Digital Economy and Society Index (DESI) 2020

Integration of digital technology

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Integration of digital technology

Digital technologies enable businesses to gain competitive advantage, improve their services and products and expand their markets. Digital transformation of businesses opens up new opportunities and boosts the development of new and trustworthy technologies. This dimension measures the digitisation of businesses and e-commerce.

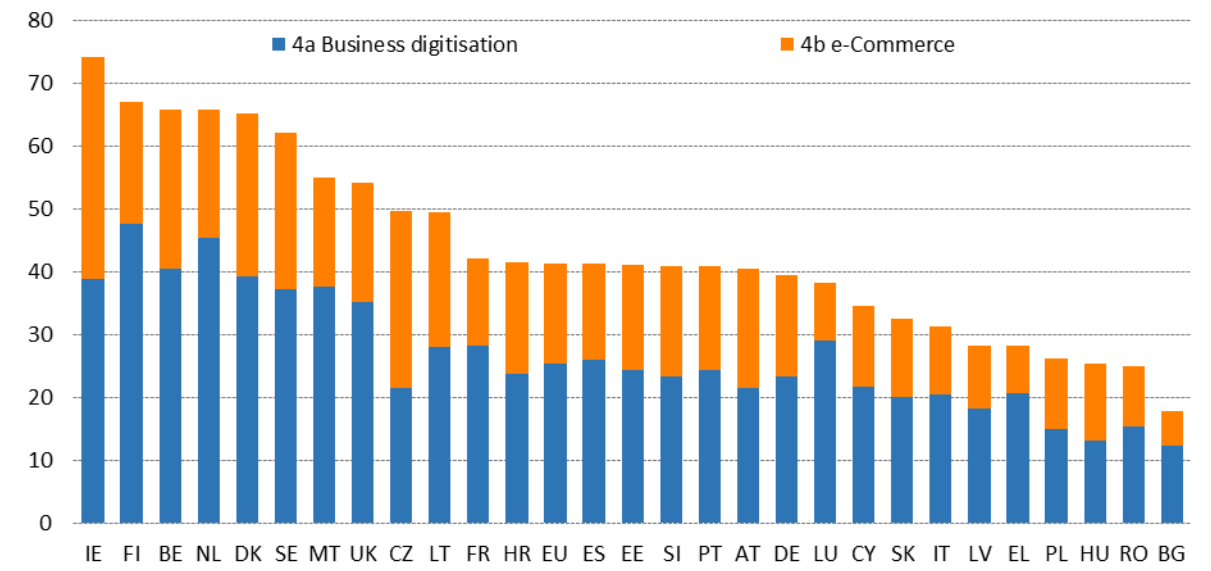
Table 1 Integration of digital technologies indicators in DESI

	EU	
	DESI 2018	DESI 2020
4a1 Electronic information sharing % enterprises	**34%** 2017	**34%** 2019
4a2 Social media % enterprises	**21%** 2017	**25%** 2019
4a3 Big data % enterprises	**10%** 2016	**12%** 2018
4a4 Cloud % enterprises	**NA**	**18%** 2018
4b1 SMEs selling online % SMEs	**17%** 2017	**18%** 2019
4b2 e-Commerce turnover % SME turnover	**10%** 2017	**11%** 2019
4b3 Selling online cross-border % SMEs	**8%** 2017	**8%** 2019

Source: DESI 2020, European Commission.

The top performers are Ireland, Finland, Belgium, the Netherlands, Denmark and Sweden with scores greater than 55 points (out of 100). At the other end of the scale, Bulgaria, Romania, Hungary Poland, Greece and Latvia lag behind with scores less than 35 points, significantly below the EU average of 43 points.

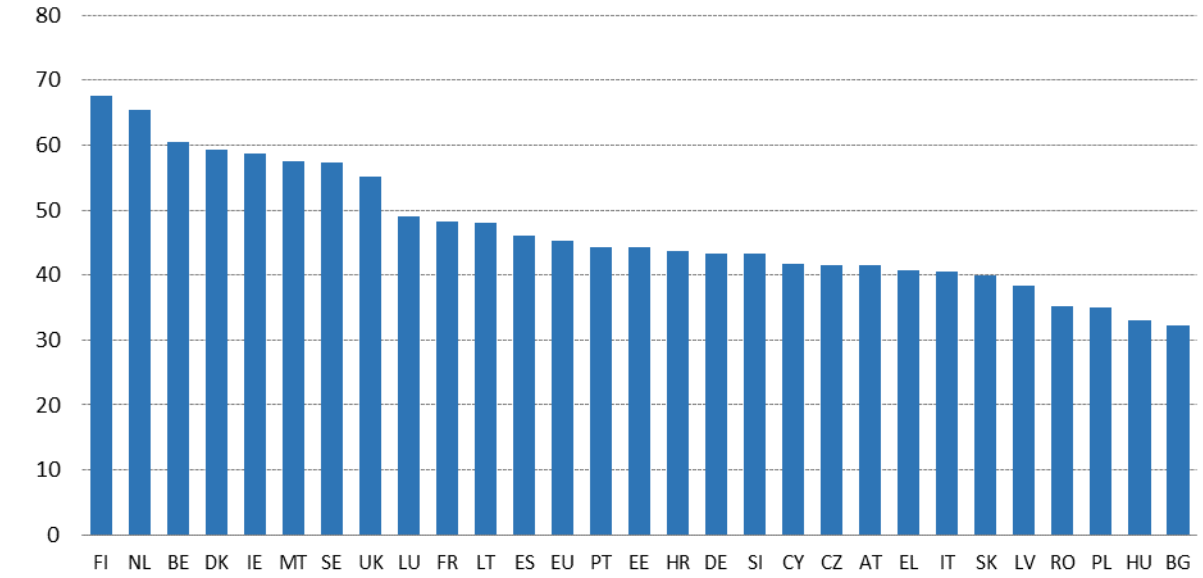
Figure 1 Digital Economy and Society Index (DESI) 2020, integration of digital technologies



Source: DESI 2020, European Commission.

The leading countries on '4a business digitisation' are Finland, the Netherlands and Belgium, with scores above 60 points. Bulgaria, Hungary, Poland, Romania, Latvia and Slovakia lag behind in the adoption of e-business technologies, scoring below 40 points.

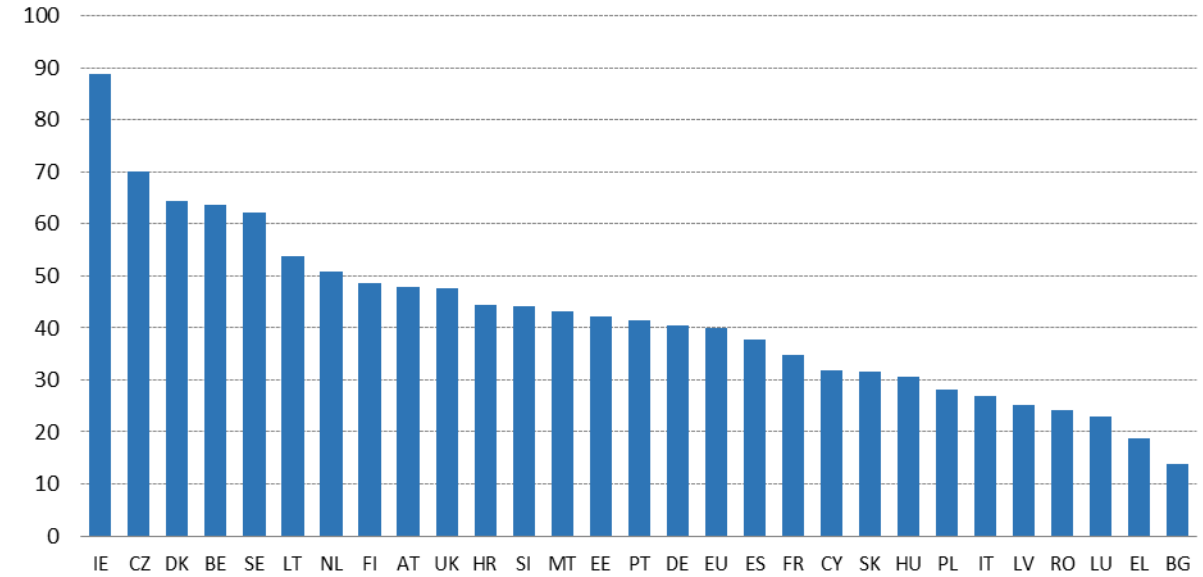
Figure 2 Integration of digital technologies, business digitisation index, 2020



Source: DESI 2020, European Commission.

Ireland, Czechia, Denmark, Belgium and Sweden are the top five countries in '4b e-commerce', with scores above 60 points. Ireland leads in all the three indicators under e-commerce (i.e. SMEs selling online, e-commerce turnover and selling online cross-border). Bulgaria, Greece, Luxembourg and Romania perform the worst with scores below 25 points.

Figure 3 Integration of digital technologies, e-commerce index, 2020



Source: DESI 2020, European Commission.

1. Digital intensity index

The Digital Intensity Index (DII) measures the use of different digital technologies at enterprise level. The DII score (0-12) of an enterprise is determined by how many of the selected digital technologies it uses. Figure 4 presents the composition of the DII in 2019. It also 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 aspects seem to be reaching saturation, at least for large companies, for most aspects there is still room for improvement.

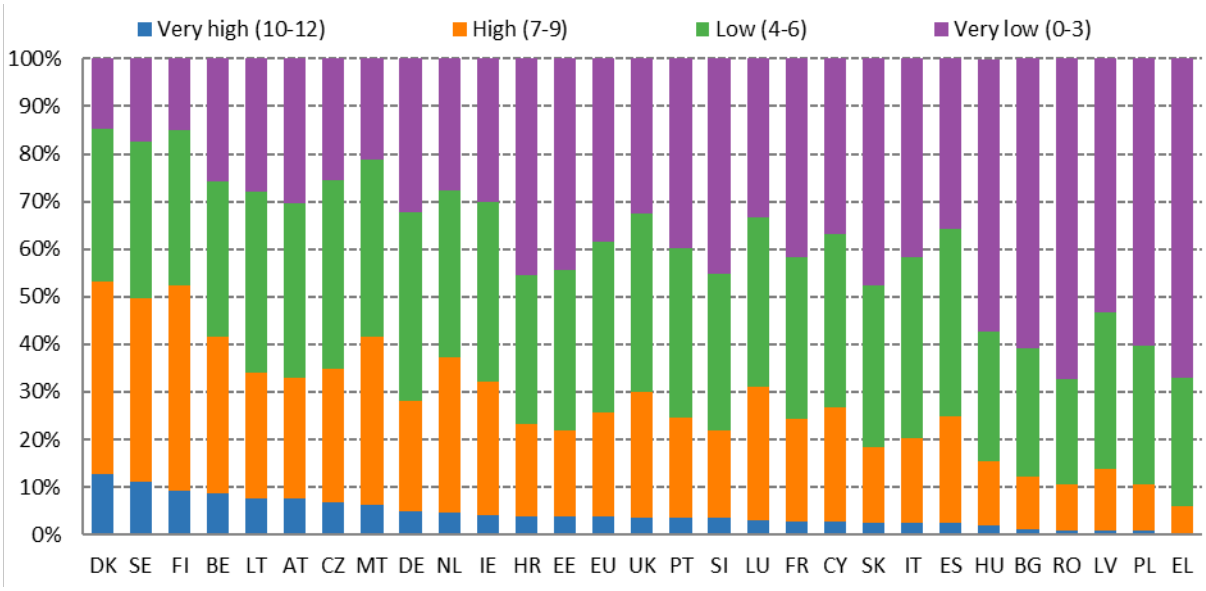
Figure 4 Digital Intensity Index indicators tracking digitisation processes (% enterprises), 2019

	Large	SMEs
Use anyICT security measures	99%	92%
Make persons employed aware of their obligations in ICT 'security related issues'	91%	61%
Maximum contracted download speed of the fastest internet connection is at least 30 Mb/s	80%	49%
Use ERP software package to share information	78%	33%
Use any social media	78%	52%
Use social media for any purpose	76%	50%
Use customer relationship management (CRM) software	62%	32%
>50% of employed people use computers and the internet	55%	44%
>20% of workers with portable devices for business use	46%	36%
Sell online (at least 1% of turnover)	39%	18%
Receive electronic orders (web or EDI) from customers from other EU countries	23%	8%
> 1% of the total turnover web sales and B2C web sales> 10% of the web sales	10%	8%

Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

Denmark and Sweden are the only countries in the EU where the percentage of enterprises with a very high DII (i.e. possessing at least 10 out of the 12 monitored digital technologies) is above 10%, followed by Finland and Belgium with 9%. By contrast, in countries such as Romania, Greece, Bulgaria, Poland and Hungary the majority of businesses (over 55%) have made only a small investment in digital technologies (i.e. have a very low DII).

Figure 5 Digital Intensity Index by level (% of enterprises), 2019

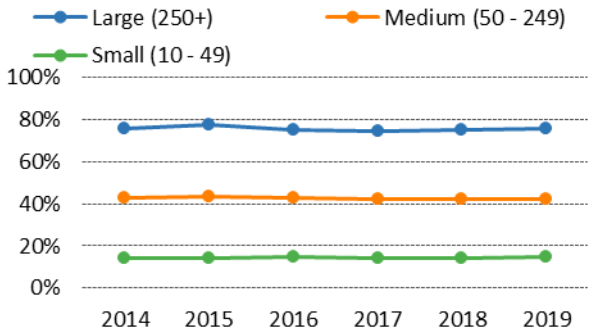


Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

2. ICT specialists in enterprises

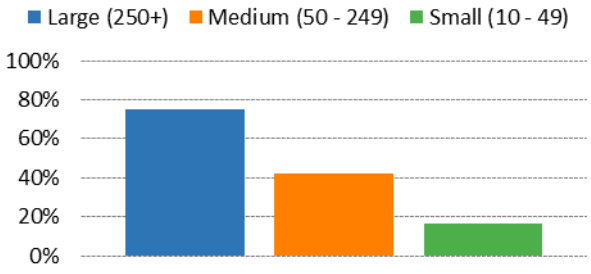
Large enterprises have a scale advantage, and as a result 75% of them employ internal ICT specialists. The share of small enterprises employing ICT specialists increased from 14% in 2018 to 15% in 2019. For medium-sized enterprises the increase was limited (42.5% in 2019, compared to 42.1% in 2018).

Figure 6 Enterprises employing ICT specialists (% of enterprises), 2014-2019



Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

Figure 7 Enterprises employing ICT specialists (% of enterprises), 2019

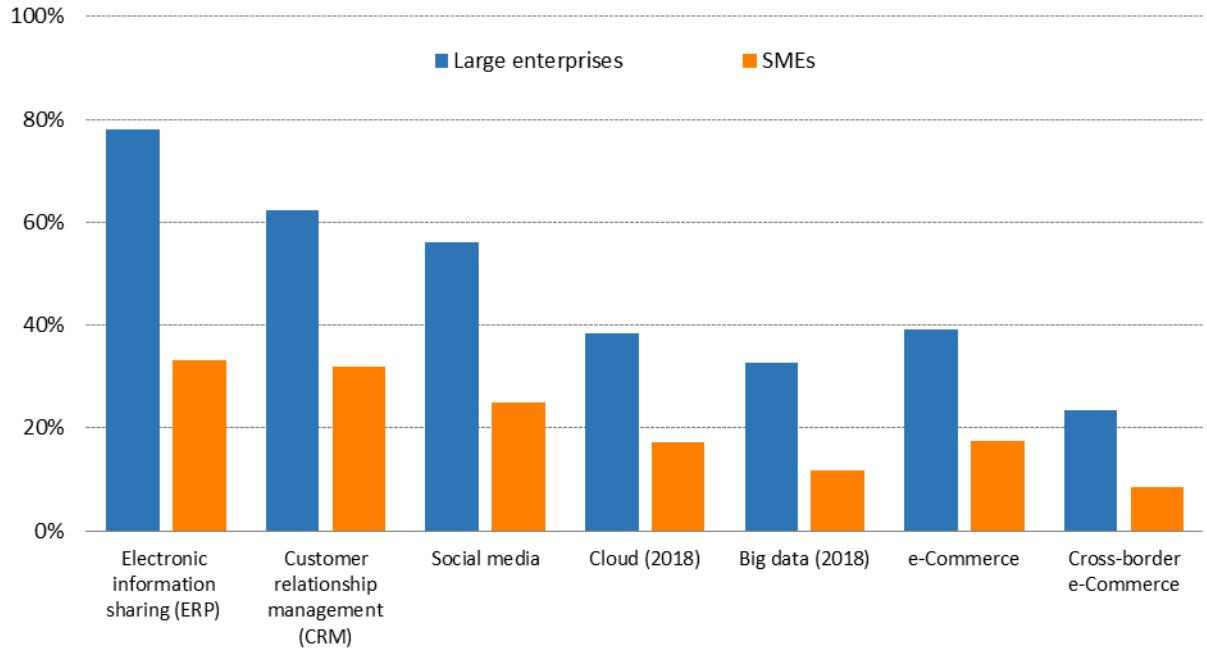


Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

3. Adoption of digital technologies by enterprises

It is evident that large enterprises adopt new technologies more often. Electronic information sharing through enterprise resource planning (ERP) software is much more common in large enterprises (78%) than in SMEs (33%). SMEs (32%) use customer relationship management (CRM) systems to analyse information about clients for marketing purposes less than large enterprises (62%). In contrast, large enterprises (78%) and SMEs (52%) are active on social media. SMEs exploit e-commerce opportunities to a limited extent, as only 18% sell online (versus 39% of large enterprises) and only 8% sell cross-border online (23% for large enterprises). There are many other technological opportunities yet to be exploited by SMEs such as cloud services and big data.

Figure 8 Adoption of digital technologies (% entreprises), 2019

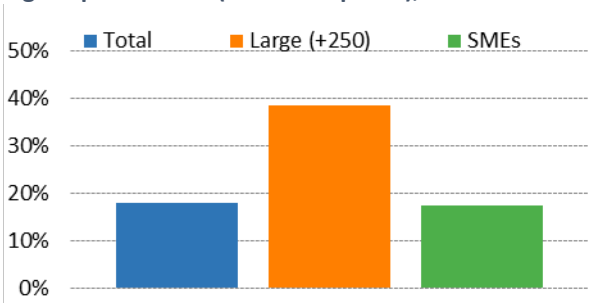


Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

4. Cloud computing

In 2018, 26% of European enterprises purchased cloud computing services and incorporated cloud technologies to improve their operations while reducing costs; this was an increase of 25% on 2016. The cloud uptake of larger companies (56%) was higher than for SMEs (25%) in 2018.

Figure 9 Cloud computing services of medium-high sophistication (% of enterprises), 2018

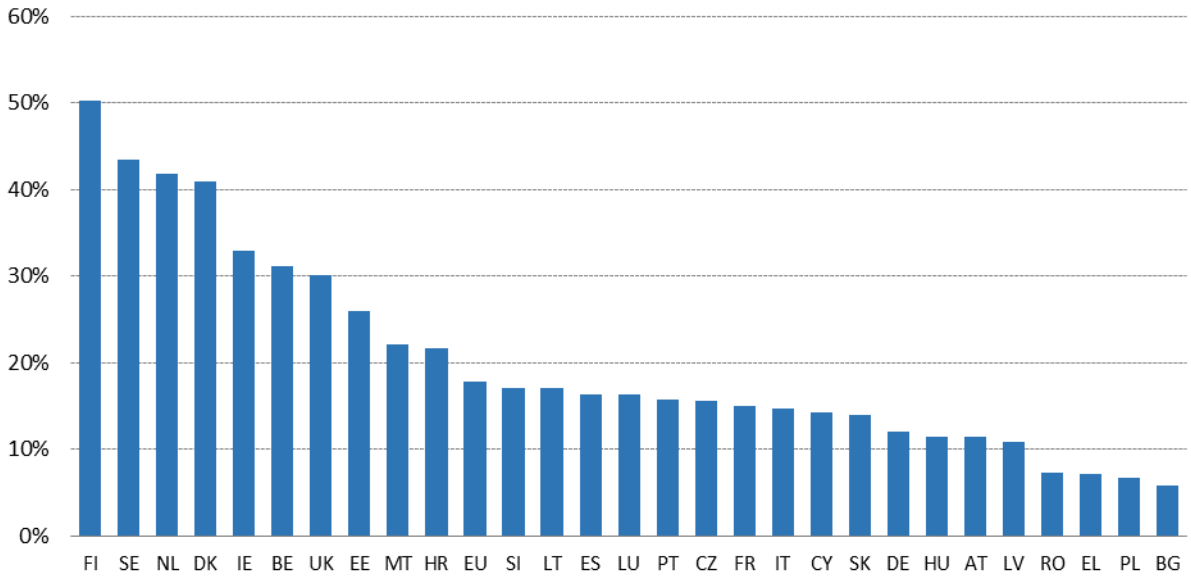


Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

18% of companies use medium-highly sophisticated services (i.e. hosting of the enterprise's database, accounting software applications, CRM software and computing power). The ratio for large enterprises is 39%, well above that of SMEs (17%).

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

Figure 10 Cloud computing services of medium-high sophistication per country (% of enterprises), 2018

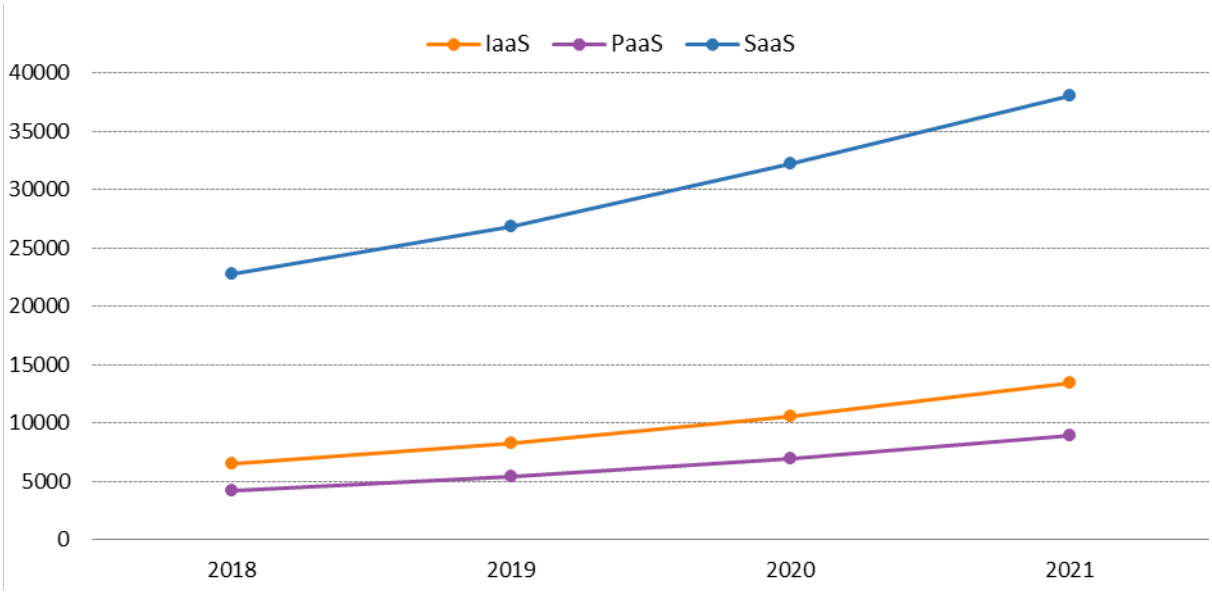


Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

Across the EU market, 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) increased by 21% between 2018 and 2019. Total revenues are expected to continue to grow by 50% between 2019 and 2021.

SaaS represents almost two thirds of total public cloud revenues generated on the EU market and is forecasted to continue until at least 2021. IaaS and PaaS represent 20% and 13% respectively of total public cloud revenues generated on the EU market. Between 2019 and 2021, it is forecasted that IaaS and PaaS will grow at 63% and 67% respectively both at a higher rate than SaaS over the same period (42%).

Figure 11 EU public cloud service revenues per category (forecast revenues for 2020 and 2021) (€ million), 2018 – 2021

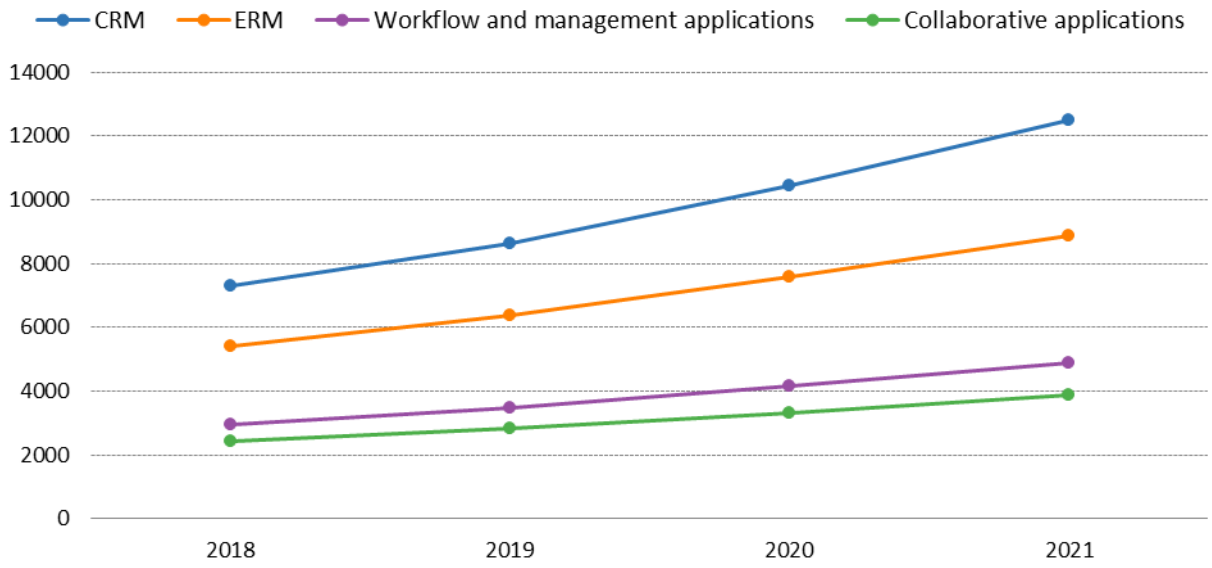


Source: European Commission based on IDC.

Between 2018 and 2019, among the four applications contributing the most to SaaS revenues across the EU market, the revenue growth rates for each increased by the following percentages: 18% for content workflow and management applications, 18% for CRM, 17% for enterprise risk management (ERM) and 16% for collaborative applications. These are also expected to remain the most prominent applications contributing to total SaaS revenues until at least 2021, with expected respective revenue growth rates of 40%, 45%, 40% and 37% between 2019 and 2021.

Software security, as a SaaS application, contributed €115.5 million to total SaaS revenues on the EU market. Its revenue growth rate is expected to increase by 48% between 2019 and 2021, making it the fastest growing SaaS application over that period.

Figure 12 Revenue of the top 4 SaaS Applications as share of total SaaS EU (forecast revenues for 2020 and 2021) (€ million), 2018 – 2021



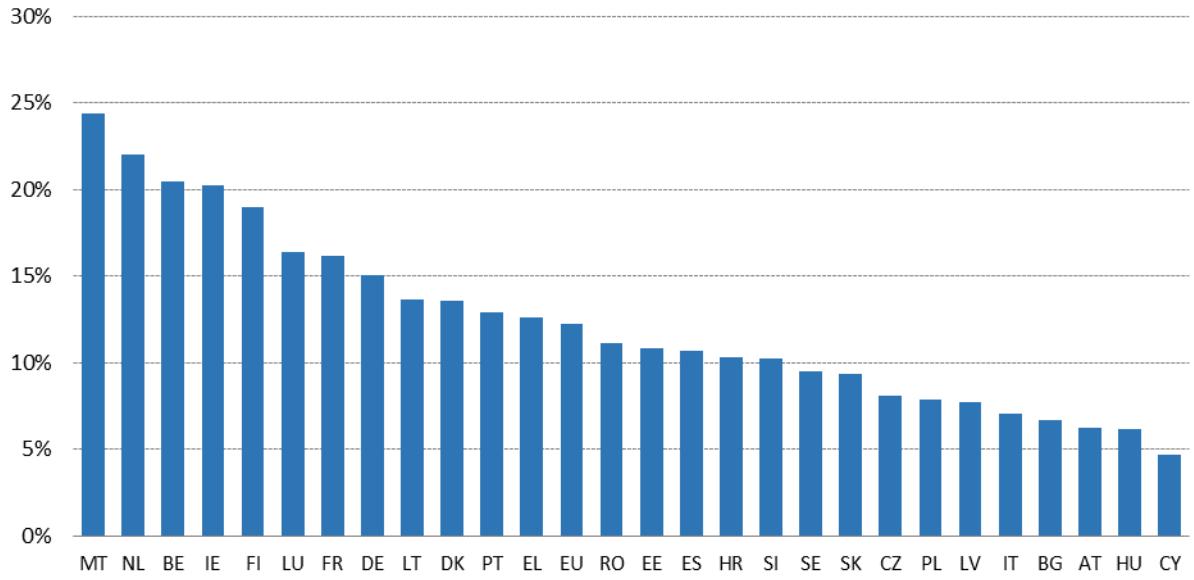
Source: European Commission based on IDC.

5. Big data

Enterprises all over the EU are constantly adapting to new technologies for collecting, storing and analysing data. In 2018, 12% of companies used big data for analysing large volumes of data. This helped them to produce near time or real time results from data that come in different format types. Large companies have the lion's share in big data processing (with 33% of them using big data), while SMEs have still room for improvement to take advantage of all the benefits of big data (12% use big data).

In Malta, almost a quarter of enterprises use big data. The Netherlands, Belgium and Ireland follow closely, with at least 20%. On the other hand, enterprises in Cyprus, Hungary, Austria and Bulgaria barely use big data at all.

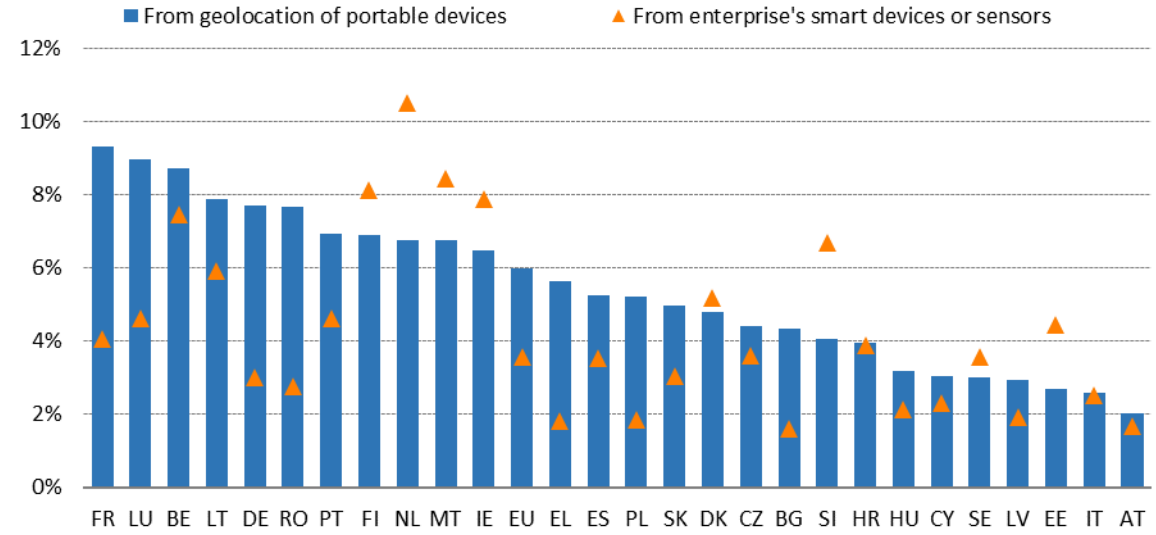
Figure 13 Enterprises analysing big data from any data source (% of enterprises), 2018



Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

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

Figure 14 Sources used by enterprises to analyse big data (% of enterprises), 2018

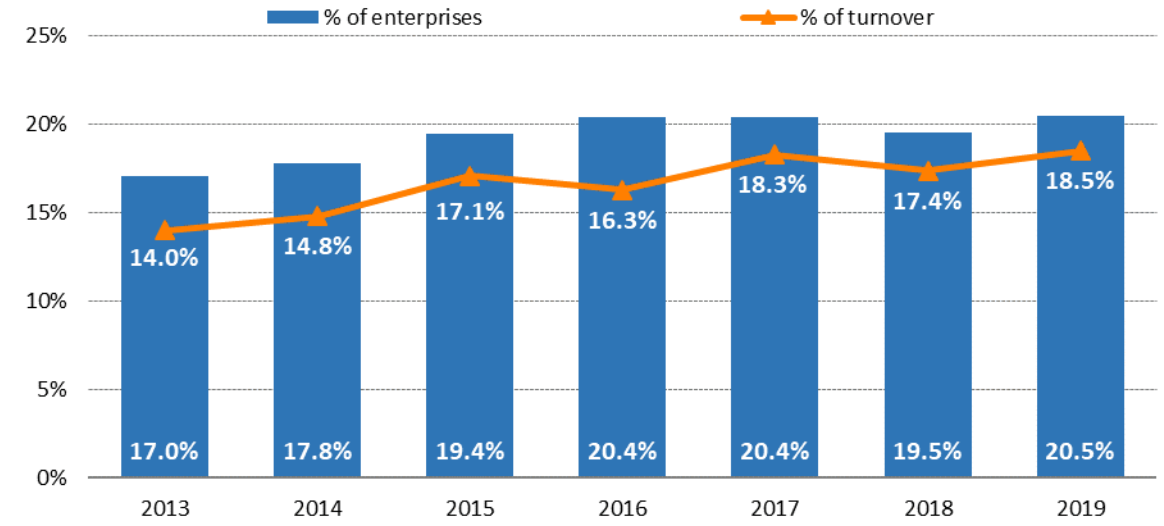


Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

6. e-Commerce

Already before the COVID-19 outbreak, one in five EU enterprises made online sales. For 2019, online sales amounts to 18% of total turnover of companies that employ 10 or more people. Between 2013 and 2019, the percentage of companies selling online increased by 3.5 percentage points and the turnover of these companies realised from online sales increased by 4.5 percentage points.

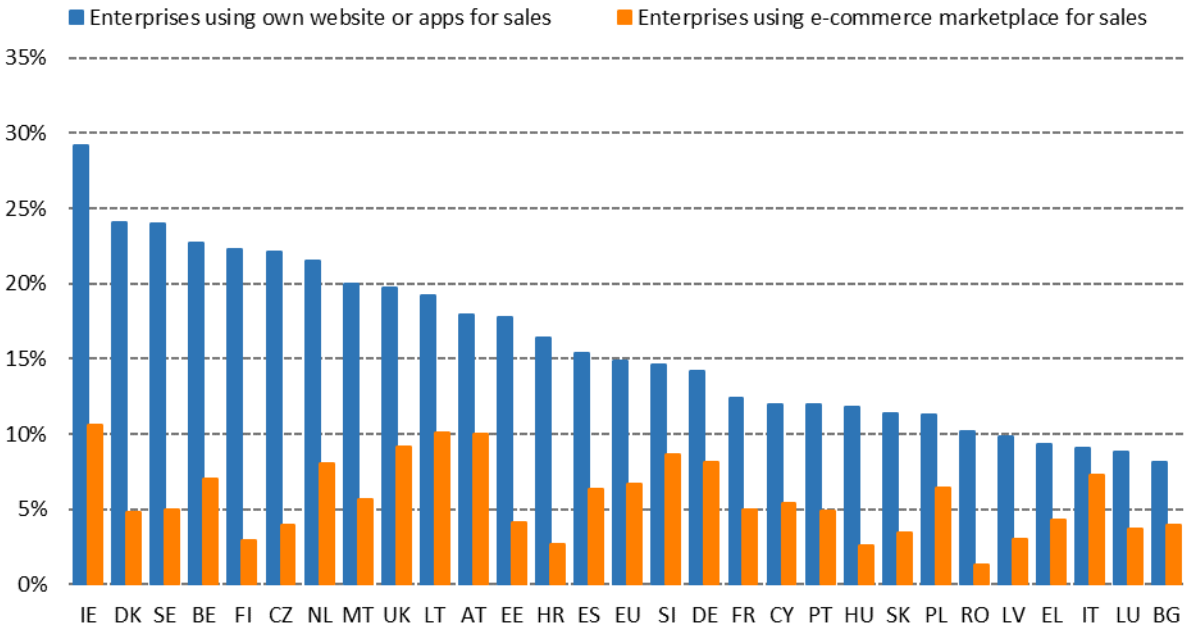
Figure 15 Trends in e-commerce (% of enterprises, % of turnover), 2013-2019



Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

Prior to the pandemic, almost 15% of enterprises were active on online marketplaces in Europe using their own website or apps for selling online. Ireland is the leader with 29% of its enterprises active on online marketplaces, followed by Denmark and Sweden (each with 24%). Almost 7% of all enterprises in the EU sold through e-commerce marketplaces used by several enterprises for trading products. Online platforms may facilitate economic growth by enabling sellers to access new markets and reach new customers at lower costs.

Figure 16 Online sales broken down by own website or apps and marketplace (% enterprises), 2019

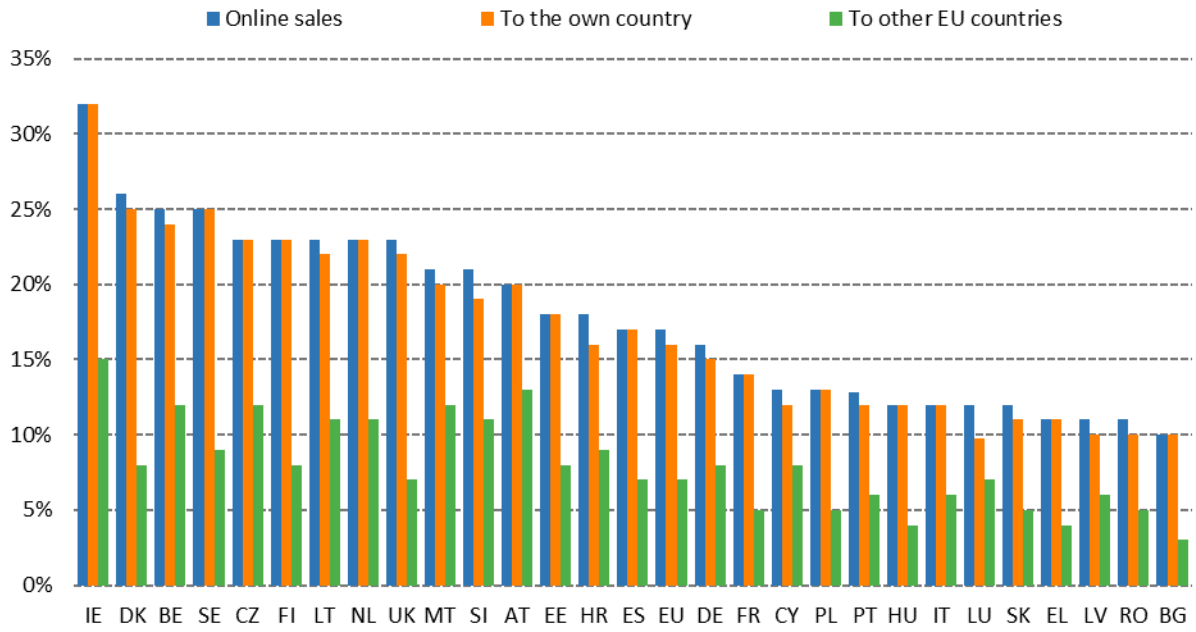


Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

7. Cross-border e-commerce

Enterprises benefit from cross-border e-commerce by exploiting economies of scale. This helps to reduce costs, increase efficiency, promote competitiveness and improve productivity. Cross-border e-commerce is even more important for enterprises and especially SMEs that are confined to a small home market. Only 7% of enterprises have web sales to customers in other EU countries, while almost all enterprises with web sales report that they sell to customers in their own country (16%). Enterprises in Ireland, Denmark, Belgium and Sweden have the largest proportion of online sales, with 25% or more of their sales occuring online. Ireland is also the country, where companies are most likely to make cross-border web sales to other EU countries (15% of Irish enterprises have web sales across borders), followed by Austria (13%) Belgium (12%), Czechia (12%) and Malta (12%).

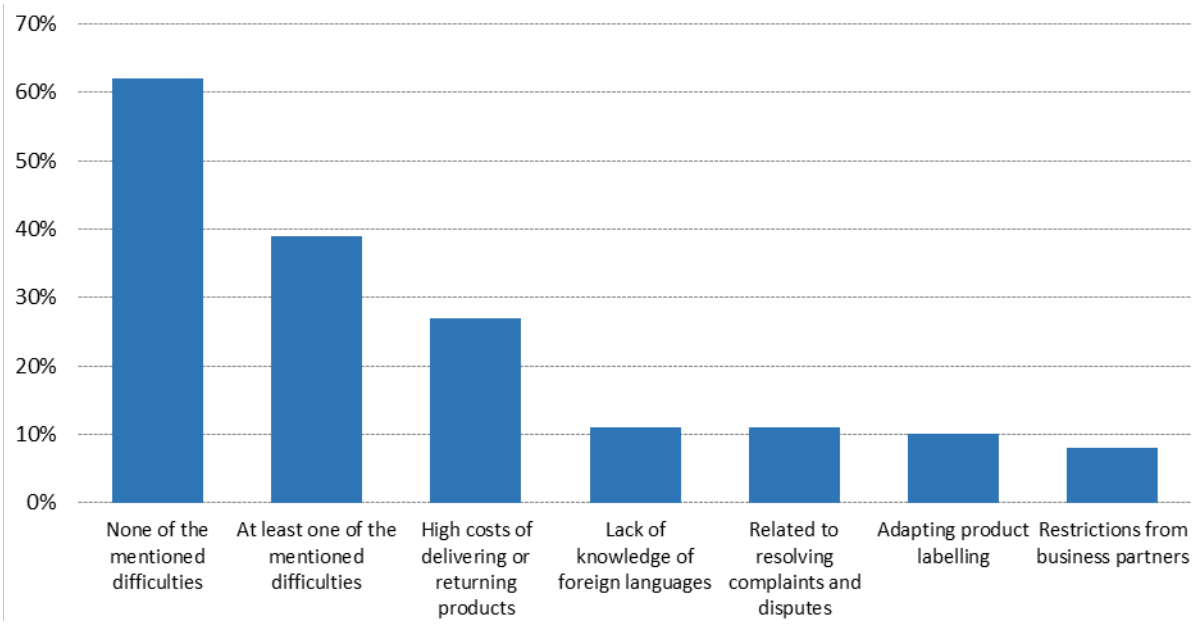
Figure 17 Web sales to own country and other EU countries (% of enterprises), 2019



Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

Most of enterprises (62%) with web sales to other EU countries have no difficulties when selling to customers in other EU countries. On the other hand, almost 40% report at least one obstacle that is mainly related to economic factors (e.g. high costs of delivering or returning products, a problem reported by 27% of enterprises). Other factors such as linguistic and legal problems are also significant. The lack of knowledge of foreign languages and problems related to resolving complaints and disputes are also highlighted as difficulties by 11% of the enterprises selling online to other EU countries.

Figure 18 Difficulties when selling to other EU countries (% of enterprises with web sales to other EU countries), 2019

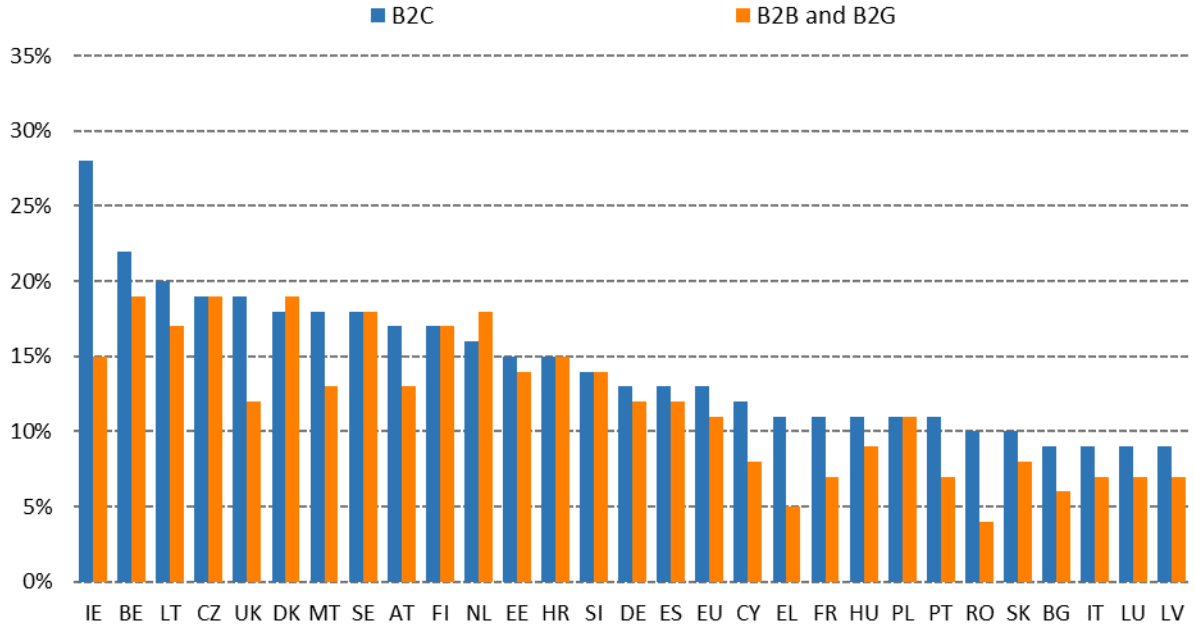


Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

8. Business to business (B2B), business to government (B2G) and business to consumers (B2C) web sales

11% of EU enterprises report web sales to businesses and governments. 13% have web sales to consumers, ranging from 9% of enterprises in Latvia, Luxembourg, Italy and Bulgaria to 28% in Ireland.

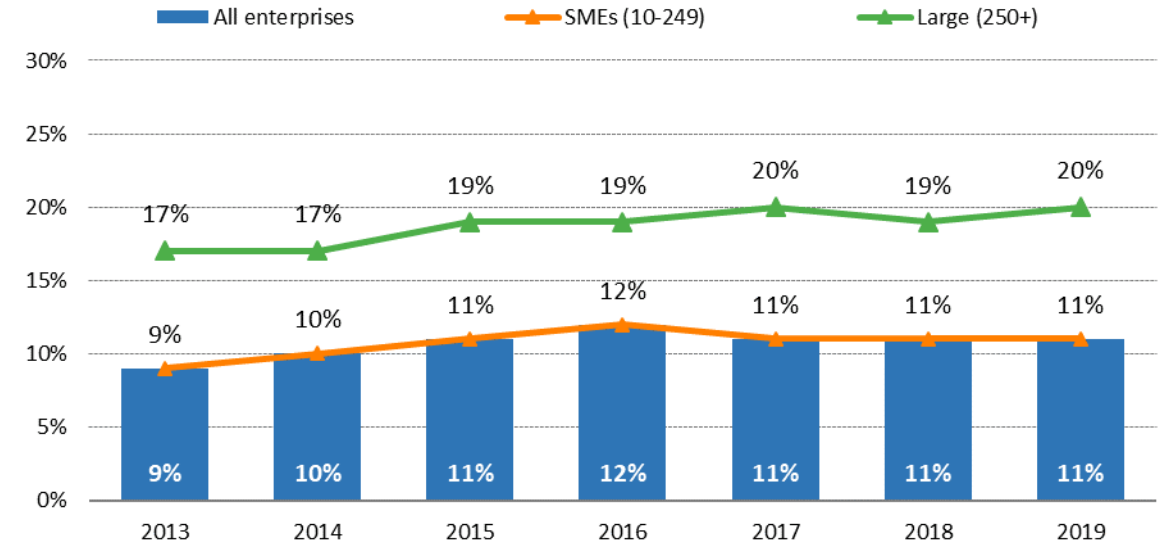
Figure 19 Enterprises exploiting B2C, B2B and B2G opportunities (% of enterprises), 2019



Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

11% of enterprises sell through a website or an app to other enterprises or governments, slightly more than in 2013 (9%). Large enterprises are more active in this segment with 20% of large companies selling B2B or B2G online, up from 17% in 2013. However, only 11% of SMEs are active in B2B or B2G online sales.

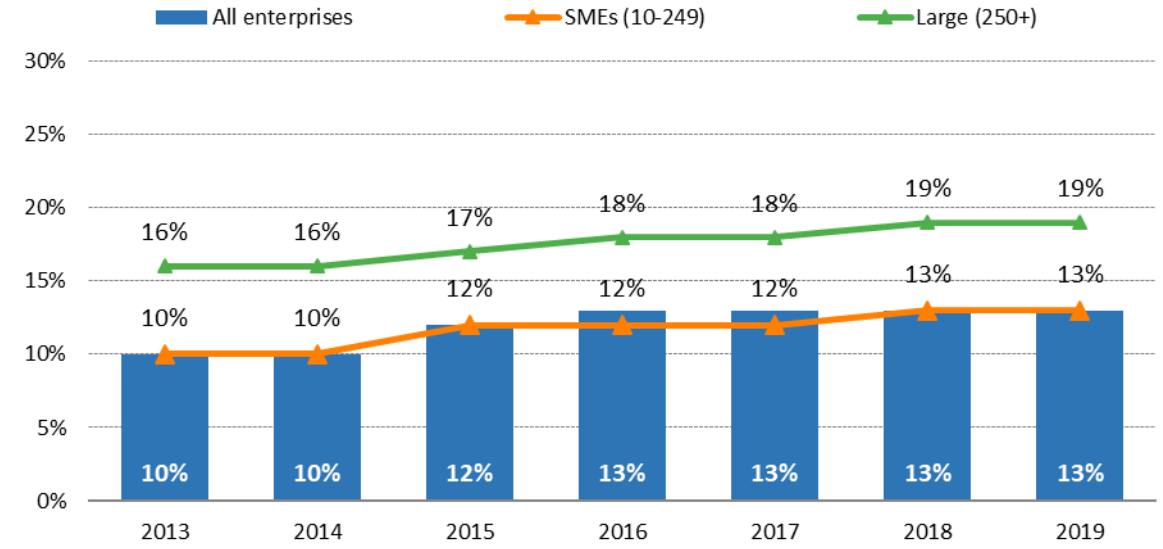
Figure 20 Enterprises exploiting B2B and B2G opportunities (% of enterprises), 2013-2019



Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

Web sales to consumers follow the same trend as B2B and B2G sales. 13% of enterprises perform web sales to consumers. The increase since 2013 is 3 percentage points for large and SMEs.

Figure 21 Enterprises exploiting B2C opportunities of online sales (% of enterprises with B2C online sales more than 10% of the web sales), between 2013 and 2019



Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

ANNEX I Abbreviations

Abbreviation	Explanation
4G / 5G	Fourth/Fifth generation technology standard for cellular networks
AI	Artificial Intelligence
BCO	Broadband competence office
BERD	Business expenditure on R&D
CAGR	Compound annual growth rate
CEF	Connecting Europe Facility
CRM	Customer Relationship Management
CSA	Coordination and Support Actions
DIH	Digital Innovation Hubs
DII	Digital Intensity Index
DOCSIS	Data over cable service interface specification
DSL	Digital subscriber line
DTT	Digital terrestrial television
EBP	European Blockchain Partnership
EBSI	European Blockchain Services Infrastructure
eForm	Electronic Form
EFSI	European Fund for Strategic Investments
eID	Electronic Identification
eider's	Electronic Identification, Authentication and Trust Services
EIF	European Investment Fund
ERA-NET	European Research Area
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning
Euro HPC JU	Euro High Performance Computing Joint Undertaking
FET	Future & Emerging Technologies
FTTB	Fibre-to-the-building
FTTH	Fibre-to-the-home
FTTP	Fibre-to-the-premises
FWA	Fixed wireless access
GBARD	Government Budget Allocations for R&D
GDP	Gross Domestic Product
GHz	Gigahertz
HES	Secondary and Higher Education Establishments
HPC	High Performance Computing
IA	Innovation Action
IaaS	Infrastructure as a service
ICOs	Initial Coin Offerings
ICT	Information and communication technology
IMSI	International mobile subscriber identity
IoT	Internet of Things
JRC	Joint Research Centre
LEIT	Leadership in Enabling and Industrial Technologies
LTE	Long-term evolution
Mbps	Megabits per second
MHz	Megahertz
MNO	Mobile network operator
MVNO	Mobile virtual network operator

NACE	Statistical Classification of Economic Activities in the European Community
NBP	National broadband plan
NGA	Next generation access
NRA	National regulatory authority
OTT	Over-the-top
PaaS	Platform as a Service
PCP	Pre-Commercial Procurement
PERD	R&D personnel
PPI	Public Procurement for Innovation
PPS	Purchasing Power Standards
PRC	Private for-Profit Companies
PSAP	Public safety answering point
QCI	Quantum Communication Infrastructure
R&D	Research and Development
R&I	Research and Innovation
REC	Research Organisations
SaaS	Software as a Service
SMEs	Small and Medium Enterprises
USO	Universal service obligation
VDSL	Very-high-bit-rate digital subscriber line
VHCN	Very high capacity network