

**INFORMATION AND COMMUNICATION TECHNOLOGIES USAGE
IN ENTERPRISES 2023**

1. INTRODUCTION

The usage of computers, internet and e-commerce in enterprises is a very important area. The data are used for international comparability analysis in European Union as well as all over the world organized by Eurostat, OECD and other international organisations.

2. METHODOLOGICAL INFORMATION

SO SR organized the independent survey on ICT usage in enterprises in the year 2023 for the twentieth time with the aim to obtain data concerning this area with regard to the methodological recommendations and in the structure of questionnaire proposed by Eurostat. The survey was included in EU action grants in the field of business statistics under the European Statistics part of the Single Market Programme (ESS) - Statistics on the usage of Information and Communication Technologies 2023 and 2024.

2.1 STATISTICAL UNIT

Statistical unit was the enterprise. In 2023, for the third time, data collection was carried out for all legal units belonging to the enterprise. The survey frame was based on the Statistical Business Register. The target population and sample frame for the purposes of this survey involved all enterprises with main activity classified in sections NACE Rev.2 – C, D, E, F, G, H, I, J, L, M, N, S95.1 and ICT sector. Enterprises were divided into three groups by following manner:

- enterprises with 10 to 49 employees (S)
- enterprises with 50 to 249 employees (M)
- enterprises with 250 and more employees (L)

Large enterprises (L) were included exhaustively in the enterprise survey. Sample survey was organized in case of medium (M) and small (S) enterprises. The sample was created by using a simple random selection in each stratum defined by size class according to the number of employees and economic activity. The regional allocation of units in the sample at NUTS2 level was also taken into consideration when sampling.

2.2 ORGANISATION OF SURVEY

The survey - ICT ENT 2-01 Survey on ICT usage and e-commerce in enterprises, was included in a three-year Program of state statistical surveys in 2021–2023. It was organized as mandatory stand-alone one. It was not embedded in another survey.

Reference period of the national survey was in line with the reference period defined in the Eurostat model questionnaire.

The notifications with information that the survey is organized via web were sent to the reporting unit's e_boxes. Later on, they were reminded by e-mail.

2.3 QUESTIONNAIRE

The national survey questionnaire ICT ENT 2-01 Survey on ICT usage and e-commerce in enterprises contains all indicators from the Eurostat model questionnaire, only the order and numeration of modules is different.

The questionnaire is divided into the following parts:

ACCESS AND USE OF THE INTERNET

- Access to the internet
- Use of a fixed line connection to the internet for business purposes
- Use of website
- Use of mobile apps
- Use of social media
- Other use of internet

USE OF CLOUD COMPUTING SERVICES

DATA UTILISATION, SHARING, ANALYTICS AND TRADING

- Use of business software
- Data sharing
- Data analytics
- Data trading

INVOICING

ARTIFICIAL INTELLIGENCE

E-COMMERCE SALES

- Web sales of goods or services
- EDI-type sales

BACKGROUND CHARACTERISTICS

2.4 SAMPLING AND IMPUTATION METHOD

The sample was created on the base of the same methods, which are used in other surveys organized by SO SR (short-term surveys, structural business surveys). In comparison with other surveys the boundary between exhaustive and sample survey was changed in the direction upwards. In this survey the sample is organized in enterprises with 10 to 249 employees, whereas in STS and SBS the sample concerns the enterprises with 1 to 19 employees. Three-stage sampling was applied on the base of following criteria:

- NACE Rev.2 level 3
- NUTS level 2
- Number of employees.

The enterprises were selected inside of each strata applying random sample.

	Total	of which enterprises with		
		10 to 49 persons employed (S)	50 to 249 persons employed (M)	250 or more persons employed (L)
Frame population	14 193	11 196	2 429	568
Gross Sample	2 864	1 799	497	568
Net Sample	2 607	1 570	476	561

The Frame population and Gross Sample were restructured after the survey - the number of enterprises in size categories S, M, L were revised according to the number of persons employed reported in the survey.

2.5 METHOD USED FOR IMPUTATION

The imputations in case of unit non-response were not made.

Imputations of item non-response were realised on base of SBS survey data in case of variables average number of persons employed and turnover.

3. ANALYSIS

With regard to the comparability with data for previous years the analytical part of report is focused on the enterprises classified in the following NACE Rev.2 activities:

Section C	Manufacturing (10 - 33)
Section D, E	Electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities (35 - 39)
Section F	Construction (41 - 43)
Section G	Wholesale and retail trade; repair of motor vehicles and motorcycles (45 - 47)
Section H	Transportation and storage (49 - 53)
Section I	Accommodation and food service activities (55 - 56)
Section J	Information and communication (58 - 63)
Section L	Real estate activities (68)
Section M	Professional, scientific and technical activities (69 - 75)
Section N	Administrative and support service activities (77 - 82)
Class S_95.1	Repair of computers and communication equipment
ICT sector	26.1 - 26.4, 26.8, 46.5, 58.2, 61, 62, 63.1, 95.1

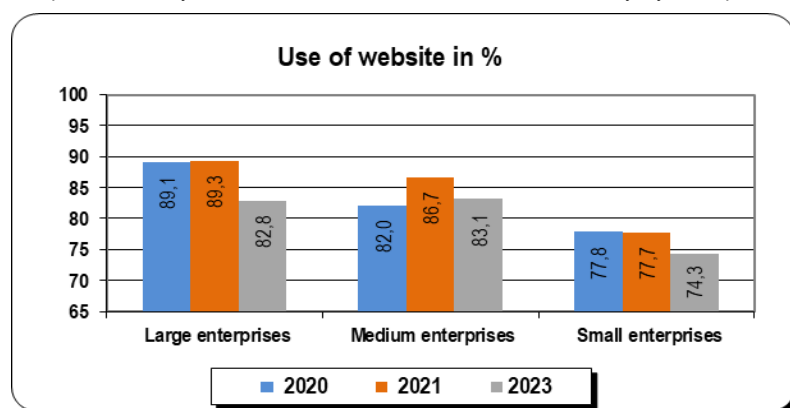
ACCESS AND USE OF THE INTERNET

Employees have access to the internet for work purposes in 93,2% of enterprises in 2023. Most of them are in areas of Repair of computers and communication equipment, Professional, scientific and technical activities, Transport and storage, Electricity, gas, steam and air conditioning supply, water supply, sewerage, waste management and remediation activities and ICT sector. Considering the enterprise size, employees have access to the internet for work purposes in 99,5% of large, 93,9% of medium and in 92,7% of small enterprises.

Almost 91% of enterprises used fixed line connection to the internet in the year 2023. This share decreased by 1,4 pp compared to 2022. Fixed connection used 98,5% of large enterprises, 95,6% of medium and 88,9% of small enterprises.

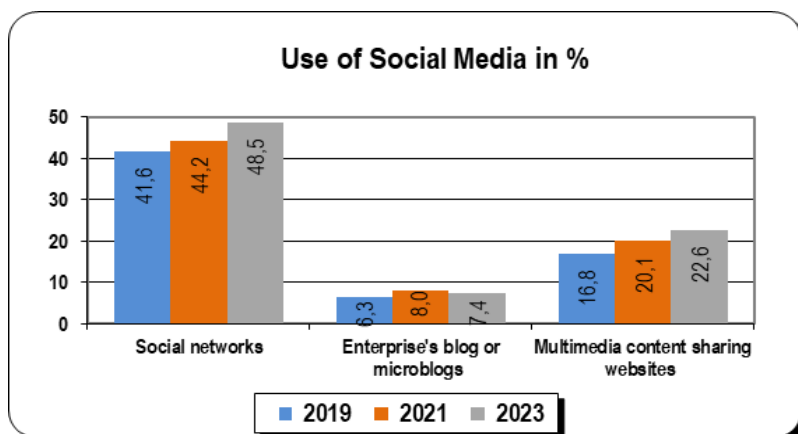
The enterprises with maximum contracted download speed (% of those enterprises that have a fixed connection to the internet)	2021	2022	2023
up to 30 Mbit/s	21,1	17,2	14,6
30 - 100 Mbit/s	36,7	38,0	35,0
100 - 500 Mbit/s	21,6	23,2	26,6
500 Mbit/s – 1 Gbit/s	12,0	11,9	12,5
1 Gbit/s and more	8,6	9,7	11,4

More than 76% of enterprises with internet connection had their own website. This share decreased by 3,6 percentage points compared to the year 2021. The own website was used mainly by enterprises in Repair of computers and communication equipment (92,3%), ICT sector (87,1%), Information and Communication (86,3%), Electricity, gas and steam, water supply, sewerage and waste management (85,3%).



The following table shows results of the survey on facilities offered by the company's website in 2023 according to the size structure of enterprises:

Facilities via website (% of enterprises which have a website)	10 to 49 persons employed (S)	50 to 249 persons employed (M)	250 or more persons employed (L)
Description of goods or services, price lists	89,9	86,6	74,0
Content available in at least two languages	36,8	60,2	63,3
Online ordering or reservation or booking	32,8	27,6	26,4
Advertisement of open job positions or online job application	21,0	44,6	67,7
Tracking or status of orders placed	15,2	15,3	17,4
Possibility for visitors to customise or design online goods or services	11,8	10,8	10,3
A chat service for customer support	10,5	12,6	14,2
Personalised content on the website for regular/recurrent visitors	8,2	8,5	12,5



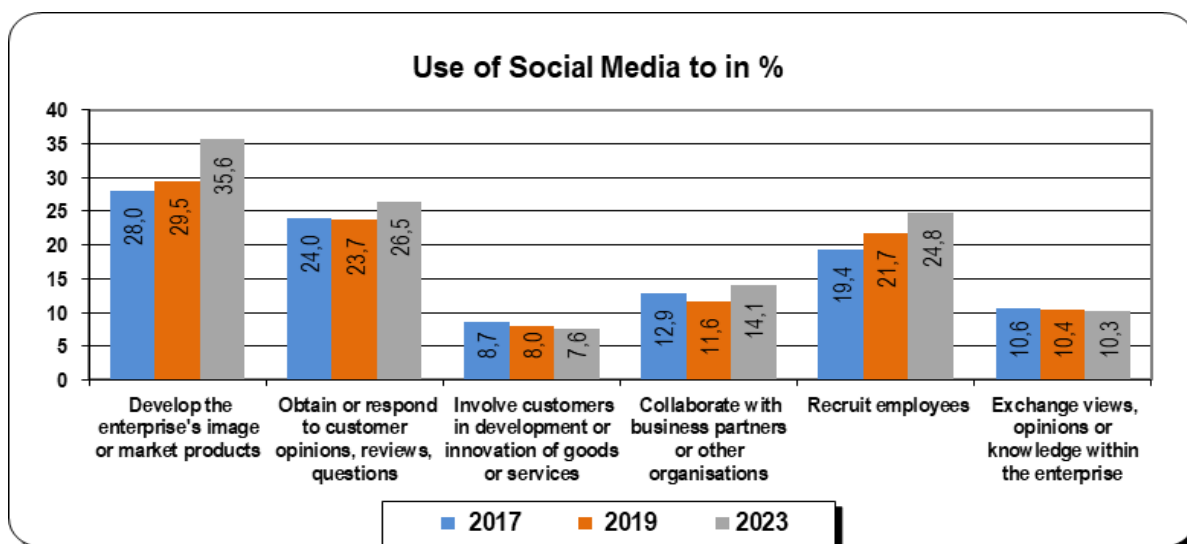
7% of enterprises with internet connection had a mobile app for clients.

More than 50% of enterprises used some of the social media listed in following graph. Their number increased by 2,6 percentage points compared to 2021.

More detailed results on the use of social media in enterprises by size category are presented in the following table:

Use of social Media (% of enterprises which have access to the internet)	10 to 49 persons employed (S)	50 to 249 persons employed (M)	250 or more persons employed (L)
Social networks (e.g. Facebook, LinkedIn, Xing, Viadeo, Yammer, etc.)	46,1	54,2	70,2
Enterprise's blog or microblogs (e.g. Twitter)	5,8	12,1	17,9
Multimedia content sharing websites or apps (e.g. YouTube, Flickr, SlideShare, Instagram, Pinterest, Snapchat etc.)	20,3	29,2	39,4

Nearly 36% of enterprises used social media in the year 2023 for developing the enterprise's image or market products (number of enterprises increased by 6,1 percentage points compared to the year 2019), 26,5% of enterprises for obtaining or respond to customer opinions, reviews, questions (+2,8pp), 14,1% of enterprises for collaborating with business partners or other organisations (+2,5pp) and 7,6% for involving customers in development or innovation of goods or services (-0,4pp). Nearly 25% of enterprises used social media for recruiting employees. More than 10% of enterprises used social media for exchange views, opinion or knowledge within the enterprise.



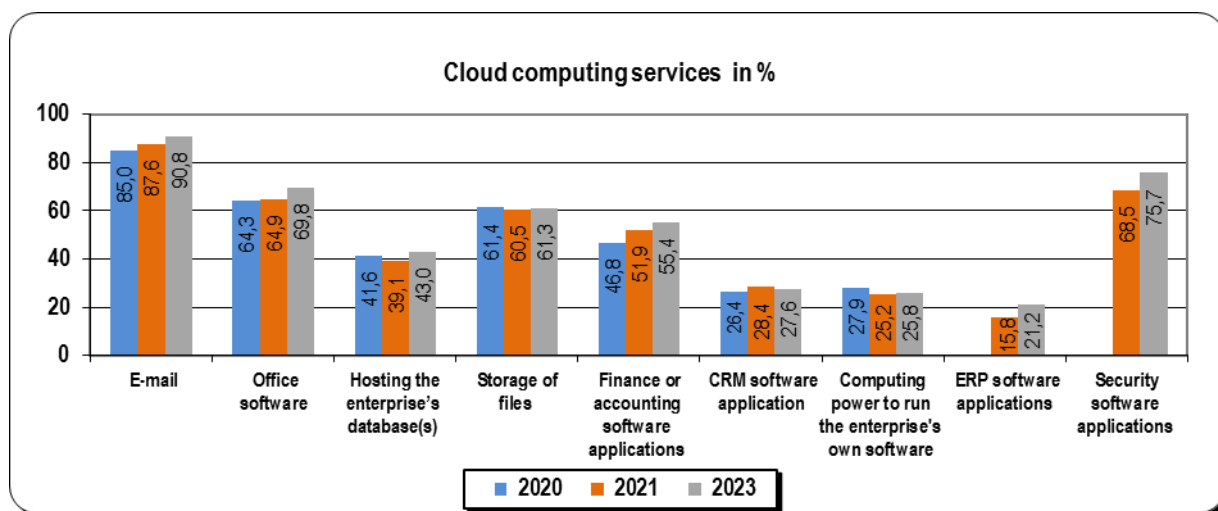
In the year 2023 paid for advertising on the internet 30,9% of enterprises. Number of enterprises increased by 4,8 percentage points compared to the year 2018. This proportion was 42,6% in large enterprises, 37,1% in medium and 28,9% in small enterprises.

The paid using of the targeted advertising methods on the internet by used methods is shown in the table:

The enterprises paying for advertising on the internet using advertising methods (% of those enterprises that paying for advertising on the internet)	2018	2023
Based on content or keywords searched by internet users	75,2	69,7
Based on the tracking of internet users' past activities or profile	31,6	36,5
Based on the geolocation of internet users	23,3	32,5
Any other method of targeted advertising on the internet not specified above	41,6	41,5

USE OF CLOUD COMPUTING SERVICES

In the year 2023 used cloud computing services almost 37% of enterprises. These services were mostly used by enterprises with main activity classified in Information and communication (61,9%), ICT sector (59,8%), Administrative and support activities (46,3%). As regards the size of enterprises, cloud computing services were used by 67,8% of large enterprises (their share increased by 6,6 percentage points compared to the year 2021), by 49,9% of medium enterprises (increased by 2,4 pp) and by 32,4% of small enterprises (decreased by 2,3 pp compared to 2021).

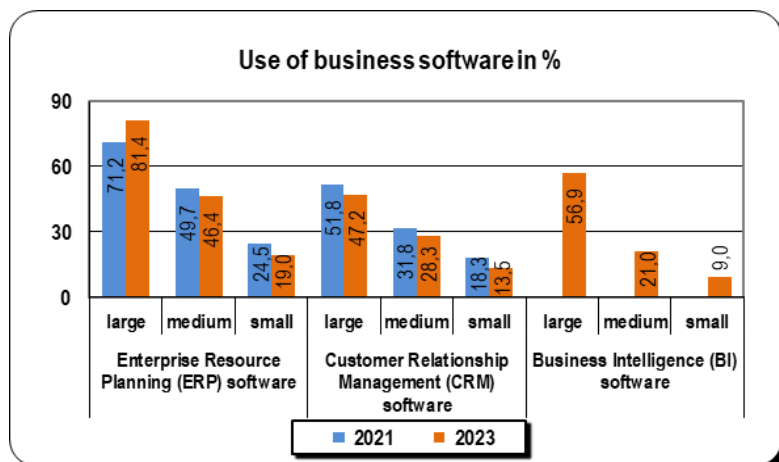


Almost 91% of enterprises purchased cloud computing services mainly for the purposes of E-mail. Purchase of e-mail (as cloud computing service) increased by 3,1 percentage points in comparison with the year 2021, in the case of large enterprises the increase was by 8,8 pp, in medium enterprises by 9,3 pp and in small enterprises by 0,6 pp. About 70% of enterprises purchased cloud computing services for the purpose of Office software. Use of the Internet for this purpose increased in comparison with the year 2021 by 4,9 pp.

More than 61% of enterprises purchased of cloud computing services for the purpose of Storage of files (use of the internet for this purpose increased in comparison with the year 2021 by 0,8 percentage points), 55,4% of enterprises for Finance or accounting software applications (+3,5 pp), 43% of enterprises for Hosting the enterprises database(s) (+3,9 pp), 27,6% of enterprises for Customer Relationship Management software application (-0,8 pp), 25,8% of enterprises for Computing power to run the enterprise's own software (+0,6 pp), 21,2% of enterprises for ERP software applications (+5,5 pp), 25,8% of enterprises for Security software applications (-42,6 pp) and 21,2% of enterprises for Computing platform providing a hosted environment for application development, testing or deployment (+3,7 pp).

DATA UTILISATION, SHARING, ANALYTICS AND TRADING

More than 26% of enterprises used the software package ERP (Enterprise Resource Planning) for automatic share of information within the enterprise in the year 2023 (number of enterprises decreased by 5,1 percentage points compared to the year 2021). 17,4% of enterprises used Customer Relationship Management (CRM) software and more than 13% of enterprises used Business Intelligence (BI) software.



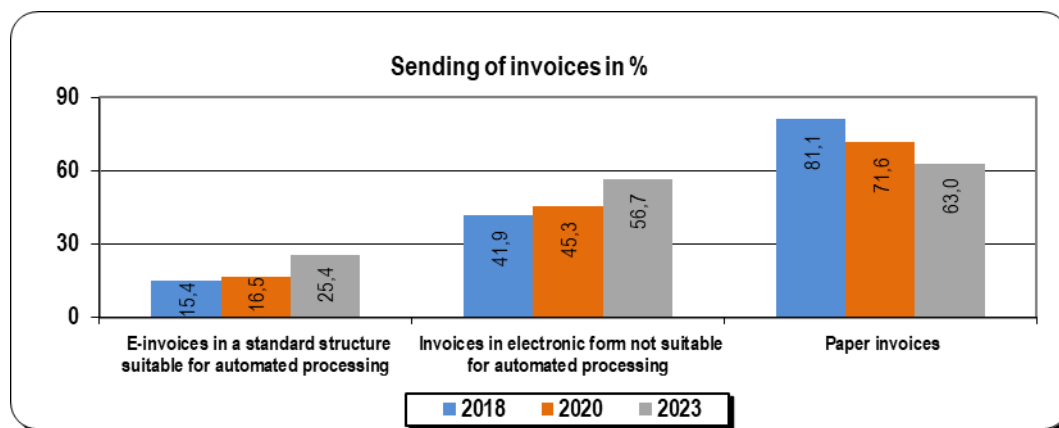
Only 1% of enterprises sold own data or access to them and 2,4% of enterprises purchased any data or access to them last year.

Sources for data analytics is available in the next table:

Sources for data analytics (% of those enterprises that perform data analytics)	2023
Data analytics on data from transaction records such as sale details, payments records	77,4
Data analytics on data about customers such as customer purchasing information, location, preferences, customer reviews, searches	59,7
Data analytics on web data	37,0
Data analytics on data from social media, incl. from your enterprise's own social media profiles	36,5
Data analytics on location data from the use of portable devices or vehicles	36,0
Data analytics on data from smart devices or sensors	21,5
Data analytics on government authorities' open data	18,4
Data analytics on satellite data	12,1

INVOICING

More than 25% of enterprises used e-invoices in a standard structure suitable for automated processing form for sending invoices. Invoices in electronic form not suitable for automated processing used 56,7% of enterprises and paper form of invoices 63% of enterprises.



Share of enterprises sending e-invoices is available in the next table:

Sending of e-invoices (% of the enterprises which sent e-invoices)	2018	2020	2023
less than 10%	36,6	28,2	17,1
10 – 25%	17,9	11,2	10,7
25 – 50%	18,8	14,6	14,2
50 – 75%	11,2	16,1	18,1
more than 75%	15,5	29,8	39,9

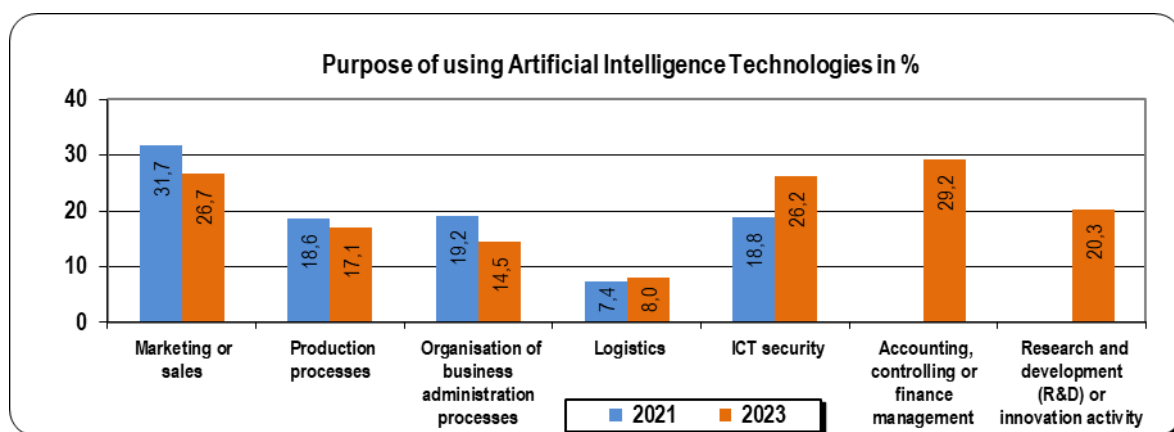
ARTIFICIAL INTELLIGENCE

In 2023 only 7,6% of enterprises used at least one Artificial Intelligence Technologies. Artificial intelligence refers to systems that use technologies such as: text mining, computer vision, speech recognition, natural language generation, machine learning, deep learning to gather and/or use data to predict, recommend or decide, with varying levels of autonomy, the best action to achieve specific goals.

More detailed results on Artificial Intelligence Technologies in enterprises are provided in the following table:

Use of Artificial Intelligence Technologies (% of enterprises which have access to the internet)	2021	2023
Technologies performing analysis of written language	2,4	4,2
Technologies converting spoken language into machine-readable format	1,1	2,5
Technologies generating written or spoken language	0,7	1,7
Technologies identifying objects or persons based on images	1,9	2,2
Machine learning for data analysis	0,9	2,0
Technologies automating different workflows or assisting in decision making	1,7	2,9
Technologies enabling physical movement of machines via autonomous decisions based on observation of surroundings	0,4	0,9

Reasons for using the Artificial Intelligence software or systems are shown in the following graph:



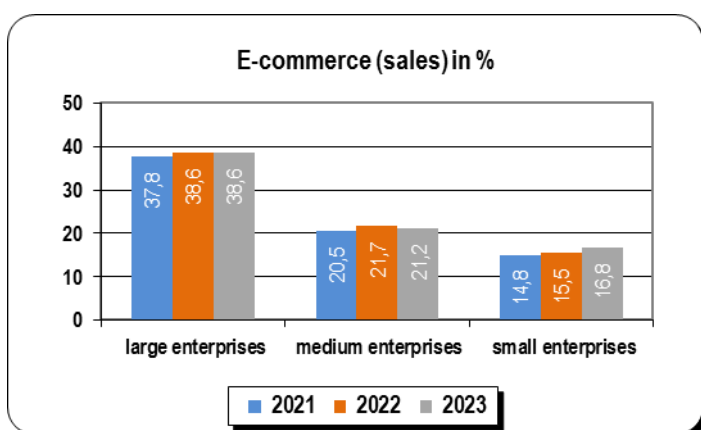
The following table shows data on the type of Artificial Intelligence Technologies used:

The type of Artificial Intelligence Technologies used (% of enterprises used at least one Artificial Intelligence Technologies)	2021	2023
Developed by own employees	18,7	21,0
Commercial software or systems were modified by own employees	30,9	35,6
Open-source software or systems were modified by own employees	16,7	26,7
Commercial software or systems ready to use were purchased	56,0	52,5
External providers were contracted to develop or modify them	35,2	35,0

Reasons for not using the Artificial Intelligence software or systems are the following: the costs seem too high (3,6% of enterprises), lack of relevant expertise in the enterprise (3,4%), incompatibility with existing equipment, software or systems (3,4%), lack of clarity about the legal consequences (2,5%), difficulties with availability or quality of the necessary data (2,3%), concerns regarding violation of data protection and privacy (1,9%), Artificial Intelligence Technologies are not useful for the enterprise (1,4%), ethical considerations (1%).

E-COMMERCE

Sales of products and services via web and EDI were realized in 18,4% of enterprises. This share increased by 0,9 percentage points in comparison with the previous year.



These forms of sale were mostly used by enterprises in Wholesale and retail trade; repair of motor vehicles and motorcycles (31,8%), Repair of computers and communication equipment (30,8%), Accommodation and food service activities (27,1%), ICT sector (17,7%) and Administrative and support activities (17,5%).

Share of enterprises with Sales of products and services via web increased in large enterprises by 0,6 pp to 19,8% compared to the previous year and in small enterprises by 1,2 pp to 15,5%.

Sales of products and services via EDI were realised in 4% of enterprises what is by 0,8 pp less than in previous year. This type of sales was used in 8,4% of enterprises in Manufacturing activities, in 7,7% of enterprises in Repair of computers and communication equipment.

More detailed results on web sales of goods or services in enterprises are provided in the following table:

Through which website or application have enterprise web sales (% of enterprises which had web sales)	2021	2022	2023
via enterprise's websites or applications	92,0	93,3	93,2
via e-commerce marketplace websites or applications used by several enterprises for trading goods or services	36,2	33,5	41,1