), Ireland (12 %), the UK (8.3 %) and Sweden (8.1 %).

The highest share of turnover from selling via the marketplace (from the total turnover of the firm) was gained in Ireland (2.5 %) and the Netherlands (1.6 %).

When looking at the composition of the web sales turnover, companies in Cyprus gained 35 % of their web sales turnover through sales on marketplaces, while companies in Italy gained 25 %.

Turnover from web sales broken down by own website or apps and marketplace, 2018 (% total turnover)



Source: Eurostat