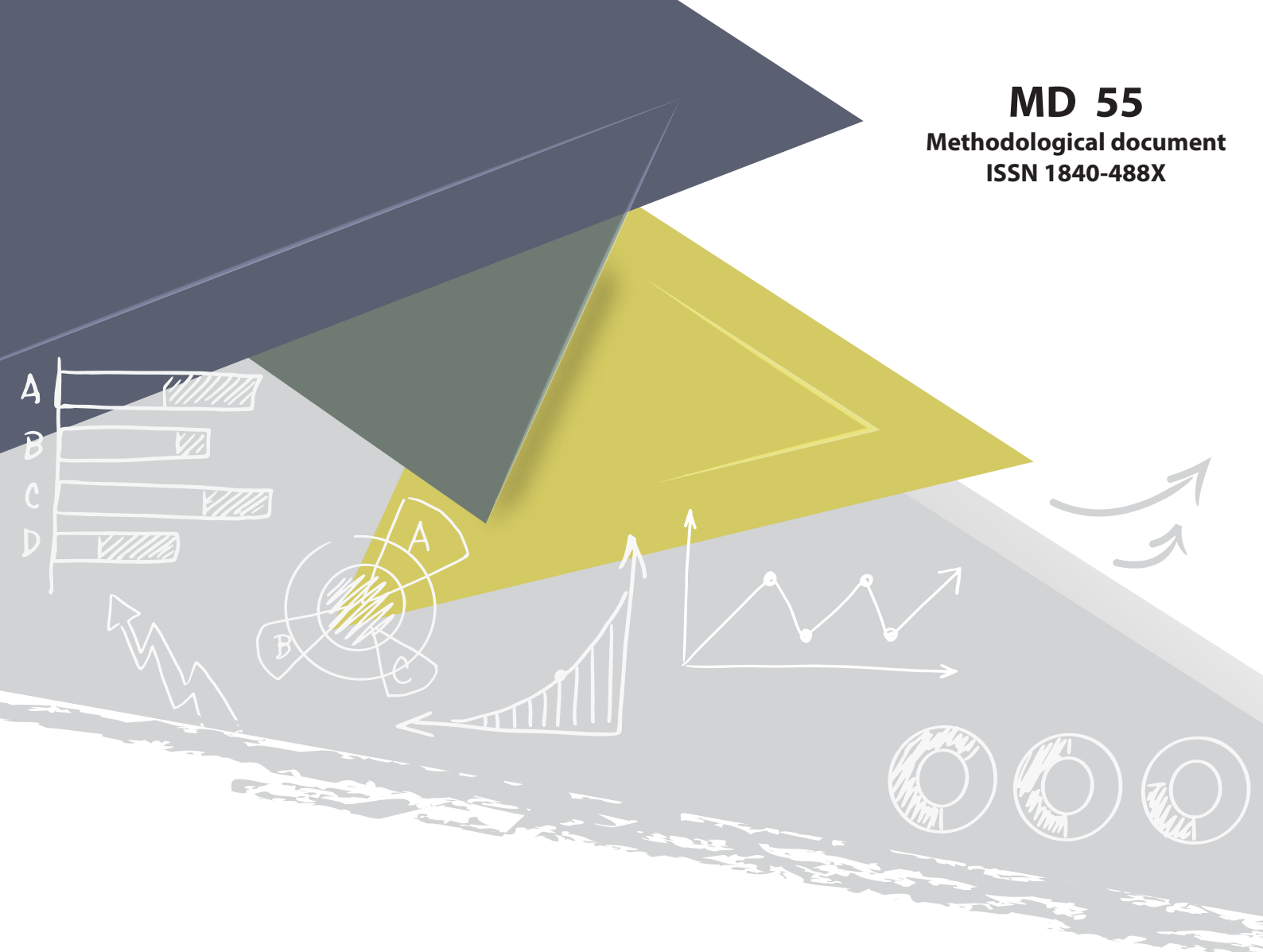




USAGE

OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN ENTERPRISES, 2024



Bosnia and Herzegovina



Agency for Statistics of
Bosnia and Herzegovina

Sarajevo, 2024

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**Agency for Statistics of
Bosnia and Herzegovina**

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1.1. Introduction

1.1.1. Statistics on ICT Usage and E-Commerce in Enterprises

The statistics on the use of information and communication technologies (ICT) and e-commerce in enterprises monitor the adoption of advanced technologies and the digitalization of the economy. The necessary data is collected through an annual survey titled **"Survey on the Use of Information and Communication Technologies in Enterprises."** The survey measures enterprises' access to and use of the internet and e-commerce (i.e., online sales of goods and services), employment of ICT specialists, ICT security, and the use of artificial intelligence technology. Survey questions are developed annually in accordance with Eurostat recommendations and guidelines, as well as the evolving needs of data users and policymakers. The survey is conducted annually on a sample of enterprises across the territory of Bosnia and Herzegovina using the CATI (Computer-Assisted Telephone Interviewing) method.

The publication of data from this survey is carried out at the level of Bosnia and Herzegovina as well as at the entity level.

1.1.2. Legislation

The survey is conducted based on EU legislation and is coordinated by Eurostat to ensure a harmonized approach to the production of statistics across all reporting countries. Three regulations currently form the legal basis for the ICT usage survey in enterprises for the 2024 survey:

- **Regulation (EU) 2019/2152 of the European Parliament and the Council of 27 November 2019** on European business statistics, repealing 10 legal acts in the field of business statistics ("EBS Regulation");
- **Commission Implementing Regulation (EU) 2020/1197 of 30 July 2020**, establishing technical specifications and arrangements in accordance with Regulation (EU) 2019/2152 of the European Parliament and the Council on European business statistics, repealing 10 legal acts in the field of business statistics ("General Implementing Act" or "EBS GIA Regulation"); and
- **Commission Implementing Regulation (EU) 2023/1507 of 20 July 2023**, establishing the technical specifications for data requirements on the topic "Use of ICT and E-Commerce" for the reference year 2024, in accordance with Regulation (EU) 2019/2152 of the European Parliament and the Council ("Implementing Act").

Regulation (EU) 2019/2152 serves as the framework regulation.

1.1.3. Statistical Unit

The statistical unit is the basic type of element within a group (also referred to as the population) that we aim to observe or analyse.

There are several types of statistical units based on their usage. The observation unit represents an identifiable entity for which data can be obtained. During data collection, this is the unit for which data is recorded. The statistical unit does not necessarily have to be the same as the reporting unit. The reporting unit is the entity that submits reports to the research body.

The observation unit in the "Survey on the Use of Information and Communication Technologies in Enterprises" is the enterprise, as defined by Council Regulation (EEC) No 696/93 of 15 March 1993 on the statistical units for the observation and analysis of the production system in the community.

The regulation defines the list of statistical units:

"An enterprise is the smallest combination of legal units that constitutes an organizational unit producing goods or services and has a certain degree of autonomy in decision-making, particularly regarding the allocation of its current resources. An enterprise carries out one or more activities at one or more locations. An enterprise can also be a single legal unit."

An enterprise, as defined above, is an economic entity that may consist of multiple legal units. Some legal units operate exclusively for other legal units, and their existence can be explained solely by administrative factors (e.g., tax reasons) without any economic significance. A large portion of legal units without employees also belongs to this category. In many cases, the activities of these legal units should be considered auxiliary activities of the parent legal unit to which they serve, belong, and must be linked in order to form an enterprise used for economic analysis.

However, defining an enterprise as an appropriate statistical unit imposes certain limitations. Some enterprises, particularly larger ones, consist of multiple local units (branches). As a result, the geographical distribution of results (although still possible using the location of the enterprise's headquarters) is limited.

1.1.4. Target Population

Target population is the population of interest and consists of a clearly defined group of statistical elements for which we seek to obtain information. This delineation is based on one or more attributes of the statistical unit. For example, in the case of an enterprise, some commonly used attributes to delineate the target population include size (e.g., number of employees, economic activity, and its location). An example of a target population could be: "Enterprises with 10 or more employees, classified under NACE sections 41-43 (Construction), geographically located in the EU."

Frame population ideally consists of a complete list of elements of the target population. Although the target population can be easily defined, in practice a list of all its elements is required for complete or partial observation (if the survey is based on a sample). The list should be comprehensive and include each element of the target population only once. However, in practice, under-coverage and over-coverage commonly occur. Statistical element files (registers) are usually maintained and updated; they contain lists of statistical units as well as information on certain attributes, which are typically used to delimit the target population.

The target population of the "Survey on the Use of ICT and E-commerce in Enterprises" is the group of enterprises defined by the following attributes:

- **Economic activity:**

NACE Rev. 2 was first applied in the survey in 2009. The survey results have been published in accordance with NACE Rev. 2 since 2010.

Enterprises are classified into the following categories according to NACE Rev. 2:

NACE Rev.	Description
Sector C	Production
Sector D, E	Electricity, gas, steam, and air conditioning supply; Water supply; Sewerage, waste management, and remediation
Sector F	Construction
Sector G	Wholesale and retail trade; Repair of motor vehicles
Sector H	Transportation and storage
Sector I	Accommodation and food services
Sector J	Information and communication
Sector L	Real estate business
Sector M	Professional, scientific, and technical activities
Sector N	Administrative and support activities
Group 95.1	Repair of computers and communication equipment

Enterprises are classified into one of these categories based on their principle of economic activity.

- **Enterprise Size**

Enterprises with 10 or more employed persons.

Optionally, the target population may be expanded to include enterprises with 0 to 9 employees.

With the introduction of the Framework Regulation on European Business Statistics (EBS Regulation), the variable "employed persons" has been replaced with "employed and self-employed persons". For ease of use, the term "employed and self-employed persons" is used only in the introductory section of the questionnaire and in Module X, while the term "employed persons" continues to be used throughout the rest of the questionnaire.

From a statistical definition perspective, although the term "employees" is used in the text, it always refers to "employed and self-employed persons".

- **Geographical Scope**

Enterprises located in any part of the territory of Bosnia and Herzegovina.

1.1.5. Sample

The sample should be listed at the enterprise level. Enterprise attributes should be used as they are registered in statistical business registers.

1.1.6. Periodicity

The periodicity is annual, meaning that data is collected and compiled once a year. However, some variables can be observed with a lower frequency, for example, variables that tend to remain stable over time, variables for biennial benchmarking indicators.

The annual survey should be considered a compromise between the burden on users and the need for relevant and up-to-date information on rapidly evolving domains, such as the information society.

Specifically, the variables for the biennial benchmarking indicators aim to keep the burden on enterprises as low as possible over the years.

This periodicity is established by Regulation (EU) 2019/2152 of the European Parliament and Council of December 17, 2019, on European Business Statistics, for the topic of the use of ICT and e-commerce (OJ L 327, Article 6, page 10), and in Commission Implementing Regulation (EU) 2020/1030 of July 15, 2020 (OJ L 227).¹

1.1.7. Observed Variables and Attributes

An attribute is a characteristic of a statistical unit, and each attribute can have one or more observed variables with either qualitative or quantitative information. For example, for the statistical unit "enterprise", the attribute is the size of the enterprise, while the observed variable is the number of employees.

There are many ways to classify observed variables, but the most relevant distinction for research on ICT usage is the difference between **qualitative and quantitative variables**.

Qualitative variables refer to non-numerical information. They serve solely as labels or names to identify the attributes of a statistical unit. An example is "use (Yes/No) of any type of fixed internet connection" by an enterprise. Sometimes, qualitative variables can be transformed into numerical values by recoding the non-numerical values. Binary (or dichotomous) variables are an important type of qualitative variable. Binary variables assume only two distinct values, which are typically converted into numerical values by meaningfully assigning them the values "0" and "1".

Quantitative variables contain information about how much in numbers or how much in percentages. An example is "the number of employed persons using computers with internet access."

In research on the use of ICT and e-commerce, the observation variables are mostly qualitative (binary variables).

Variables		
Qualitative/dichotomous variables (yes/no questions)	The rule here is that if the answer is "Yes" for one legal entity, the same answer applies to the entire enterprise.	
Qualitative variables/questions with different offered response modalities, but with only one possible answer.	In the 2024 research, this refers to the question about internet speed, as well as the question about the definition of the latest review of documents on measures, practices, or procedures related to ICT security, where the most recent update should be within the enterprise.	
	Dependent variables	Dependent variables are those for which the simple sum of the amounts of legal units of the enterprise gives a consolidated total for the entire enterprise. This must be the case for all enterprises, regardless of how the legal units are combined to form the enterprise.

¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1595572475445&uri=CELEX:32020R1030>

Quantitative variables	Independent	Independent variables are those that cannot simply be summed to calculate the total amount at the enterprise level if the enterprise consists of several legal units. However, consolidation of the amounts of the relevant variable (e.g., turnover) of the basic legal units must be carried out, including the elimination of values related to internal flows. Non-additive variables are variables with internal flows, such as e-commerce or turnover. Non-additive variables should be collected from the contact person, the legal unit most suitable for providing a response for the entire enterprise, or from the group leader/top management. Alternatively, if consolidation is performed in the national statistical office, efforts should be made to exclude internal flows within the enterprise in the case of web sales or EDI (electronic data interchange) type sales	Data collection from enterprises When data is collected from enterprises, they should be asked to exclude internal flows within the enterprise.
			Data collection from legal units When data is collected from legal units, information about the existence of internal flows within the enterprise should be used from the (statistical) business register if available. Legal units may be asked to exclude internal flows within their enterprise.
Percentages	Data collection from enterprises	When data is collected from enterprises, the contact person, the legal unit most suitable for providing a response for the entire enterprise, or the group leader/top management should provide a percentage or an estimate for the entire enterprise.	
	Data collection from legal units	If data is collected from legal units, the statistical office should consolidate the data by dividing the absolute values (e.g., employees with internet access for business purposes) from all legal units by the total value, such as the total number of employees across all legal units. If data from any legal unit is unavailable, it should be imputed. Information from statistical business registers can be used if available or useful. Care should be taken when dealing with percentages for independent variables to exclude internal flows within the enterprise if possible.	
Mutually exclusive questions	Mutually exclusive questions are, for example, questions about the use of artificial intelligence (AI), where there is a different set of questions for those who use AI and those who do not (such as reasons for not using AI). In this case, responses to such a question (e.g., reasons for not using AI) should only be considered if no legal unit within enterprise have used the relevant technology (AI technologies). Therefore, the answers should be counted for the enterprise as a whole; a "yes" answer in at least one legal unit should be counted as a "yes" for the entire enterprise.		

1.1.8. Aggregated Variables and Indicators

Certain variables or numerical values are defined by a statistical measure used to summarize the values of a specific variable for all statistical units within a given group. Such measures can take the form of aggregates (e.g., the total number of Yes responses to a specific question) or indicators (e.g., the percentage of Yes responses).

Aggregates can be collected for the entire population or for different subpopulations defined by background variables (e.g., NACE classification or enterprise size classes) or for subpopulations conditionally defined based on responses to other study variables (e.g., broadband network users compared to non-broadband users).

For example:

- the number of enterprises with internet access
- the number of enterprises with 10 to 49 employees that have internet access

To obtain indicators (proportions, etc.), aggregates must be divided by the total population or subpopulation.

For example, the denominator of such a proportion can be:

- the total population of enterprises in selected strata (e.g., "percentage of enterprises with 10 to 49 employees that have internet access" = the number of enterprises with 10 to 49 employees that have internet access divided by the total number of enterprises with 10 to 49 employees).

1.1.9. Accuracy

The accuracy of statistical information refers to the closeness of estimates to the unknown true values. In practice, it represents the degree to which the information correctly describes the phenomena intended for measurement. The accuracy of statistical information is divided into bias (systematic error) and variance (random error).

1.1.10. Data Collection

Data collection can be conducted at the level of the entire enterprise or at the level of the enterprise's legal unit.

Data collection		
At the enterprise level	Contact person	If an enterprise consists of more than one legal unit, the statistical office should reach an agreement with one of the legal units on who should be the contact person for all legal units. If this is not possible, the legal unit most suitable for providing the response should be selected. If it is not known which legal unit is the most suitable for the response, the group leader or top management should be contacted.
	Quality Assurance Measures	The contact person should be provided with a list of legal units for which responses are required. If it is found that the data in the statistical business registers regarding the legal units belonging to the enterprise are inaccurate, this should be reported to colleagues in the relevant profiling unit or the statistical business registers.
At the legal unit level	Contact person	Ideally, data should be collected from all legal units belonging to the enterprise in the sample. If data cannot be collected from all legal units, the reporting legal units should report on behalf of all legal units belonging to the enterprise.
	Quality Assurance Measures	Special attention should be given to including legal units that have e-commerce to avoid underestimating e-commerce. This would include, for example, legal units that have reported having e-commerce or websites with functions for ordering goods or services in previous years, or legal units known from other sources to have e-commerce. For independent variables, such as variables with internal flows within the enterprise, it may be better to collect data from the contact person/legal unit designated or legally most suitable for providing a response for the entire enterprise, or from the group leader or top management. For independent variables, legal units should be asked to exclude internal flows within the enterprise.

2.1. Questionnaire for 2024

The explanations in this chapter refer to the questions in the 2024 questionnaire model. The structure of this chapter follows the model of the questionnaire, meaning the explanations are grouped by modules and questions.

General Note: 'Use', 'have', or 'there is another enterprise for you'

In many questions, the use of computers, networks, systems, software, etc., is mentioned. The term **'use'** does not refer to ownership of such goods and infrastructure. For example, 3D printers or robots used in one enterprise may belong to that enterprise, may be rented, or may be shared with another organization.

In addition, enterprises often purchase ICT services or services related to the use of ICT for other purposes (such as accounting). In cases where ICT services or other services involving the use of ICT are fully provided by another enterprise, and the responding enterprise does not use ICT for that function, it should not be considered as ICT usage within the responding enterprise.

In some cases, ICT is used both by the responding enterprise and by the ICT service provider (another enterprise). In these cases, the question should clarify which types of activities will be considered as ICT usage by the responding enterprise.

2.1.1. Modul A: Internet Access and Usage

Question A1: How many employees have access to the internet for business purposes? (including fixed connection, Wi-Fi connection, and mobile network connection)

If it is not possible to provide an answer to this question,

Question A1_P: Please evaluate the participation of employees who use the internet for business purposes (percentage of the total number of employees):

(Scope: all enterprises)

[Type: numerical, absolute, or percentage values]

This variable refers to employees who have access to the World Wide Web from their work computer or a computer to which they have free access. The following definition of a computer applies: *Computers include personal computers, laptops, tablets, and other portable devices such as smartphones.*

The goal is to identify enterprises with access to the World Wide Web. The reason for applying this specific internet service is that, among the various services that can be run on the internet, the most common is the World Wide Web (as well as email). Accessing the internet only through email service is not considered in this variable, as email is already very common in Europe and does not effectively represent the potential for information access compared to using the World Wide Web.

This variable can be collected in absolute or percentage values. Eurostat recommends using a combination of both, which allows the respondent to answer in either absolute or percentage values.

Regardless of the method used to collect this variable, the variable X2 'Average number of employed persons during the *previous year*' (**X2**) is necessary for calculating the total percentage of employed persons who use internet-connected computers.

In small enterprises, business owners sometimes do not consider themselves employees of the enterprise, so it is important to ensure they are included as well.

Use of fixed internet connection for business purposes.

A2. Does your enterprise use any type of fixed broadband internet connection? (e.g., ADSL, SDSL, FTTP, cable internet, public Wi-Fi)

(Scope): Enterprises that have internet access, i.e., if A1 > 0 >

[Type: single answer (e.g., select only one); binary (Yes / No); filter question]

'Connection' refers to the type of network link between the enterprise's computer network and the internet service provider (ISP) network.

Type of fixed internet connection:

DSL connection, e.g., XDSL, ADSL, SDSL, VDSL, etc.

"Digital Subscriber Line" (DSL) is a technology that allows the transmission of digital data over the wires of a local telephone network. DSL service is provided simultaneously with the regular telephone service on the same telephone line, as it uses a higher frequency that is separated by filtering. The DSL line can carry both data and voice signals, with the data portion of the line being continuously connected.

"Asymmetric Digital Subscriber Line (ADSL)," where more bandwidth is allocated for „download“ than for „upload“, and " High-bit-rate Digital Subscriber Line (HDSL)" are considered dominant DSL technologies. " Symmetric Digital Subscriber Line (SDSL)" refers either to a DSL technology offering symmetric bandwidth for both upload and download or to a specific DSL variant where data is supported on a single line that does not support analogue calls. Very High-Speed Digital Subscriber Line (VDSL) is a DSL technology that provides faster data transmission. VDSL is capable of supporting high-definition television, telephone services (voice over IP), and internet access over a single connection, among other services.

Fiber optic technology (FTTP), cable technology, etc.

Other fixed (wired or wireless) high-speed connection includes the following types of Internet connections:

- Cable modem 'cable TV network connection';
- Relay for leased high-capacity lines, ATM, digital multiplex;
- Ethernet LAN connection;
- Fiber optic connection;
- Fixed wireless connection (FWA), e.g., satellite connection, public Wi-Fi connection, WiMax.

Wi-Fi essentially does not refer to Wi-Fi (which can be xDSL, cable, or fiber), but rather to public Wi-Fi, hotspots, and hot zones, which have different names in different countries. For example, in Luxembourg, it is called Hot City, and the coverage is very wide.

A cable modem uses modems connected to cable television networks (cable TV lines) for permanent 'fixed' internet access. The term "cable internet" or simply "cable" refers to the delivery of internet services through this infrastructure. A cable modem is a device that allows you to connect your computer to the local cable TV line. It is considered one of the permanent 'fixed' internet connections of high-capacity speed.

"A" leased line (dedicated line) is a telephone line rented for private use. The leased line is typically established via a switch or dial-up line. Leased lines are usually available at speeds of 64k, 128k, 256k, 512k, 2 Mb. Higher speeds are available on alternative interfaces.

A high-capacity leased line is a permanent telephone connection between two points established by a common telecommunications provider. Typically, leased lines are used by enterprises to connect geographically distant offices. Unlike standard dial-up connections, a leased line is always active. Since the connection carries no other communications, the provider can guarantee a certain quality level. For example, a T-1 channel is a type of leased line that ensures a maximum transfer speed of 1.544 Mbps. The connection can be split into different lines for data transmission and voice communication, or the channel can be used for a single high-speed data transmission. The process of splitting the connection is called

multiplexing. Increasingly, leased lines are being used by enterprises, and even individuals, for internet access as they support faster data transfer rates and are cost-effective.

Fixed Wireless Access (FWA) is a technology that uses radio frequency, infrared, microwave, or other types of electromagnetic or acoustic waves instead of wires, cables, or fibre optics to transmit signals or data (enabling internet access) between fixed points. This includes, for example, satellite internet connections (wireless transmission over long distances) or public Wi-Fi (wireless transmission over medium-range distances).

Wi-Fi (or Wi-Fi, Wi-Fi, Wi-Fi, Wi-Fi), short for 'Wireless Fidelity', is a set of Ethernet standards for wireless local area networks (WLAN) currently based on IEEE 802.11 specifications. New standards outside of the 802.11 specifications, such as 802.16, have been developed, offering many improvements. Wi-Fi was initially intended for wireless devices and LAN networks, but it is now widely used for internet access (one of the main international standards for wireless broadband internet access and networking, with widespread use in businesses, homes, and public spaces). It is based on radio signals with a frequency of 2.4 GHz, theoretically capable of speeds exceeding 54 Mbps. It allows a person with a computer or device with wireless capability to connect to the internet when near a hotspot. Internet connection through mobile phone networks is not included in this category.

A3. What is the maximum internet connection speed in your enterprise?

(Please select only one answer)

[Scope: Enterprises with a fixed internet connection, i.e., A2 = Yes]

[Type: single answer (e.g., select only one)]

The maximum contracted transfer speed refers to the theoretical maximum speed — according to the obligations agreed with the ISP — at which data can be downloaded. The five offered options are measured in Mbit/s (Mb/s or Mbps) or Gbit/s (Gb/s or Gbps). These represent megabits per second or gigabits per second and are a measure of bandwidth (the total flow of information over a telecommunications medium in a given time). Mbps should not be confused with MBps (megabytes per second). A common issue is that speed tests and ISPs use bits per second, while download agents/programs use "bytes per second". Remember, 1 byte = 8 bits.

The five available options are: a) less than 30 Mbit/s; b) at least 30 but less than 100 Mbit/s; c) at least 100 but less than 500 Mbit/s; d) at least 500 but less than 1 Gbit/s; e) at least 1 Gbit/s.

Additional categories may be added at the national level if needed.

Please note that the actual bandwidth and transmission speed depend on a combination of factors, including the ISP, equipment and software used, internet traffic, and the destination server. Therefore, it may differ from the contracted download speed asked for in this question. Respondents are not required to conduct a speed test on their equipment to answer the question. Enterprises (respondents) can obtain information about the maximum contracted download speed of their fastest fixed internet connection from their monthly telecommunications service (internet) bills or by contacting their internet service providers.

A4. Is the speed of your fixed broadband internet connection sufficient for the actual needs of your enterprise?

Scope: enterprises with a fixed broadband internet connection, i.e., A2 = Yes]

[Type: single answer (i.e., select only one); binary (Yes/No)]

The purpose of this question is to "count" how many enterprises consider their internet connection speed sufficient for their needs. Essentially, question A4 aims to measure the level of demand for an improved internet connection, as well as the overall enterprise assessment of their current fixed internet connection. The responses to question A4 will be combined with respondents' choices in A3 regarding the contracted download speed. The fact that question A3 refers to the contracted download speed, while A4 generally refers to the speed when connecting to the internet for business purposes, is not considered an issue.

Use of Mobile Internet Connection for Business Purposes (Scope: Enterprises with Internet Access)

A mobile internet connection refers to the use of portable devices that connect to the internet via mobile phone networks for business purposes. Enterprises provide portable devices and cover subscription and usage costs, either fully or at least up to a certain limit.

Essentially, these are portable devices that enable a mobile internet connection via mobile phone networks. The survey includes enterprises that provide portable devices as compensation or as part of an employee's equipment, provided that the conditions for introducing the module (covering subscription and usage costs) are met, and that the portable devices allow mobile internet access via mobile phone networks.

Additionally, "business use" refers to usage that is work-related.

Mobile and wireless internet connection: Question A5 specifically refers to a "mobile internet connection" via mobile phone networks (whether within or outside the enterprise's premises). This should not be confused with "wireless internet connection" (e.g., Wi-Fi, Bluetooth, or to some extent WiMAX). Exclusive use of wireless internet connections is excluded—whether within enterprise premises or within the range of an access point or hotspot outside the enterprise's premises.

From a practical point of view, portable devices can switch between mobile (telephone networks) and wireless connections (Wi-Fi, Bluetooth, and WiMax). However, the intention is to measure the adoption of "mobile internet connection" when portable devices connect to the internet via mobile telephone networks, regardless of the fact that devices can switch to/connect to wireless networks and regardless of the technology used (3G or more advanced, but also less than 3G in the absence of an adequate signal) for accessing mobile telephone networks.

Portable Devices: Portable devices that enable a mobile internet connection refer to laptops, tablet computers, or smartphones.

Other portable devices, such as smartphones, qualify as computers and have been developed to provide functionalities beyond mobile phones that previously served only one purpose: voice communication and SMS/MMS messaging. Smartphones and similar devices are equipped with customized software, enhanced bandwidth efficiency, internet access, digital cameras, portable music players, GPS functions, and much more — offering both business and entertainment options despite their relatively small size.

However, the growing demand for portable devices requiring more powerful processors, larger memory, and bigger screens has placed low-power portable devices at the centre of attention. Notebook computers and tablet computers equipped with a built-in modem or an external (USB) modem have significantly expanded the family of compact-sized mobile computing devices.

The use of mobile phones exclusively for voice/SMS/MMS communication (e.g., enterprises that require employees to be available for business calls at any time and anywhere) is not within the scope of questions

A4 and A5. Additionally, M2M (machine-to-machine) communications should not be considered within the scope of mobile internet usage.

In certain cases, a laptop can be connected to a headset (e.g., via Bluetooth, cable, etc.), and the phone can be connected to the internet via a mobile connection (through a mobile phone network). We consider the laptop to be an internet-connected device. In this case, the phone acts as a USB modem or a modem card. Furthermore, the laptop is a device used to access business software applications (or any application) via the internet, not the headset.

A5. How many employed persons use a portable device provided by the enterprise, which allows internet connection via a mobile phone network for business purposes? (e.g., via laptops or other portable devices such as smartphones).

Optional

If it is not possible to answer this question,

A5_P. Please evaluate the participation of employed persons who use portable devices (provided by the enterprise) for business purposes, and which enable internet connection via mobile network telephony?

[Scope: enterprises with internet access, i.e., A1 > 0; optional]

[Type: numerical, absolute, or percentage values]

The question refers to enterprises that provide portable devices enabling **mobile** internet access (via contract/subscription). **Portable computers that use mobile phone networks may include notebooks, laptops, tablets, etc., while other portable devices may refer to smartphones using mobile phone networks.** Mobile internet connection refers to connecting via mobile phone networks.

Technically, **high-speed mobile phone network connection** refers to internet access using wireless transmission of 3G / 3G generation (3G, 4G) mobile network technologies based on CDMA (Code-division multiple access) such as UMTS (Universal Mobile Telecommunications System – broadband W-CDMA); CDMA2000x; CDMA 2000 1xEV-DO; CDMA 2000 1xEV-DV).

3G (or 3-G) is insufficient for third-generation mobile phone technology. 3G-related services enable the transmission of both voice data (phone call) and non-voice data (such as downloading information, exchanging emails, and instant messaging). It includes high-speed mobile networks (e.g., CDMA2000 1X, WCDMA, CDMA2000 1xEV-DO, etc.)

4G is the fourth generation of cellular wireless standards (mobile telephony technology). It is the successor to the 3G and 2G families of standards. The ITU-R organization has set advanced requirements for international mobile telecommunications for 4G standards, specifying the maximum speed requirements for 4G service as 100 Mbit/s for high-mobility communication (such as trains and cars) and 1 Gbit/s for low-mobility communication such as pedestrians and stationary users).

UMTS is one of the 3G mobile phone technologies. It uses W-CDMA as its primary standard. It is standardized by 3GPP and represents the European response to the ITU IMT-2000 requirements for 3G cellular radio systems. It currently delivers data transfer speeds of up to 384 Kbit/s and up to 2 Mbit/s when fully implemented.

CDMA2000 1x is an IMT-2000 3G mobile network technology based on CDMA technology, enabling high-speed data transmission of up to 144 kbps. It is also known as 1XRTT.

CDMA2000 1xEV-DO is an IMT-2000 3G mobile network technology based on CDMA technology, enabling high-speed data transmission of up to 2.4 Mb/s.

5G is the fifth-generation technology standard for broadband cellular networks, which mobile phone companies began deploying worldwide in 2019 and is intended to be the successor to 4G. The main advantage of the new networks is their higher bandwidth, providing faster download speeds, ultimately reaching up to 10 gigabits per second (Gbit/s).

UMTS is one of the 3G mobile phone technologies. It uses W-CDMA as its primary standard. It is standardized by 3GPP and represents the European response to the ITU IMT-2000 requirements for 3G cellular radio systems. It currently provides packet-switched data transfer speeds of up to 384 Kbit/s and up to 2 Mbit/s when fully implemented.

CDMA2000 1x is an IMT-2000 3G mobile network technology based on CDMA, delivering packet-switched data transfer speeds of up to 144 kbps. It is also known as 1XRTT.

CDMA2000 1xEV-DO is an IMT-2000 3G mobile network technology based on CDMA, delivering packet-switched data transfer speeds of up to 2.4 Mbps.

The concept of 'employed persons' used in this variable is the one described in the explanation of variable X2 ("Average number of employed and self-employed persons (Employed persons)").

This variable can be collected in absolute or percentage values. Eurostat recommends using a combination of both, allowing respondents to choose whether to provide answers in absolute values or percentage values. Absolute values may be more suitable for smaller enterprises, while percentages may be more appropriate for larger ones. When the number of employees is small, it is easier for respondents to identify how many employees use a portable device provided by the enterprise that enables internet access via mobile cellular networks for business purposes, rather than calculating percentages afterward. Collecting data in percentages may introduce measurement errors due to rounding, as responses must be given in whole numbers between 1 and 100.

Additionally, percentage-based data collection can introduce other measurement errors by prompting respondents to make an educated guess, leading to bias typically associated with this type of response. On the other hand, for larger enterprises with a high number of employees, identifying each worker using a enterprise-provided portable device with mobile network connectivity for business purposes can be burdensome or even impossible, resulting in non-response. In such cases, collecting this information in percentages may be preferable.

Regardless of how this variable is collected, the variable 'number of employed persons' or X2 is needed to calculate the overall percentage of employees who use portable devices provided by the enterprise and enable internet connection via mobile phone networks for business purposes. To calculate the overall percentage, it is necessary to sum the total number of employees and the total number of employees who use a portable device provided by the enterprise that enables internet connection via mobile networks for business purposes. If the answer is given as a percentage, the corresponding absolute value should be calculated by multiplying the answer by the X2 variable in order to increase the number of employees who use a portable device provided by the enterprise and enable internet connection via mobile phone networks for business purposes.

This question refers to employees using portable devices (either inside or outside the premises) that provide internet access via mobile phone networks for business purposes, which the enterprise provides either permanently or temporarily (e.g., as needed or upon request). The question concerns individuals (not devices), so it is recommended to ask for an estimate of the number of people using the devices.

Portable devices provided as needed or upon request, such as for meetings outside office premises, business trips, participation in conferences, providing on-site maintenance and support to clients, etc., are included within the scope of the question. The scope also covers cases where employees use portable devices without internet access (although the devices allow for it).

Question A5 also applies to business owners.

Question A6: Do any employees have remote access to the following? (via computers or portable devices such as smartphones)?

[Scope: enterprises with internet access, i.e., $A1 > 0$]

[Type: single answer per item (i.e., select only one); binary (Yes/No); multiple items may apply]

Question A6 measures the technological readiness of enterprise to implement remote work by enabling its employees to access the enterprise's resources remotely.

The question does not ask about usage, but rather about access, meaning the ability to remotely connect to the enterprise's resources.

Access can be achieved through any device, whether a desktop computer or any portable device, including smartphones. There is no restriction regarding device ownership, as it covers access through both personal device (owned by the employee) and corporate device (provided by the enterprise).

a) Enterprise Email

Enterprises that provide their employees with remote access to the enterprise's email system should answer "Yes" to this option. If the enterprise's official email system is, for example, Gmail (or another system) that can be accessed from anywhere, the enterprise should select 'Yes' to question A6a).

b) Enterprise Documents (e.g., files, spreadsheets, presentations, charts, photographs)

This response option covers remote access to enterprise documents, including spreadsheets, presentations, or any other files. This item should also be marked 'Yes' if only a limited number of documents can be accessed remotely. The item does not include cases where documents (e.g., files, spreadsheets, presentations, charts, photographs) are accessed via email inboxes (saved in sent or received emails).

c) Business applications or enterprise software (e.g., access to accounting, sales, ordering, CRM)

Please exclude applications used for internal communication, such as Skype, Teams, Viva Engage (formerly Yammer).

The response option c) includes remote access to business applications of enterprise or software used by the enterprise, such as application or software related to accounting, sales, or other business software. This item should also be marked 'Yes' if remote access is only available to a limited number of business applications or software. The use of internal communication applications, such as Skype, MS Teams, Viva Engage (formerly Yammer), is excluded from the scope of response option c).

Online meetings

(Scope: enterprises that have internet access, i.e., if $A1 > 0$)

The module aims to collect information on the holding of online meetings (remote meetings) by enterprises and their guidelines related to the security of such meetings and the replacement of business travel by favouring remote meetings.

Remote work and virtual meetings, especially, are truly very relevant topics, especially in the current situation where the COVID-19 pandemic forced many enterprises worldwide to turn to remote work and/or virtual meetings in order to maintain their business operations while adhering to the restrictions and social distancing measures imposed by national governments.

These indicators are also relevant in the context of using digital technologies to build a smarter and more sustainable economy, especially in the post-COVID-19 crisis period.

A7. Does your enterprise hold online meetings (via, e.g., Skype, Zoom, MS Teams, WebEx, etc.)?

(Scope: enterprises that have internet access, i.e., if A1 > 0)

[Type: single answer (e.g., select only one); binary (Yes / No); filter question]

Question **A7** is a filter question aimed at measuring whether enterprises hold remote (online) meetings via the internet using tools such as Zoom, Skype, MS Teams, or others.

A remote meeting can be internal (between people within the enterprise, whether they are in the office or working remotely) or external (with individuals outside the enterprise, e.g., business partners).

Remote meetings can be held via video, audio only, or both video and audio. This includes remote meetings held through dedicated applications or web browsers. Video meetings can be held on any device, whether a desktop or any portable device, including smartphones.

2.1.2. Module B: E-commerce

This module covers sales through e-commerce (received orders) conducted via websites or applications, or as EDI-type sales. Since 2011, the measurement of e-commerce sales has been divided into web sales and EDI-type sales, which are separate sub-modules and include mandatory reporting variables.

One important difference in this module compared to most other variables in the questionnaire is that the reference period is the previous calendar year instead of the current situation. Economic flow variables such as turnover and purchases—the main variables for measuring e-commerce—should be measured over a longer period rather than at a single point in time. To maintain comparability with key business statistics, the calendar year is taken as the reference period.

Definition of E-Commerce

To ensure international comparability of statistics on ICT usage in enterprises, the OECD definition of e-commerce is used throughout this module (from the “Updating the OECD Statistical Definition of Electronic Commerce” (DSTI/ICCP/IIS(2009)5/FINAL)):

E-commerce refers to the sale or purchase of goods or services conducted over computer networks using methods specifically designed for receiving or placing orders. Payment and delivery of goods or services do not have to be conducted online. E-commerce transactions exclude orders made via manually typed email messages.

E-commerce refers to the sale or purchase of goods or services conducted over computer networks using methods specifically designed for receiving or placing orders. Payment and delivery of goods or services do not have to be conducted online. An e-commerce transaction can take place between enterprises, households, individuals, and other public or private organizations.	Includes: Orders made via websites, extranets, or EDI sales. Excludes: Orders placed by phone, fax, or manually typed email messages.
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Measurement Framework	
Type	Definition of E-Commerce Type
Web E-Commerce	Orders placed through an online store (webshop) or via web forms on the internet or extranet, regardless of the access method (computer, laptop, mobile phone).
EDI e-commerce	EDI-Type Orders. EDI (Electronic Data Interchange) is a business tool for exchanging various types of business messages. EDI is used to send or receive business information in a predefined format that allows for automatic data processing without the need for manual message entry. "EDI commerce" is limited to messages for order creation.

Defining E-Commerce in the Questionnaire

Respondents are provided with the main definition of e-commerce in the questionnaire.

In e-commerce sales of goods or services, orders are placed through websites, applications, or EDI-type messages using methods specifically designed for receiving orders.

Payment can be made online or offline.

*E-commerce **does not include** orders placed via email.*

Defining Web Sales in the Questionnaire

At the beginning of the module on web sales, the concept of web sales is explained to the respondents.

An online store (webshop) is the most obvious and clear example of web-based e-commerce. It is a separate website on the web or a distinct section of a webpage where products are displayed and typically ordered using a shopping cart.

Web forms are simple forms integrated into enterprise's website where products and services can be ordered. You can enter an order or click to create an order by clicking the "submit" button.

Extranet is a closed environment for agreed partners or customers where various information can be exchanged between these parties. If a sale is made in the extranet, it is considered as a web sale. In the extranet, the actual purchase can be made either through the webshop or through the web forms explained above.

Reservations and binding/fulfilled reservations are treated similarly to orders; for certain economic sectors (e.g., NACE Rev.2, sector 55 Accommodation), these terms are most commonly used to describe 'orders'. The questions in this module relate to sales (and achieved turnover), and are limited to executed sales, orders, and reservations. Reservations and orders that are not fulfilled are outside the scope of this module.

Sales through **mobile device or computer applications** are also considered web sales. 'App' is short for 'web application'. There are two types: browser-based web applications and client-side web applications. The first are web applications available through a website (HTML and JavaScript) and run within a web browser. The second are installed on the device (e.g., smartphone), run without a browser, but use web protocols.

In addition to sales through the enterprise's own websites or applications, sales through external **websites or applications for e-commerce marketplaces** are also counted as the enterprise's web sales. E-commerce marketplaces are external websites or applications used by multiple companies to sell their products or services to customers.

Defining EDI-type sales in the questionnaire

At the beginning of the web sales module, the concept of web sales is explained to the respondents.

EDI can be defined as the transfer of structured data, according to agreed message standards, from one computer system to another without human intervention. EDI provides the technical basis for automatic commercial "conversations" between two entities, whether internal or external. The term EDI encompasses the entire process of electronic data exchange, including transfer, message flow, document format, and the software used to interpret the documents.

Demand-driven orders/commands refer to situations where, for example, a certain minimum stock level is set in the buyer's enterprise's system, and when the inventory falls below the specified minimum level, the system sends an EDI message to the selling enterprise to deliver more goods.

This is an example of an advanced, yet in certain activities common method of business automation through automated integration between the systems of two trading partners.

Questions about web sales

Web sales of goods or services

Web sales cover orders, reservations, and bookings placed by your customers via:

- Your enterprise's **website or application**:
 - Online store (webshop)
 - Web forms
 - Extranet (webshop or web forms)
 - Reservation/booking service applications
 - Mobile device or computer applications
- **E-commerce marketplace websites or applications** (used by multiple enterprises to sell goods or services).
Orders placed via email are not considered web sales.

B1. Did your enterprise achieve web sales of products/services during 2023?

(Scope: enterprises with internet access, i.e., if $A1 > 0$)

[Type: single answer per item (e.g., select only one); binary (Yes / No); multiple items may be expected]

- a) Your enterprise's website or mobile applications? (including extranet)
- b) E-commerce websites or applications used by multiple enterprises in a marketplace for trading products? (used by several enterprises to trade goods or services). (e.g., e-brokers, Booking, hotel.com, eBay, Amazon, Amazon Business, Alibaba, Rakuten, TimoCom, etc.)

Methodological explanations on e-commerce marketplaces: The following working definition is proposed: the term "e-commerce marketplace" refers to websites or applications used by multiple enterprises to trade products (e.g., Booking, hotels.com, eBay, Amazon, Amazon Business, Alibaba, Rakuten, etc.). *Amazon Business* is a marketplace on Amazon.com that relates to B2B commercial transactions.

TimoCom has been added to the list of examples of e-commerce marketplaces in questions B1 and B3. TimoCom operates the largest transport platform in Europe, covering 44 European countries. The services on the platform include: transport orders (for digitally searching and managing transport orders), freight exchange (to avoid empty routes), vehicle offers, fixed contracts (a platform for transport tenders), and warehouse exchange.

Amadeus is not an example of an e-commerce marketplace. It is a platform that connects travel service providers and sellers worldwide, offering search, pricing, booking, ticketing, transactions, and service capabilities. It primarily provides services designed for enterprises within the tourism sector, developing technology that enables travel agents and websites to book airline, rail, ferry, and cruise tickets, hotel rooms, car rentals, travel packages, and more. Travel agencies can build their own

services on Amadeus, such as their own platforms. Amadeus is not a marketplace but an infrastructure.

Please note that e-commerce **marketplaces** are considered different from **e-commerce platforms** such as Shopify, WooCommerce, Magento, BigCommerce, etc., which provide scalable, standalone online solutions for enterprises looking to establish their own web and e-commerce presence.

The following should **not** be **considered e-commerce marketplaces**:

- a) Enterprise's website or application that sells its own products.
- b) A website or application of a single seller acting as a distributor, selling specific products of other enterprises;
- c) A website that offers e-commerce solutions for other enterprises to install for their own e-commerce functionality ;
- d) a website focused on non-commercial activities such as collaborative design.

B2. What percentage of total turnover was generated from web sales of goods or services in 2023?

[Scope: Enterprises that had online sales of goods or services, i.e., B1a = Yes or B1b = Yes]

[Type: Percentage values]

For turnover, the SBS definition should be used. See variable X3 in the questionnaire.

Collecting electronic orders in percentage values has the advantage of allowing us to obtain an estimate from respondents who may not have records in the enterprise that can provide this value. Therefore, if specific records of all these transactions are not kept in a centralized form, it may be difficult for the enterprise to provide the value of orders received through the website or application. Another way to address this issue is to allow enterprises to estimate online turnover in monetary terms, indicating that "an estimate would be sufficient."

For enterprises with a very small share of e-commerce in turnover, there is evidence that respondents significantly round around 1%. Therefore, when collected as a percentage in this way, a relatively large portion of the values collected is 1%. Another challenge with this method is that for large enterprises, a value smaller than 1% can still represent a significant monetary amount. When responses from large enterprises are included, this can lead to significant instability in the results.

Additionally, higher percentage shares are often reported, rounded to multiples of 10% or 5%.

For these reasons, the response should be provided in decimals.

Due to challenges in collecting data in percentages, the preferred method for collecting the value of sales through a website or application is in absolute values. Unfortunately, for many enterprises, this value is not available. For this reason, the currently recommended approach is to request precise absolute values from enterprises if they have the information. Alternatively, if such information is not available, they should be asked for an estimate, either in monetary terms or as a percentage of total turnover.

Please respond with a) or b).	
a) What was the value of your web sales of goods or services in 2023?	(National currency, excluding VAT) _____
Or b) What percentage of the total turnover was generated through web sales of goods or services in 2023? (If you cannot provide an exact percentage, an approximate value is sufficient.)	□ □ □ , □ %

Currently, some countries request absolute values, while others request percentage values. The current formulation aims to provide an alternative to avoid potential bias that could arise from using only one of the two methods—namely, underestimation in the case of absolute values and overestimation in the case of percentage values. **It might be desirable to allow enterprises to use the option for which they can provide more precise responses.**

B3. What is the percentage of the value of web sales in 2023 for the following?

[Scope: Enterprises that had web sales of goods or services via their own websites or applications or via e-commerce marketplaces, i.e., B1a = Yes and B1b = Yes]

[Type: Numeric, percentage values]

a) Through your enterprise's website or mobile application (including extranet).

b) Through an e-commerce website or application used by multiple enterprises for trading products (e.g., e-bookers, Booking.com, Hotels.com, eBay, Amazon, Amazon Business, Alibaba, Rakuten, TimoCom, etc.).

The sum of response options a) and b) must always equal 100%.

B4. What percentage of the value of web sales in 2023 was generated by the type of transaction? (Please refer to the value of web sales you reported in B2.)

If you cannot provide exact percentages, an estimate will be sufficient.

a) Sales to end consumers (**B2C**)

b) Sales to other enterprises (**B2B**) and sales to the public sector (**B2G**)

Total: 100%

[Scope: Enterprises that had online sales of goods or services, i.e., B1a = Yes or B1b = Yes]

[Type: Numeric, percentage values]

a) **B2C (Sales to end consumers)**

The term B2C refers to business relationships with consumers and relates to e-commerce transactions between enterprises and individuals as end consumers. E-commerce between users and consumers

usually takes the form of websites offering individuals the ability to place orders for products.

b) Sales to other enterprises (B2B) and sales to the public sector (B2G)

The term B2B refers to business operations and relates to e-commerce transactions between enterprises (different from transactions between enterprises and other groups, such as consumers (individuals) or the government). B2B refers to commercial transactions between businesses that provide responses and other enterprises (e.g., manufacturers and wholesalers, wholesalers and retailers). Business e-commerce typically occurs in the form of processes between trading partners and is carried out in larger quantities than applications between users and consumers (e.g., using e-marketplaces or websites of respondents with login/password procedures). B2B e-marketplaces connect buyers and sellers through a hub where online transactions can be made. Distinguishing e-commerce between B2B and B2C is important because B2B transactions offer advantages for enterprises, such as reducing product cycle times, lowering inventory levels, and increasing trade volume.

B2G refers to business operations with public/government enterprises or institutions and includes e-commerce transactions between the responsible enterprise and public authorities, conducted through websites or applications.

B5. Did your enterprise make web sales to customers located in the following geographic areas during 2023?

[Scope: Enterprises that received orders placed through their website or application, i.e., B1 = Yes; optional]

[Type: Single answer per item (e.g., select only one); binary (Yes / No); multiple items may be expected]

a) BIH

b) European Union countries

c) Other countries

In this question, an enterprise that had online sales (via the enterprise's website or applications and/or e-commerce marketplace website or applications used by multiple enterprises for trading goods or services) during 2023, is asked about the location of its customers. Three response options are provided:

- a) Bosnia and Herzegovina: The customer is located in the same country as the enterprise;
- b) European Union countries: The customer is located in one of the EU countries;
- c) Rest of the world: The customer is located outside the EU27 member states.

Respondents will mark all applicable options.

EDI Sales Type

The EDI sales type refers to sales **through** Electronic Data Interchange (EDI). This type of sale

involves:

- Being in an **agreed or standard format** suitable for automated processing
- An EDI order message created by the buyer's **business system**
- Orders placed through an EDI service provider
- Automatically generated **demand-driven orders**
- Orders received directly into your **ERP** systems

EDI examples: EDIFACT, XML / EDI (e.g., UBL, Rosettanet, *[add national examples]*)

B7. Has your enterprise engaged in EDI-type sales of goods and services during 2023?

(Scope: enterprises with internet access, i.e., if A1 > 0)

[Type: single answer (e.g., select only one); binary (Yes / No); filter question]

B8. What was the value of your EDI-type sales?

[Scope: enterprises that had EDI-type goods or services, i.e., B8 = Yes]

[Type: numerical, absolute or percentage values]

Please answer either a) or b):

- a) What was the value of your goods or services sales via EDI in 2023?** (in BAM, excluding VAT)
- b) What percentage of total turnover was generated through EDI-type goods or services sales in 2023?**

For turnover, the SBS definition should be used. Please refer to variable X3 in this document.

Please refer to the definitions at the beginning of this chapter and the guidelines for some possible interpretation of the issues presented below.

Guidelines for some specific cases of potential interpretation issues regarding e-commerce, websites, or EDI-type.

- 1) The following example aims to clarify the difference between EDI-type and web sales in a situation where both technologies are involved.

Case / Situation:

The enterprise has a website with sales capabilities. The customer selects a product, and the transaction is completed by pressing the "Submit" button. The website generates an EDI-type message, which is sent to the sales department to electronically prepare transport documents and goods; to the accounting department for the preparation of an electronic invoice; and to the shipping department to prepare the shipment planning. The same case can be replicated if the customer does not use the enterprise's website but rather an online store website that generates the same EDI messages.

Classification / Explanation:

According to the definition of e-commerce², this is referred to as **web sales** because the order was placed via the enterprise's website (or a third-party website selling on behalf of the enterprise – online store), even if the enterprise received it as an EDI-type message. The reporting enterprise should avoid double recording of sale.

2) Online sale of loans via applications, e.g., on mobile phones

In the example below, we will attempt to clarify the issue of e-commerce in relation to applications when the responding enterprise sells loan online. Specifically, this issue concerns enterprises that sell loans via the internet to users who have the enterprise's application on their mobile phone, tablet, or other device.

There are three different cases:

- a) **Reporting of enterprises in specific economic activities related to the sale of loans for purchasing products from third-party enterprises:** For reporting enterprises whose main economic activity is the sale of loans, the fact that they sell loans over the internet should be considered e-commerce. This should be regarded as a commercial transaction, similar to the sale of vouchers (with or without a specified product), and initially recorded as a liability to other enterprises (e.g., retailers, wholesalers, service providers). The "service fee" should be recorded as revenue when the end client ultimately uses the loan/voucher and orders products. There may be a "timing issue" for tax purposes regarding the registration of the "service fee" before the final client utilizes the loan/voucher.
- b) **For enterprises selling credit/vouchers not tied to any of their specific products (e.g., gift cards with a predetermined amount):**

From an accounting perspective, selling loans online is not considered e-commerce (as no specific product is determined); it should be registered as an advance payment rather than revenue. It should be registered as a commercial transaction and revenue only when the customer orders specific products via the internet (e-commerce) or through other means (brick-and-mortar business).

- c) **For reporting enterprises selling loans/vouchers implicitly linked to specific products (e.g., group cinema tickets, etc.):** In principle, this should be treated the same as the cases above. However, in some countries, according to national tax laws, it may be recorded as a commercial transaction and revenue since a specific product and its corresponding price are stated on the loan/voucher.

In the context of research, however, the most important issue is avoiding double recording (in the sale of loans and receiving orders) and allowing enterprises to respond as accurately as possible depending on how e-commerce is implemented in their accounting system.

3) Explanation of sales via extranet: Web sales or EDI sales

Enterprises (respondents) may receive orders placed via an extranet, which usually involve

² Specifically, the type of e-commerce transaction is defined by the method of order placement. This approach aims to mitigate interpretation issues where both types, EDI and Web, are used in the process. An example is a situation where a customer places an order via a web application, but the information is transmitted to the seller as an EDI-type message. However, the type of sales application remains web-based, while EDI is merely a business application for information transfer (DSTI / ICCP / IIS (2009) 5 / FINAL).

transactions between enterprises. It may not always be clear to the respondents whether orders received via the extranet should be considered internet sales or EDI-type sales. If unclear, the level of automation for order placement should be considered, and the respondent may seek clarification. In fact, respondents should know how their customers place orders other than via EDI-type messages.

The OECD definition of e-commerce is based on the **way an order is placed**. If the order is placed through forms/web forms on the extranet, it is clearly web sales, regardless of whether an EDI-type message exchange follows, as explained in case 1) above. The issue to clarify with the enterprise (respondent) should specifically concern the operations of their partner when entering the order.

4) Framework Agreements

Goods or services agreed to be sold under a framework agreement, but later ordered via web or EDI orders, are also included in e-commerce sales. This means a situation where enterprises reach an agreement on a set number/quantity/scope/limit of products – not necessarily online – for an agreed time frame, but the products are electronically ordered later when needed. In this case, the initial sale (framework agreement) should not be considered as e-commerce, but rather the order of products (and only the revenue generated from orders for that reference year).

The next seven cases are grouped together. Some of them raise specific issues related to the application of the e-commerce definition.

Examples of what constitutes e-commerce:

The first case is a typical example of an enterprise that has web sales.

Case 1) A website or e-commerce application may offer the option to fill out a web form (online), thus the order is placed via the website or application.

The second case) Refers to the use of "methods specifically designed to receive orders" via a website, and if the selling enterprise (responsible enterprise) takes the order on its own initiative.

Case 2) An e-commerce website may offer the option to fill out a web form (online), so the order is placed on the website, and the responding enterprise enters the website and retrieves the order online in any format.

Examples of what is NOT e-commerce:

The following cases are not considered e-commerce, as the web form or PDF order form is used as a Word document, text document, or email. The website does not provide means for creating an order; instead, the order is placed differently (via email, another electronic message through the website, or by post). In these cases, orders are not necessarily made on the website and may be done by printing the PDF document, which is then entered into the computer system. These cases are not considered e-commerce because there is human intervention in the process and a "pause" in automation.

Case 3) An e-commerce website may offer the option to **fill out a web form (online)**. The form is a "printed" PDF and is sent by the customer to the responsible enterprise as an **attachment** via email.

Case 4) An e-commerce website may offer the option to **fill out a web form (online)**. The form is a "printed" PDF and is sent by the client to the responsible enterprise **via post**.

Case 5) An e-commerce website or application may offer the option to fill out a **PDF** order form (not

necessarily online). The form is "saved" in PDF format, which the customer sends to the responsible enterprise as an **attachment via email**.

Case 6) An e-commerce website may offer the option to fill out a PDF form (not necessarily online). The form is "saved" in PDF format, which is sent by the client to the responsible enterprise via the same **website as an attachment to a message**.

Case 7) An e-commerce website may offer the option to fill out a **PDF** form (not necessarily online). The form is "saved" in PDF format, which is sent by the customer to the responsible enterprise **via post**.

B9. Has your enterprise used Big Data Analytics during 2023?

(Scope: enterprises with internet access, i.e., if A1 > 0)

[Type: Single answer (e.g., select only one); binary (Yes / No); filter question]

Big Data analysis is an analysis that uses advanced analytical techniques such as data mining and statistical analysis on extensive datasets.

2.1.3. Module C: ICT Experts and Skills

C1. Does your enterprise employ ICT experts?

ICT employees for whom ICT is the main job. For example, development, operations, or maintenance of ICT systems or applications.

(Scope: all enterprises)

[Type: Single answer (e.g., select only one); binary (Yes / No)]

The purpose of this question is to determine whether enterprises employ ICT experts, thus indirectly indicating the growth of ICT specialist skills. The skills of ICT experts refer to those required for the development, operation, and maintenance of ICT systems or applications.

In addition, ICT experts possess relevant skills for defining, designing, installing, supporting, managing, evaluating, or conducting research activities.

Use of the term ICT experts: Generally speaking, "experts" are considered professionals in the field of ICT, such as database specialists, ICT support specialists, etc. It has been confirmed that from the user's perspective, a broader scope should be covered. Therefore, keep in mind that in the context of the research, the explanation that "ICT is their main job" is important. The working group has recommended using the term "ICT experts," which should include the following codes and groups from ISCO 08 (occupations):

133 ICT Service Managers
2152 Electronic Engineers
2153 Telecommunications Engineers
2166 Graphic and Multimedia Designers
2356 Information Technology Trainers
2434 ICT Sales Specialists
25 ICT Professionals
251 Software and Applications Programmers and Analysts
252 Database and Network Specialists
35 ICT Technicians
351 ICT Operations and User Support Technicians
352 Telecommunications and Broadcasting Technicians
7422 ICT Installers and Repairers

(<http://www.ilo.org/public/english/bureau/stat/isco/isco08/index.htm>).

Questions on ICT specialists and skills (C1, C2, C3, C4, and C6) refer to persons employed by the enterprise providing the response, excluding those who provide their services as ICT specialists to the responding enterprise on behalf of another enterprise and/or are employed by another enterprise or are self-employed (outsourcing).

C2. Has your enterprise provided any type of training to employees for the development of ICT skills during 2023?

(Scope: all enterprises)

[Type: Single answer per item (e.g., select only one); binary (Yes / No); multiple items can be expected]

a) Training for ICT experts

Mark "No" if the answer to question C1 is "No."

b) Training for other employees

The purpose of this question is to identify enterprises that provide professional ICT training to their employees either internally or using external trainers. The training for option **a)** specifically refers to the ICT skills of ICT experts (if the enterprise did not employ ICT experts during 2023, respondents should select 'No'). Option **b)** refers to ICT professional development aimed at developing or enhancing ICT-related skills for other employees, other than ICT experts (skills for using specific job-related applications, including specialized software tools or generic software tools).

ICT skills refer to skills related to tasks such as: managing online marketing or e-commerce; managing a enterprise's social media profile; programming languages; design or management of websites or applications; managing databases or data analysis; maintaining computer networks, servers, etc.; IT security or privacy management; using or designing specific software applications; managing telecommunications systems and networks, etc. The above list of ICT skills includes only some prominent examples and is not exhaustive; other ICT-related skills may also be included depending on the functions and needs of the enterprise.

C3. Has your enterprise hired or attempted to hire ICT specialists during 2023?

(Scope: all enterprises)

[Type: single answer (e.g., select only one); binary (Yes / No); filter question]

The purpose of this and the following question is to identify the shortage of ICT³ specialists in the labor market, in cases where the enterprise has hired or attempted to hire staff for jobs that require specific ICT skills. If the answer to question C3 is "No," respondents should proceed to question C6.

C4. Did your enterprise have job vacancies for ICT specialists in 2023 that were difficult to fill?

[Scope: Enterprises that employed or tried to employ ICT specialists in 2023, i.e., C3 = Yes]

[Type: Single answer (e.g., select only one); binary (Yes / No)]

The purpose of this question is to identify the shortage of ICT specialists in the labour market when the answer to question C3 is "Yes." Question C4 **refers only to difficulties caused by external factors**, such as a general lack of candidates or a lack of candidates with skills or experience relevant

³ Mismatch between the competencies of job seekers and those required or expected by employers. Shortages indicate an insufficient number of qualified individuals in the labour market due to a lack of job seekers, excessively low pay rates for them, and low unemployment rates.

to the job position. The question does not refer to situations where the job vacancy could not be filled due to internal organizational difficulties during the hiring process.

C6. Who performed ICT functions in your enterprise during 2023? (e.g., maintenance of ICT infrastructure; support for office software; development or support of business management software/systems and/or web solutions; security and data protection)?

[Scope: All enterprises]

[Type: Single answer per item (e.g., select only one); binary (Yes / No); multiple items may apply]

- a) Employees in your enterprise (including employees in parent or affiliated enterprises)**
- b) External providers (external collaborators)**

The purpose of this question is to collect information on who performed ICT functions in the enterprise.

Please note that "external provider" refers to any other enterprise that carried out ICT functions within the scope of this question. Partners and parent enterprises are not considered external providers.

According to definitions from an international survey source, there are four types of sources based on 'location' and 'control.' Accordingly, outsourcing (i.e. external providers) refers to the provision of ICT services by unrelated enterprises; otherwise, it is considered indirect sourcing (i.e. through own personnel).

ICT functions refer to:

- ICT infrastructure maintenance functions should include software components necessary for hardware operation (e.g., operating system software, drivers for peripheral devices, network software, etc.), as well as updating and upgrading system-related software. Maintenance functions should also include repairing broken equipment and expanding existing infrastructure in terms of hardware, followed by the necessary software.
- Providing support for office software – software intended for creating documents, presentations, spreadsheets, charts, etc. Support in the context of office automation software may include, for example, installing office software, training on efficient software usage, and granting user access to databases.
- Development of business management software/systems (e.g., ERP – Enterprise Resource Planning, used for resource management through information exchange between various functional areas such as accounting, planning, production, marketing, CRM software applications for managing customer information, etc.). Development should include providing customized enterprise solutions, as well as adapting purchased, packaged, off-the-shelf software (e.g., SAP) or cloud-based software services. In addition, within the scope of development, all types of software solution maintenance should be taken into consideration (corrective, adaptive, perfective, and preventive) due to business evolution – e.g. error correction, updating and expanding software functionality, and system adaptation and adjustment. The development/purchase of customized (ad hoc solution) „business management software/system" is also included under "developed by an external provider."
- Support for business management software/systems (e.g., ERP, CRM, HR, databases). Support should relate to providing advice for problem-solving, improving the efficiency of using the solutions, training, etc.
- Development of web solutions (e.g., development of your enterprise's website, applications, e-commerce solutions, etc.). Ad hoc programming or the integration of social media links on the

enterprise's **website** should be considered as development, expanding the existing functionalities of the website.

-

There are two types of **web applications**: browser-based and client web applications. The former are web applications accessible via a website (html and Java scripts) and run within a web browser. The latter are installed on a device (e.g. smartphone), run without using a browser, but operate using web protocols. Having such applications allows, for example, database management, scaling, and automation of business growth for sales, marketing, and operations (business automation), etc. By using such applications, a customer can, for instance, place an order or purchase credit (e-commerce).

- Web application development is a process that may include: defining user goals and scope, selecting technology, developing technical architecture and structure, analysing and selecting third-party vendors (e.g., SSL certificates, payment gateways), designing appearance and interface, quality, security, and usability testing.
- Support for web solutions (e.g. support for the enterprise's own websites, applications, e-commerce solutions, etc.), excluding the enterprise's general website. Support for "web solutions" includes assistance with updating, for example, product lists, prices, and other enterprise information, but does not include the expansion of web solution functionalities. Providing support in the context of the e-commerce market may be considered in cases of training, providing instructions and guidance, etc. Web hosting services (e.g., providing servers, computers, computer space, and software tools) or providing infrastructure as a platform for e-commerce are not considered as support for web solutions on their own merits.
- ICT security and data protection (e.g., security testing, security training, resolving ICT security incidents, etc.), excluding upgrades of previously packaged software.

In cases where no one performs the mentioned functions, the enterprise should select "No" for both questions. A "Yes" answer to both questions is possible if ICT functions are performed by both internal employees and external collaborators.

2.1.4. Module D: ICT Security

(Scope): Enterprises that have access to the internet, i.e., if A1 > 0

ICT security refers to the measures, controls, and procedures applied to the enterprise's ICT systems to ensure the integrity, authenticity, availability, and confidentiality of the enterprise's data and systems.

Security risks, applied measures, and experienced incidents can be classified according to the following conceptual approaches:

- CIA Security Model based on:
 - **Confidentiality** (restricting access, limiting access to information to prevent disclosure to unauthorized persons or systems).
 - **Integrity** (ensuring the accuracy and consistency of systems and data). Integrity is a prerequisite for ensuring confidentiality. Without it, encryption is useless.

- **Availability** (ensuring that computer systems, security controls, and communication channels function properly) and newly added non-repudiation or authenticity⁴.
- "3 A" Basic Security Tools: authentication, authorization, auditing.
- Maturity Scale: enterprises that are aware of security risks; enterprises that have implemented certain security measures; enterprises that ensure regular maintenance and updating of security policies and measures.

D1: Does your enterprise apply any of the following ICT security measures to its ICT systems?

(Coverage: enterprises with internet access, i.e., if A1 > 0)

[Type: single answer per item (e.g., mark only one); binary (Yes / No); multiple items can be expected]

The purpose of this question is to determine which security measures enterprises apply to their own ICT systems to ensure the integrity, authenticity, availability, and confidentiality of data and information systems.

The response options reflect security measures related to information systems: identification, authorization, and authentication.

Identification is the ability to uniquely identify a system or application user within the system. It is the process of linking a user to an event that has occurred on a server, network, or another resource. This information is almost always recorded. Typically, it involves a username, or some type of highly unique identifier assigned to that specific function.

Authentication is the process of determining whether a client is truly who they claim to be. It can be performed using passwords (knowledge-based authentication) or through additional devices such as smart cards, hardware tokens, or ID cards (ownership-based authentication). The final option is characteristic-based authentication, which relies on biometric authentication methods such as fingerprint scanners or retinal pattern recognition. Strong authentication is defined as using at least a combination of two authentication methods, such as a password and a smart card. Authentication methods can be classified into: a) Static passwords – these do not change unless they expire or the user changes them. b) One-time passwords (OTP) – such as personal identification numbers (PINs) delivered via SMS or other means c) Digital certificates – e.g., x.509 certificates and similar d) Biometric credentials.

Authorization is the process that determines what an authenticated client is allowed or not allowed to do within a network. In general, user identification and authentication are used in the context of authorization.

a) Authentication through a strong password (e.g., minimum length, use of numbers and special characters, periodic changes, etc.)

A strong password may have one or more requirements, such as a specified minimum length, inclusion of a mix of uppercase and lowercase alphanumeric characters and special symbols, enforcing users to periodically change their passwords, and ensuring that passwords are transmitted and stored in encrypted form. The described conditions follow the ISO standard 9594-1.

⁴https://en.wikipedia.org/wiki/Information_security

Note: This provision applies to the use of strong password authentication for accessing any ICT system or enterprise software, including remote access (e.g., the enterprise network, business software, or any other relevant application).

b) Authentication through biometric methods used for access to the enterprise ICT system (e.g., fingerprint, voice, or facial recognition authentication).

Authentication using biometric methods involves the use of physical or behavioural characteristics of an individual to verify their identity. Biometric authentication can be based on fingerprint recognition, iris scanning, retina scanning, voice recognition, facial recognition, or other physical characteristics. One or more characteristics may be used, depending on the infrastructure and the desired level of security. In biometric authentication, the physical characteristic being examined is typically mapped to a username. This username is then used to make access decisions once the individual has been verified. In some cases, the user is required to enter their username when attempting to authenticate; in other cases, a search is performed based on the biometric sample to determine the associated username.

Biometric authentication is performed by comparing the physical characteristic presented by the individual for authentication with the stored copy. For example, a person would place their finger on a fingerprint scanner to compare it with the stored sample. If the fingerprint matches the stored sample, the authentication is considered successful.⁵

Note: Users refer to users of IT systems. The use of biometric methods for purposes unrelated to ICT systems and hardware protection (e.g., access to business premises not connected to IT) is not within the scope. The scope includes the use of biometric authentication for access to the enterprise ICT system or software, including remote access (e.g., enterprise network, business software, or any other application).

c) Authentication based on a combination of at least two authentication mechanisms (i.e., a combination of, for example, a user-defined password, a one-time password (OTP), a code generated by a security token or received via a smartphone, biometric methods (e.g., fingerprint, voice, facial recognition)).

This option covers authentication methods where identification is defined by the combination of at least two authentication methods.

Note: This applies to the use of authentication based on a combination of at least two authentication mechanisms for access to any ICT system or enterprise software, including remote access (e.g., network, business software, or any other application).

d) Data, document, or email encryption

Encryption is the process of encoding messages or information in such a way that only authorized individuals can access them. Encryption alone does not prevent interference, but it denies the content of the message to an interceptor. In an encryption scheme, the intended information or message, known as plaintext, is encrypted using an encryption algorithm, generating ciphertext that can only be read after decryption. The authorized recipient can easily decrypt the message using the key provided by the sender to the recipients, but not to unauthorized interceptors. The purpose of encryption is to ensure that only those authorized to access the data (e.g., a text message or file) can

⁵[Biometric authentication - overview | ScienceDirect Topics](#)

read it, using a decryption key. Anyone who is not authorized can be excluded, as they do not possess the necessary key, without which it is impossible to read the encrypted information.

e) Creating backup copies of data at an off-site location (including cloud backups)

Off-site data backup is part of a data protection strategy that involves sending critical data from the primary location to another location using portable storage media, such as magnetic media, external hard drives, or electronically through remote backup services. Off-site data protection is typically part of a contingency plan that outlines disaster recovery actions in the event of security incidents. It includes data backups in the cloud (for enterprises that purchase cloud computing services).

f) Network Access Control (management of user rights within the enterprise network)

Network access control within the enterprise enables access and enforces security policies based on the status of the computer and the identity of the user. Network Access Control (NAC), also known as network admission control, is a method of enhancing the security of a proprietary network by limiting access to network resources to endpoint devices that comply with the defined security policy.⁶ For example, if the connecting system does not have the standard corporate antivirus package installed, the user should be assigned a different access control policy than if all required software is installed and all signatures are up to date.⁷

Note: Users refers to users of the IT system.

g) VPN (Virtual Private Network extends a private network across a public network to enable secure data exchange over the public network)

A Virtual Private Network (VPN) extends a private network across a public network, such as the internet. It allows users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network. Applications operating over a VPN can thus benefit from the functionality, security, and management of the private network. VPNs can provide employees with secure access to the corporate intranet while working remotely. They are also used to securely connect geographically dispersed offices of an organisation, creating a single cohesive network.

h) ICT security monitoring system that enables the detection of suspicious activities in ICT systems and alerts the enterprise, excluding standalone antivirus software

This response option covers the use of advanced ICT methods for intrusion detection, such as next-generation intrusion prevention systems (NGIPS), next-generation firewalls (NGFW), or intrusion detection systems (IDS). An example of a **next-generation intrusion prevention system (NGIPS)** is the NSFOCUS Next-Generation Intrusion Prevention System, which provides advanced multi-level artificial intelligence (AI) analysis for detecting and mitigating future, unknown, and advanced persistent threats (APTs), from day zero. NSFOCUS goes beyond signature- and behaviour-based detection, using cutting-edge Intelligent Detection advanced heuristic learning technology to identify network and application threats. NGIPS also combines artificial intelligence (AI) with cutting-edge threat

⁶[https://www.cybertraining365.com/cybertraining/Topics/Network_access_control_\(NAC\)](https://www.cybertraining365.com/cybertraining/Topics/Network_access_control_(NAC))

⁷<https://www.networkworld.com/article/2310210/lan-wan/what-is-nac-anyway-.html>

intelligence to detect malicious websites and botnets. The optional virtual sandboxing feature can be added to the NGIPS system using the NSFOCUS threat analysis system. TAS employs multiple innovative detection mechanisms to identify known and zero-day APTs, including IP reputation mechanisms, antivirus mechanisms, static and dynamic analysis, and virtual sandbox execution that simulates live hardware environments.⁸

A **Next-Generation Firewall (NGFW)** is part of the third generation of firewall technology, combining traditional firewall with other network device filtering functions, such as application firewalls using in-line deep packet inspection (DPI), intrusion prevention systems (IPS). Other techniques, such as TLS/SSL encrypted traffic inspection, website filtering, QoS/bandwidth management, antivirus inspection, and third-party identity management integration (e.g., LDAP, RADIUS, Active Directory) can also be used. NGFWs include typical functions of traditional firewalls such as packet filtering, network and port address translation (NAT), stateful inspection, and virtual private network (VPN) support. The goal of a next-generation firewall is to incorporate multiple layers of the OSI model, improving the filtering of network traffic based on packet content.

NGFWs perform deeper inspection compared to the inspection conducted by first- and second-generation firewalls. NGFWs carry out more detailed inspection, checking packet content and verifying signatures for malicious activities such as attacks and malware.

An Intrusion Detection System (IDS); also Intrusion Prevention System or IPS) is a device or software application that monitors networks or systems for malicious activities or policy violations. Any intrusion activity or violation is typically reported either to an administrator or collected centrally using a Security Information and Event Management (SIEM) system. The SIEM system combines outputs from multiple sources and uses alarm filtering techniques to distinguish malicious activities from false alarms.

IDS types range from individual computers to large networks. The most common classifications are Network Intrusion Detection Systems (NIDS) and Host-based Intrusion Detection Systems (HIDS). A system that monitors critical operating system files is an example of a HIDS, while a system that analyzes incoming network traffic is an example of a NIDS. IDS can also be classified based on the detection approach. The most well-known variants are signature-based detection (recognizing malicious patterns, such as malware) and anomaly-based detection (detecting deviations from a "good" traffic model, often relying on machine learning). Another common variant is reputation-based detection (identifying potential threats based on reputation scores). Some IDS products have the ability to respond to detected intrusions. Systems with response capabilities are typically called Intrusion Prevention Systems (IPS). Intrusion Detection Systems can also serve specific purposes by complementing them with custom tools, such as using honeypots to attract and characterize malicious traffic.⁹

i) Maintenance of log files enabling analysis after ICT security incidents

The activities of information system applications or user activities can be recorded and used for

⁸ [Next Generation Intrusion Prevention \(NGIPS\) - NSFOCUS, Inc., a leader in global network and cybersecurity, protects enterprises and operators from advanced cyber attacks. \(nsfocusglobal.com\)](https://www.nsfocusglobal.com)

⁹ [Intrusion Detection System - Wikipedia](https://en.wikipedia.org/wiki/Intrusion_Detection_System)

analysis in the event of security incidents, in order to take appropriate actions to prevent such incidents in the future or to quantify the damage caused.

Note: Activities refer to computer activities on the network.

j) ICT risk assessment, or periodic assessment of the likelihood and consequences of ICT security incidents

Risk assessment includes general ICT-related issues such as accidental outages, hardware failures, and uptime. Essentially, there are three components of risk management:

- Assessment aimed at identifying assets and evaluating their properties and characteristics.
- Risk assessment, to detect threats and vulnerabilities that pose a risk to assets.
- Risk mitigation, to address risks by transferring, eliminating, or accepting them.

ICT risk assessments are conducted to enable enterprises to evaluate, identify, and modify their overall ICT security.

k) ICT security tests, e.g., conducting penetration tests, testing the security alert system, reviewing security measures, testing backup systems.

The purpose of ICT security tests is to evaluate the established ICT security measures. Penetration tests, for example, can help determine whether the system is vulnerable to an attack, whether the defense was sufficient, and which defense (if any) the test was able to bypass.

D2. Does your enterprise inform employees about their ICT security obligations in the following ways?

(Scope: enterprises with internet access, i.e. if $A1 > 0$)

[Type: single answer per item (e.g., mark only one); binary (Yes / No); multiple items may be expected]

This question aims to provide information on the methods that enterprises use to raise ICT security awareness among employees. The answer options distinguish between mandatory and non-mandatory awareness-raising methods. Additionally, there is a difference between legally binding and non-binding obligations. Enterprises may apply different levels of obligations, e.g., between employees working in IT departments and other staff. In this case, the options should refer to the staff.

a) Voluntary training or internally available information (e.g., information on the enterprise intranet)

This option refers to information that employees can follow or download voluntarily, such as ICT security information on the enterprise's intranet or informational flyers. The information may also be provided by the enterprise's Information and Communication Technology department.

b) Mandatory training courses or mandatory material viewing

This option covers mandatory training or presentations on information security policies, precautions, or principles. The difference between training and mandatory material (which can be a presentation) lies in the level of interactivity or active involvement of the participants. The option also includes eLearning techniques with participation tracking. Positive responses would indicate a higher level of awareness within the enterprise compared to employee-initiated training.

c) Through a contract (e.g., employment contract)

This option focuses on the legal aspects of the information security policy. Employees may be informed and bound by the information security policy through their employment contract or appointment letter. This is typically accompanied by complementary actions such as downloading an informational document or participating in training activities. The purpose of this item is to highlight the employment contract as the primary source for raising employee awareness. At the same time, other types of contracts, which may specifically address ICT security obligations, should not be excluded from this response.

D3. Does your enterprise have documents regarding measures, practices, or procedures for ICT security?

(ICT security and data confidentiality documents cover employee training on the use of ICT, ICT security measures, evaluation of ICT security measures, plans for updating ICT security documents, etc.)

(Scope: enterprises with internet access, i.e., if A1 > 0)

[Type: single answer required, i.e., *select only one*; binary (Yes/No); filter question]

ICT Security Documents refer to document(s) that describe how the enterprise plans to maintain the security and confidentiality of ICT data. ICT security and data confidentiality documents outline how employees will be trained in the secure use of ICT, what security measures will be implemented and enforced, procedures for evaluating the effectiveness of ICT security measures, plans for updating ICT security documents, etc. The enterprise may have one or more documents related to ICT security. Measures, practices, or procedures should be applied within the enterprise. The document(s) may be in paper or electronic form.

The existence of document(s) on ICT security measures, practices, or procedures (ICT security policy) within an enterprise indicates that the enterprise is aware of the importance of its ICT systems and the associated risks. The enterprise has made an effort to formulate document(s) identifying systems, their risks, and how to address these risks. The focus is on the mentioned measures, practices, or procedures related to ICT security that are actually being implemented. Such a document(s) represents a "formally defined policy," meaning a policy adopted by the enterprise. Typically, such document(s) on ICT security contain the objectives and goals of the measures, practices, or procedures. The document should contain, or reference definitions of relevant terms related to ICT security. Additionally, it should include documentation or refer to documentation of the enterprise's information systems. The main component would be the assessment of security risks in terms of the likelihood of incidents occurring and their potential impact on the enterprise's operations. Ideally, the document should distinguish between different groups of stakeholders and their responsibilities and functions related to the operation of the information system and incident management. Finally, the

document(s) should describe security controls and measures, as well as contingency planning for ICT security incidents.

The level of documentation may depend on the size of the enterprise and the results of the ICT security risk assessment. Additionally, the ICT security document(s) may not cover all of the aspects mentioned above. It is possible that enterprises (e.g., small and medium-sized businesses) do not employ ICT experts and, as a result, engage various external ICT collaborators. These external service providers may have such documents or a 'formally defined ICT security policy' that addresses different risks and aims to protect the ICT infrastructure of their business partners.

Regarding outsourcing (e.g., in the case of using cloud computing services): the enterprise should report that it has ICT security document(s) when a) the ICT security policy is formally defined in the ICT security document(s) by the enterprise, or b) the enterprise has a service provision contract or formal agreement that covers ICT security issues of the enterprise, the risks to be addressed, and the standards to be followed. In the latter case (b), the ICT security policy of the external ICT service provider (e.g., cloud computing service provider, subcontractor for ICT functions related to maintenance, development, or support, etc.) is directly applied to protect the enterprise from ICT security risks according to specific standards. In these cases, enterprises benefiting from the security policy of their service provider should answer 'Yes' to D3 and the subsequent question.

The existence of such documents in an enterprise indicates that the enterprise is aware of the importance of its ICT and the risks associated with them. It is assumed that the existence of ICT security documents and the frequency of their review are positively correlated with the enterprise's readiness to report ICT security incidents.

Note: There is a connection between question D3 and question A6. Question D3 includes within its scope A6 (all guidelines (instructions or rules) related to security measures for remote meetings conducted over the internet by its employees), and therefore:

If the answer to question A6 is positive (A6=Yes), then question D3 should be marked as Yes. However, a positive answer to D3 (D3=Yes) does not necessarily imply that A6 should be marked as Yes.

D5. Did your enterprise experience any ICT-related security incident in 2023 that led to the following consequences?

(Scope: enterprises with internet access, i.e., if A1 > 0)

[Type: single answer per item (e.g., mark only one); binary (Yes / No); multiple items may be expected]

This question concerns incidents related to the security of information and communication systems. Enterprises may be reluctant to report these types of incidents, as they are likely to consider them sensitive information. Therefore, it is important to emphasize the confidentiality statement when asking this question to the enterprise. The number of questions on this sensitive topic is kept to an absolute minimum, and no quantitative information is being requested.

a) Unavailability of ICT services due to hardware or software failures

This response option covers cases when the enterprise's ICT services are unavailable due to hardware or software failures.

b) Unavailability of ICT services due to external attacks, e.g., ransomware attacks

This response option differs from the previous one, as the unavailability of ICT services, in this case, is caused by external malicious attacks.

A typical example would be a Distributed Denial of Service (DDoS) attack that attempts to make the

information system's resource unavailable to its users. The usual method of a DDoS attack involves overwhelming the target information system with external communication requests, preventing the system from responding adequately to legitimate requests from regular users.

c) Data destruction or damage due to hardware or software failures

This option covers data integrity issues caused by unintentional incidents resulting from hardware or software failures. Unintentional incidents can include server or hard drive crashes due to hardware failures or server crashes due to software errors, such as incorrect updates.

d) Data destruction or damage due to malware attacks or unauthorized access

This response option addresses data integrity issues related to malicious attacks. Additionally, it includes the compromise of data integrity due to unauthorized access (internal or external intrusions) to the enterprise's ICT system. An intrusion is an attempt to bypass security controls in an information system. Intrusion tools may include eavesdroppers, viruses, worms, Trojan horses, logic or time bombs, etc.

e) Detection of confidential data breaches resulting from intrusions, identity theft attacks, or intentional actions by the enterprise's own employees.

This response option refers only to cases of disclosure of confidential data due to malicious actions. The data may include information about individuals, staff or clients, intellectual property in terms of trade secrets, information, or other confidential data such as business figures or information on management decisions. Possible methods of accessing confidential data may include brute-force attacks to uncover passwords or phishing and pharming techniques.

Phishing is a criminal attempt to obtain sensitive information, such as usernames, passwords, and credit card details, by misrepresenting oneself in electronic communication. The term "pharming" refers to an attack that redirects website traffic to another fake website in order to collect sensitive information.

Intellectual property is defined as "intangible property resulting from creativity." This property can be artistic or commercial. Intellectual property may be protected by law. Types of legal protection include copyrights, patents, and trademarks. Under intellectual property law, owners are granted certain exclusive rights to intangible assets. In this context, intellectual property may be accessible to third parties, but only the owner has the right to exploit it. In cases of unauthorized use, the rights holder may initiate legal action.

Trade secrets are intellectual property that is not legally protected. "A trade secret is a formula, practice, process, design, instrument, pattern, or set of information that is not generally known and through which an enterprise can gain an economic advantage over competitors or customers." This response option refers only to intellectual property in the form of trade secrets, as it is not legally protected, and its disclosure would have negative effects on the enterprise's economic performance.

f) Disclosure of confidential data due to unintentional actions of the enterprise's own employees.

This response option refers only to cases of confidential data disclosure caused by unintentional actions of employees within the enterprise.

Note: 'No' for all items is possible in cases where none of the listed consequences have occurred due to any security incident related to ICT.

2.1.5. Module E: Artificial Intelligence

[Scope: enterprises with internet access, i.e. $A1 > 0$]

Artificial intelligence refers to systems that use computing technologies such as text analysis, speech recognition, language generation, and machine learning to collect and/or use data for prediction, recommendations, or decision-making, with varying levels of autonomy, on the best course of action to achieve specific goals.

Artificial intelligence systems can be purely software-based, such as:

- chatbots and business virtual assistants based on written language processing;
- facial recognition systems or speech recognition systems;
- machine translation software;
- data analysis based on machine learning;

or embedded in devices, such as:

- autonomous robots for warehouse or manufacturing assembly automation;
- autonomous drones for production monitoring or package handling.

E1: Does your enterprise use any of the following artificial intelligence (AI) technologies?

Scope: Enterprises with internet access, i.e., if $A1 > 0$; optional

[Type: single answer per item; binary (Yes/No); multiple items may be selected; filter question]

The goal of this question is to provide information on the use of artificial intelligence (AI) technologies by enterprises, such as text analysis, speech recognition, and written language generation. The answer options from a) to g) may not be an exhaustive list of AI technologies, but they represent the most relevant AI technologies currently used by enterprises.

The question pertains to usage. Therefore, if an enterprise creates AI solutions for use by others, i.e., "for sale," it should not answer "Yes" to E1. However, if the enterprise creates AI solutions and uses them for its own operations, it should answer "Yes" to the relevant answer options in E1. The responding enterprise should choose from the following artificial intelligence technologies; multiple answers are allowed:

a) Artificial intelligence technology that uses written language analysis (e.g., text mining)

This answer option refers to the use of artificial intelligence technologies that perform written language analysis, also known as text analysis. Text analysis, also known as textual analysis, is the process of transforming unstructured textual data into meaningful and useful information by identifying facts, relationships, and assertions that would otherwise remain buried in large volumes of unstructured or poorly structured textual data. Once extracted, this information is converted into a structured form that can be further analysed or directly displayed using grouped HTML tables, mind maps, charts, etc. Text analysis employs various methodologies for text processing, with one of the most important being written language processing (NLP).

Natural Language Processing (NLP) – a subfield of computing, information engineering, and artificial intelligence that deals with interactions between computers and human (natural) languages,

particularly how to program computers to process and analyse large volumes of natural language data. Examples of the use of technologies that perform written language analysis (text analysis):

- **Social media:** Software packages for text analysis are available for analysing social media applications in order to monitor and analyse online textual content from news websites, blogs, emails, etc. Text analysis tools assist in identifying and analysing the number of posts, likes, and followers on social media platforms. This type of analysis reveals people's reactions to different posts, news, and how they spread. It shows the behaviour of individuals belonging to a specific age group or communities with similar and differing views on the same post.
- **Business Intelligence:** Text analysis plays a significant role in business intelligence by helping organizations and enterprises analyse their customers and competitors in order to make better decisions. It provides deeper insight into business operations and offers information on how to improve customer satisfaction and gain competitive advantages. By incorporating text analysis into the equation, BI tools can utilize unstructured data in addition to structured data and expand the datasets used by models to generate business insights. Text analysis tools such as IBM Text Analytics, RapidMiner, and GATE support decision-making within organizations by generating alerts related to good and poor performance, as well as market changes that assist in taking corrective actions. It is also useful in telecommunications, business and commercial applications, and customer relationship management systems.
- **Risk Management:** Inadequate risk analysis is often a leading cause of failure. The adoption of risk management software based on text analysis technology can significantly enhance the ability to mitigate risks. This provides enterprises with easy access to thousands of sources of textual documents, enabling them to connect information and access the right data at the right time.
- **Knowledge Management:** When managing large volumes of textual documents, the ability to quickly locate important information is essential. Text analysis solutions can help enterprises accurately and efficiently identify relevant data, enabling them to gain deeper insights and deliver products to market more rapidly.
- **Cybercrime Prevention:** The anonymous nature of the internet and its numerous communication features contribute to an increased risk of internet-based criminal activities. Text analysis facilitates cybercrime prevention for enterprises by providing greater contextual understanding of the alerts they receive. This enables them to accurately identify real threats and reduce the number of false positives generated by out-of-context keywords.
- **Enhanced Customer Service:** Text analysis and natural language processing have proven extremely useful for customer support teams. They are often used to improve the customer experience by leveraging valuable sources of information such as surveys, incident reports, and user call notes to enhance the quality, efficiency, and speed of issue resolution. Text analysis is also central to chatbot functionality, as it captures the information necessary for quick, automated responses to users. As a result, enterprises can significantly reduce their reliance on call centre operators for resolving customer issues.
- **Contextual Advertising:** Digital advertising is a relatively new and growing area of application for text analysis. Compared to the traditional cookie-based approach, contextual advertising analyses the text on a web page to gain a deeper understanding of the content. For example, a person reading an article about the latest books may see an advertisement for a Kindle due to its relevance. This approach is useful not only for delivering more accurate and targeted ads, but also for fully preserving user privacy.

b) Artificial intelligence technology that converts spoken language into machine-readable format (speech recognition)

This response option refers to the use of artificial intelligence technologies that convert speech into a machine-readable format, also known as speech recognition. Speech recognition is an interdisciplinary field of computer science and computational linguistics that develops methodologies and technologies enabling the recognition and translation of spoken language into text using computers. It is also known as automatic speech recognition (ASR), computer speech recognition, or speech-to-text (STT). It involves knowledge and research in the areas of computer science, linguistics, and computational technologies.

Natural Language Processing (NLP) is a subfield of computer science, information engineering, and artificial intelligence that focuses on the interactions between computers and human (natural) languages—specifically, how to program computers to process and analyze large amounts of natural language data.

Although the science of speech recognition dates back several decades, it has significantly benefited from artificial intelligence. AI-based speech recognition utilizes the latest advancements in machine learning. These include highly trainable neural network algorithms and rich lexicons that enable precise recognition.

Examples of the use of technologies that convert speech into a computer-readable format (speech recognition):

- Speech recognition is used in call centers to manage incoming customer calls.
- Digital assistants utilize speech recognition, such as Google Voice, Amazon Alexa, Microsoft Cortana, and Apple Siri.

c) Artificial intelligence technology that generates spoken or written language (natural language generation, speech synthesis)

This option refers to the use of artificial intelligence technologies that generate written or spoken language. Written language generation is the ability of a computer program to convert structured data into written language representation. It can be used to produce long documents that summarize or explain the content of computer databases, such as generating technical manuals, creating product descriptions for large e-commerce websites, producing news (automated journalism), or summarizing medical reports. It can also be used to generate short text messages in interactive conversations (chatbots), which can even be read aloud using text-to-speech systems (synthetic speech).

Examples of the use of technologies that generate written or spoken language:

- Chatbot: A chatbot is an artificial intelligence (AI) software that can simulate a conversation (or chat) with a user in natural language through messaging applications, websites, mobile apps, or phones. Formulating responses to questions in natural language is one of the most typical examples of natural language processing applied in various business applications.

d) Artificial intelligence technology used to identify objects or individuals based on images or video recordings (image recognition and processing).

This response option refers to the use of artificial intelligence technologies that identify objects based on images, also known as image recognition or image processing. Image processing and image recognition are examples of computer vision applications.

Computer vision is an interdisciplinary scientific field that focuses on how computers can gain a high-level understanding from digital images or videos. From an engineering perspective, it aims to understand and automate tasks that the human visual system can perform. Computer vision tasks include methods for acquiring, processing, analysing, and understanding digital images, as well as extracting high-dimensional data from the real world to produce numerical or symbolic information, such as in the form of decisions.

The scientific discipline of computer vision deals with the theory behind artificial systems that extract information from images. Image data can take many forms, such as video sequences, multi-camera views, multidimensional data from 3D scanners or medical imaging devices. Subfields of computer vision include scene reconstruction, event detection, video tracking, object recognition, facial recognition, motion estimation, and image restoration.

Examples of the use of technologies that identify objects or individuals based on images (image recognition, image processing):

- Identification and authentication of users through biometric methods implemented by the enterprise (e.g. based on fingerprints, facial recognition).
- Drones equipped with image recognition capabilities can provide automated monitoring, inspection, and control of assets located in remote areas.
- In manufacturing – inspection of production lines, evaluation of critical points on a regular basis within the facility. Monitoring the quality of finished products to reduce defects. Assessment of workers' conditions can help manufacturing industries maintain full control over various activities within the systems. Examples of use include: predictive maintenance, fault detection, safety (manufacturers use computer vision to protect their employees by providing the safest working environment possible), product and component assembly (computer vision can assist in precise product assembly and reduce the time required to complete the product), barcode reading (computer vision can read barcodes to quickly and easily track components and packages at all stages of development, through the production plant, and beyond. Many manufacturers have begun integrating barcodes into their systems to better guide products through the appropriate production lines).
- Autonomous vehicles with image recognition can identify activity on the road and take necessary actions. Mini robots can assist the logistics industry by locating and transporting objects from one place to another. They also maintain a database of product movement history to prevent products from being lost or stolen.

e) Machine learning (e.g., deep learning) for data analysis

This response option refers to the use of artificial intelligence technologies based on machine learning for data analysis, e.g., deep learning. Machine learning involves 'training' a computer

model to perform automated tasks more effectively, such as data analysis. Machine learning uses algorithms whose performance improves as they are exposed to larger quantities of data over time.

Deep learning is a subset of machine learning in which multi-layered neural networks learn from vast amounts of data.

Neural networks (artificial neural networks (ANN) or connectionist systems) are computational systems somewhat inspired by biological neural networks. A neural network itself is not an algorithm, but rather a framework for many different machine learning algorithms that work together to process complex data inputs. Such systems 'learn' to perform tasks by considering examples, usually without being programmed with any task-specific rules.

Although neural networks are not explicitly mentioned in this response option, they are included within this item.

Examples of the use of machine learning (e.g., deep learning) for data analysis include:

- Machine learning-based recommendation systems are used in various fields and are most commonly recognized as playlist generators for video and music services such as Netflix, YouTube, and Spotify, product recommenders for services like Amazon, or content recommenders for social media platforms like Facebook and Twitter.
- Dynamic pricing, also known as surge pricing, demand-based pricing, or time-based pricing, is a pricing strategy in which enterprises set flexible prices for products or services based on current market demand. Entities are able to adjust prices based on algorithms that take into account competitor pricing, supply and demand, and other external market factors.
- Cyber threat detection – machine learning has become a key technology for cybersecurity. Machine learning enables early identification of cyber threats and enhances the security infrastructure by recognizing patterns, mapping cybercrime in real time, and conducting thorough penetration testing. Microsoft uses its own cybersecurity platform, Windows Defender Advanced Threat Protection (ATP), for preventive protection, breach detection, automated investigation, and response. Windows Defender ATP is integrated into Windows 10 devices, updates automatically, and uses cloud-based AI and multiple layers of machine learning algorithms to detect threats.

f) Artificial intelligence technology that automates various workflows or supports decision-making (artificial intelligence-based software robotic process automation)

This response option refers to the use of artificial intelligence technologies that automate various workflows or assist in decision-making, also known as AI-based process flow automation.

AI-based process flow automation is the automation of processes based on artificial intelligence technologies. Robotic Process Automation (RPA) is a rapidly growing approach to process automation that uses software robots to replicate human tasks. After capturing the

workflow of a process, a virtual bot imitates the actions performed by humans in the graphical user interface of an application and automates their execution.

Although process automation is not a new concept and can be carried out without artificial intelligence, i.e., rule-based automation, this response option refers only to cases where artificial intelligence is used to enhance the benefits of traditional process automation. When RPA is combined with artificial intelligence disciplines such as natural language processing or computer vision, the potential for efficient automation is significantly increased.

Combining artificial intelligence with RPA enables enterprises to automate more complex end-to-end processes than ever before and integrate predictive modelling and insights into these processes (which could, for example, identify new processes for automation) to help people work smarter and faster.

g) Artificial intelligence technology enables the physical movement of machines through autonomous decisions based on environmental observation (autonomous robots, self-driving machines, autonomous drones).

This response option refers to the use of artificial intelligence technologies that enable the physical movement of machines through autonomous decisions based on environmental observation, such as autonomous robots, self-driving cars, and autonomous drones.

Only systems that have hardware components (similar to machines) and use artificial intelligence to learn and perform their tasks should be included in this response option. Purely software robots or robots that automate manufacturing processes through repetitive actions without the use of artificial intelligence technologies are excluded from the scope.

Examples of the use of technologies that enable the physical movement of machines through autonomous decisions based on environmental observation (autonomous robots, self-driving cars, autonomous drones): This option may refer, for instance, to robots that use machine learning to improve their task execution, drones capable of selecting the best route for package delivery based on machine learning, or self-driving vehicles that use a combination of machine learning and computer vision for safe driving.

E2. Does your enterprise use software or artificial intelligence (AI) systems for the following purposes?

[Scope: enterprises that use artificial intelligence technologies, i.e., E1a) = yes or E1b) = yes or E1c) = yes or E1d) = yes or E1e) = yes or E1f) = yes or E1g) = yes]

[Type: single answer per item (i.e., select only one); binary (Yes/No); multiple items may be selected]

Question E2 is relevant for enterprises that use any of the artificial intelligence technologies listed in question E1, i.e., enterprises that have marked "Yes" in at least one of the responses in question E1. The purpose of this question is to identify the specific purposes for which artificial intelligence technologies are used within enterprises. Specifically, enterprises are asked whether they use AI technologies for particular business functions, namely marketing

or sales, production processes, organization of business administrative processes, enterprise management, logistics, ICT security, or human resources management and recruitment.

Note: Since the list of items for the use of AI technologies is not exhaustive, it is possible that all categories in E2 are marked as 'No'.

a) Use of artificial intelligence for marketing or sales (e.g., customer profiling, price optimization, personalized marketing offers, market analysis, etc.)

Some examples may include:

- Customer profiling, price optimization, personalized marketing offers, market analysis based on machine learning
- Chatbots based on natural language processing for customer support
- Autonomous robots for order processing

This response option pertains to the use of artificial intelligence technologies for marketing or sales purposes.

It may refer to chatbots capable of analyzing written language based on natural language processing to provide real-time customer support, such as answering customer questions and needs like a real person (predefined chatbots that cannot learn and only respond to specific pre-determined requests should be excluded from the scope). Other examples that can be included in this category are software programs capable of customer profiling, or recommendation systems that can suggest personalized marketing offers and knowledge gained about the enterprise's target market through neural networks (e.g., via online ads or even notifications to a customer's phone when they approach a certain store) or AI software programs capable of market analysis to guide and direct marketing decisions within the enterprise.

b) Use of artificial intelligence for production or service processes (e.g., for classification or detection of product defects, etc.)

Some examples may include:

- Predictive maintenance or process optimization based on machine learning
- Product classification tools or defect detection in products based on computer vision
- Autonomous drones for production monitoring, security, or inspection tasks
- Assembly tasks performed by autonomous robots

This response option pertains to the use of artificial intelligence technologies for production or service purposes.

Artificial intelligence can enhance the automation of production lines by integrating industrial robots into workflows and training them to perform labor-intensive, hazardous, or repetitive tasks, thereby improving productivity while maintaining quality and safety. Examples include autonomous robots capable of performing assembly tasks or autonomous drones carrying out inspection and monitoring tasks thanks to computer vision and machine learning, or systems capable of classifying products or detecting defects through computer vision, or predictive maintenance systems for evaluating the condition of machines and/or preventing equipment failures using machine learning algorithms and

neural networks. Predictive maintenance employs condition-monitoring equipment to assess asset performance in real-time. A key component of this process is the Internet of Things (IoT). IoT enables various assets and systems to connect, work together, and share, analyse, and act on data. IoT relies on predictive maintenance sensors to collect information, interpret it, and identify areas that require attention. Some examples of using predictive maintenance and sensors for predictive maintenance include vibration analysis, oil analysis, thermal imaging, and equipment monitoring.

c) Use of artificial intelligence for the organization of business processes in administration and management (e.g., business virtual assistants based on machine learning and/or natural language processing, such as for document creation, etc.)

Some examples may include:

- Business virtual assistants based on machine learning and/or natural language processing, such as for document preparation
- Data analysis or strategic decision-making based on machine learning, e.g., risk assessment
- Planning or business forecasting based on machine learning
- Human resources management based on machine learning or natural language processing, e.g., candidate pre-selection, employee profiling, or performance analysis

This response option pertains to the use of artificial intelligence technologies for any business administrative processes or enterprise management, including human resources management.

It may refer to business virtual assistants capable of performing secretarial and support tasks based on machine learning and natural language processing and generation. It can also refer to speech-to-text systems based on speech recognition that can produce written records (e.g., meeting minutes). Other systems may include automated planning or scheduling based on machine learning and any other intelligent workflow automation within the enterprise based on AI software process automation.

These may refer to business software or systems based on AI algorithms (e.g., neural networks) capable of analysing data and assisting board members in making decisions about investments and other corporate decisions within the enterprise boards. Business software or systems can also facilitate the distribution of information to shareholders through AI software robotic process automation or even ensure shareholder representation and voting at general meetings of the enterprise (via natural language generation). Other examples include intelligent systems used for sales and/or business forecasting or risk assessment based on machine learning.

Human resources management based on machine learning or natural language processing may refer to systems capable of candidate pre-selection and automated recruitment using text mining and machine learning, or to the automation of recruitment and/or onboarding processes using AI-based software robotic process automation. Onboarding refers to the process of integrating a new employee into the organization and its culture. Tactics used in this process include formal meetings, presentations, video materials, printed materials, or computer-based orientations to introduce new employees to their roles and the organization.

Enterprises can use machine learning methods to predict employee absences. Employees are one of the most important resources of an enterprise, and their absence negatively affects productivity.

Analyses can reveal the causes of absence that the enterprise may be able to prevent, such as improving mental health, investing in safety practices, and enhancing motivation in the workplace.

d) Use of artificial intelligence for logistics (e.g. autonomous robots for finding packaging and picking solutions in warehouses, shipping, tracking, etc.)

Some examples may include:

- Autonomous robots for pick-and-pack solutions in warehouses for package shipping, tracking, distribution, and sorting
- Route optimization based on machine learning

This response option refers to the use of artificial intelligence technologies for logistics. Logistics is the process of planning and executing the efficient transportation and storage of goods from the point of origin to the point of consumption. The goal of logistics is to meet customer requirements in a timely and cost-effective manner.

Examples of use include artificial intelligence related to autonomous robots for pick-and-pack solutions in warehouses or for handling packages (delivery, tracking, distribution, and sorting), or package delivery and route optimization that increase safety and efficiency, based on computer vision and machine learning. AI-powered technology is already capable of extracting product characteristics such as price tags, shelf status, and brand for real-time warehouse inventory management.

AI-powered visual inspection identifies damage, classifies the type of damage, and determines appropriate corrective actions faster than ever before.

Robotic process automation – a combination of robotic process automation and AI can automate and streamline routine business tasks to significantly reduce issues (data file collection and processing; shipping scheduling and tracking; order processing and sending confirmation emails, etc.).

e) Use of artificial intelligence for ICT security (e.g. facial recognition for user authentication, etc.)

Some examples may include:

- Facial recognition based on computer vision for ICT user authentication
- Detection and prevention of cyberattacks based on machine learning

This response option refers to the use of artificial intelligence technologies for the ICT security of enterprises. It can relate to biometric authentication systems (fingerprints, face, iris, voice) based on computer vision and/or natural language processing. Other examples may include intelligent antivirus software powered by AI, spam filtering applications (SpamAssassin), fraud detection, botnet detection, prediction of hacking incidents, or systems for detecting and preventing cyberattacks (network intrusion detection and prevention) that protect business networks and systems from intrusions and other ICT security incidents. This question does not refer to regular antivirus applications or spam filtering applications that do not use any artificial intelligence technologies.

f) Use of artificial intelligence for accounting, auditing, or financial management (e.g. machine learning to assist in data analysis for financial decision-making, etc.)

Some examples may include:

- Machine learning for data analysis that helps in financial decision-making
- Invoice processing based on machine learning
- Machine learning or natural language processing for accounting documents

This response option refers to the use of artificial intelligence technologies for accounting, auditing, or financial management. It may relate to intelligent systems used for accounting and bookkeeping services (e.g. transaction validation activities, automatic suggestions, or completion of accounting codes) and invoice processing (e.g. for reading invoices, extracting required data, coding invoices, tracking outstanding invoices). It can also refer to machine learning algorithms that analyze data to identify potential fraud issues and flag them for review, thereby preventing revenue loss.

Another example could be the analysis of large volumes of transactions to detect hidden errors or trends. AI can identify potential issues with future purchases, such as late payments and/or deliveries. AI systems can support auditing and compliance with corporate, state, and federal regulations by monitoring relevant documents and creating alerts where necessary.

Machine learning or natural language processing for accounting documents refers to the use of AI to automate and simplify accounting tasks. For example, AI can quickly and accurately record transactions in books and automate processes by extracting data from invoices, bills, and other documents using optical character recognition (OCR).

g) Use of artificial intelligence for conducting research and development or innovation activities (excluding research on artificial intelligence) (e.g. data analysis for conducting research, problem-solving, and the development of a new or improved product/service resulting from research, etc.)

Some examples may include:

- Data analysis for conducting research, solving research problems, or developing a new or significantly improved product/service based on machine learning.

This response option refers to the use of artificial intelligence technologies for research and development (R&D) or innovation activities. AI technologies that are not used for research and development or innovation activities are not within the scope of this question, nor are activities related to research and development on AI itself. The question may refer to the use of machine learning for data analysis aimed at gaining insights, categorization, prediction, and evidence-based decision-making to solve research problems or to develop new or significantly improved products/services. Research and development (R&D) activity is a creative and systematic effort undertaken with the aim of increasing knowledge—including knowledge about humanity, culture, and society—and devising new applications of available knowledge. For an activity to qualify as R&D, it must (at least in principle) meet five criteria: it must be new, creative, uncertain, systematic, and transferable. The concept of R&D includes three types of activities: basic research, applied research, and experimental development.

An innovation is a new or improved product or process (or a combination thereof) that differs significantly from previous products or processes and has been made available to potential users (product) or put into use by the enterprise (process). For a product or process to qualify as an innovation, it must be new or significantly improved within the enterprise. This includes not only

products, processes, and methods developed by the enterprise itself, but also those adopted from other enterprises or organizations.

2.1.6. Module X: Basic Information

The variables available from registers or administrative data are: 'Main economic activity of the enterprise during 2023', and 'Average number of employees and self-employed persons (employees)', and 'Total turnover (in monetary terms, excluding VAT) for 2023'.

These variables are used for weighting and in the sampling design. Specifically, the "Main economic activity" and "Average number of employees and self-employed persons (employees)" are used for sample stratification.

These variables can be collected through a questionnaire for the ICT survey or obtained from alternative sources. Alternative sources are primarily registers and one main business survey typically used for the creation of structural business statistics.

X1. Main economic activity of the enterprise during 2023

(Scope: all enterprises)

[Type: categorical]

The main (or principal) economic activity is identified as the activity that contributes the most to the total added value of the enterprise. The identified main activity does not necessarily have to account for 50% or more of the total added value of the enterprise. The classification of main activities is determined according to NACE, first at the highest level of classification and then at more detailed levels (the "bottom-up" method).

The NACE Rev. 2 nomenclature is available in the Eurostat RAMON database:

<https://ec.europa.eu/eurostat/web/nace-rev2>

NACE Rev. 2 is used to classify the main economic activity of the enterprise at the highest level of detail (4 digits). However, only the following level of detail, which is used for breakdowns, is strictly required.

It is important to note that with the introduction of Regulation (EU) 2019/2152 of the European Parliament and the Council of December 17, 2019, on European business statistics¹⁰ (OJ L 327), the NACE classification required for the survey on the use of ICT and e-commerce in enterprises has changed for both national and European aggregates, starting from 2021 onwards.

¹⁰ https://eur-lex.europa.eu/legal-content/EN/TXT/?toc=OJ%3AL%3A2019%3A327%3ATOC&uri=uriserv%3AOJ.L_.2019.327.01.0001.01.ENG

NACE Rev. 2 Groupings		
Aggregates for potential calculation of the national NACE Rev. 2 aggregate:		
1	10-33 + 35-39 + 41-43 + 45-47 + 49-53 + 55-56 + 58-63 + 68-75 + 77-82 + 95,1	
2	10 - 33	Manufacturing
3	10-18	Manufacture of products based on: food, beverages, tobacco, textiles, leather, wood, pulp and paper; publishing and printing
4	19-23	Manufacture of coke, refined petroleum products, chemical products, basic pharmaceutical products, rubber and plastic products, and other non-metallic mineral products.
5	24-25	Manufacture of basic metals and fabricated metal products, excluding machinery and equipment.
6	26-33	Manufacture of computers, electronic and optical products, electrical equipment, machinery and equipment n.e.c., motor vehicles, other transport equipment, furniture, other manufacturing, and repair and installation of machinery and equipment
7	35-39	Production and distribution of electricity, gas, steam, and air conditioning; water supply, sewerage, waste management, and remediation activities
8	41-43	Construction
9	45-47	Wholesale and retail trade; repair of motor vehicles
10	47	Retail trade
11	49-53	Transportation and storage
12	55	Accommodation
13	55 - 56	Accommodation and food service activities
14	58-63	Information and communication
15	68.	Real estate activities
16	69-75	Professional, scientific and technical activities
17	77-82	Administrative and support service activities
	26,1 - 26,4 + 26,8 + 46,5 + 58,2 + 61 + 62,01 + 62,02 + 62,03 + 62,09 + 63,1 + 95,1	Manufacture of electronic components and boards, consumer electronics, magnetic and optical media; wholesale of information and communication equipment; software publishing; telecommunications; computer programming, consultancy and related services, other information technology and computer-related services; data processing, hosting and related activities, web portals; repair of computers and communication equipment or ICT sector
Aggregates for the calculation of European NACE Rev. 2 aggregates:		
3a	10 - 12	Manufacture of food products, beverages and tobacco products
3b	13 - 15	Manufacture of textiles, wearing apparel, leather and related products

3c	16 - 18	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials; manufacture of paper and paper products; printing and reproduction of recorded media
4a	19	Manufacture of coke and refined petroleum products
4b	20	Manufacture of chemicals and chemical products
4c	21	21: Manufacture of basic pharmaceutical products and pharmaceutical preparations
4d	22, 23	Manufacture of rubber and plastic products; manufacture of other non-metallic mineral products
6a	26	Manufacture of computer, electronic and optical products
6b	27	Manufacture of electrical equipment and machinery and equipment n.e.c.
6c	28	Manufacture of machinery and equipment n.e.c.
6d	29 - 30	Manufacture of motor vehicles, trailers and semi-trailers, other transport equipment
6e	31 - 33	Manufacture of furniture and other manufacturing; repair and installation of machinery and equipment
7a	35	"Electricity, gas, steam, and air conditioning supply"
7b	36-39	Collection, treatment, and supply of water; sewerage; waste collection, treatment, and disposal activities; material recovery; remediation activities and other waste management services
9a	45	Wholesale and retail trade; repair of motor vehicles
9b	46	Wholesale trade, except for motor vehicles and motorcycles
14a	58 - 60	Publishing activities; film, video, and television program production, sound recording and music publishing; programming and broadcasting activities
14b	61	Telecommunications
14c	62 - 63	Computer programming, consulting, and related activities, information services
16a	69 – 71	Legal and accounting activities; activities of head offices; management consulting activities; architectural and engineering activities; technical testing and analysis
16b	72.	72: Scientific research and development
16c	73 – 75	Advertising and market research; other professional, scientific, and technical activities; veterinary activities
17a	77 - 78 + 80 - 82	Activities for: renting and leasing, employment, security and investigation, building and landscape services, administrative administration, business support, and other business support
17b	79	Travel agency, tour operator, and other reservation services and related activities
18a	95.1	Repair of computers and communication equipment

NACE Rev. 2 categories are classified for the purpose of dissemination into several aggregates organized into 5 hierarchical levels. At the first level, there are two categories distinguishing "Manufacturing, Energy, and Construction" and "Non-financial Services." At the second level, activities

are grouped at the NACE section level, resulting in 11 categories. The content of these groupings is described below. Also, refer to the transfer format in Annex 1.4.3.

X2. Average number of employees and self-employed persons (employees) during 2023.

(Coverage: all enterprises)

[Type: numeric]

With the introduction of the Framework Regulation on European Business Statistics, the variable "employed persons" was replaced by the variable "employees and self-employed persons." The two variables represent the same concept. For ease of use, the term "employed and self-employed persons" is only used in the introductory part of the questionnaire and in Module X, while the term "employed persons" is used throughout the rest of the questionnaire.

For the purpose of general harmonisation of ICT usage statistics in enterprises and the broader field of business statistics, the concept of employed and self-employed persons is used here, as defined in Regulation (EU) 2020/1197 of 30 July 2020 implementing Regulation (EU) 2020/2152 on European business statistics (p. 92, variable 120101: Number of employees and self-employed persons):

The number of employed and self-employed persons represents the sum of the **number of employees** and the **number of self-employed persons**.

The number of employees refers to the average number of individuals who were employed in the statistical unit during the reference period.

Explanation:

Although the employment relationship that qualifies individuals as either employees or employers is defined by specific laws or contract, the term "employees" generally refers to person engaged by an enterprise to provide services on a regular basis in return for benefits, where the services provided are not part of an independent business activity. For clarity, trainees are also considered employees if they are engaged under such conditions.

The number of self-employed persons refers to the average number of individuals who, at any time during the reference period, were the sole owners or co-owners of the business unit in which they work. Contributing family workers and external workers whose income depends on the value of the output of the statistical unit are also considered sole workers.

Note: In order to verify the comparability of data, it is necessary to indicate whether or not voluntary workers are included under this item.

The number of employed and self-employed persons should be measured as an annual average over the previous calendar year. For comparability purposes, the number of employees should not be confused with the number of employees which excludes unpaid workers or with the number of employees expressed in full-time equivalent (FTE) units.

The average number of employed and self-employed persons is classified into five size categories, of which three are mandatory and two are optional.

Size categories (based on the number of employed and self-employed persons)

Mandatory		
1	10 to 49	Small enterprises
2	50 to 249	Medium-sized enterprises
3	250 or more	Large enterprises
Optional		
4	Fewer than 2	Small micro enterprises
5	2 to 9	Large micro enterprises

X3. Total turnover (in value, excluding VAT), for 2023

(Coverage: all enterprises)

[Type: numeric]

This variable is required for weighting the proportion of turnover arising from orders received via computer networks (value of web sales and value of EDI-type sales in Module B: e-commerce sales).

For the purpose of general harmonization of ICT usage statistics in enterprises and the broader scope of business statistics, the concept of employed and self-employed persons used here follows Regulation (EU) 2020/1197 of 30 July 2020 (p. 104, Variable 140301: Net turnover) for the implementation of Regulation 2019/2152 (European business statistics):

For all activities except for NACE 64, 65, and certain activities under NACE 66, net turnover consists of all revenues generated during the reference period in the course of the regular activities of the statistical unit, presented net of all price reductions, discounts, and rebates.

Revenues are defined as increases in economic benefits during the reference period in the form of inflows or enhancements of assets or decreases in liabilities that result in an increase in equity, excluding those relating to contributions from equity participants.

The stated inflows arise from contracts with customers and are realized through the fulfilment by the statistical unit of the obligations specified in those contracts. Typically, a performance obligation is fulfilled through the sale (transfer) of goods or the provision of services; however, gross inflows may also include revenues earned as a return on the use of the statistical unit's assets by others.

Net turnover excludes:

- all taxes, duties, or levies directly linked to revenue;
- all amounts collected on behalf of any principal, if the statistical unit is acting as an agent in relation to that principal;
- all revenues not arising from the regular activities of the statistical unit. These types of revenues are usually classified as 'Other (operating) income', 'Financial income', 'Extraordinary income', or under a similar heading, depending on the applicable set of generally accepted accounting standards used for the preparation of financial statements.

1.4. Annex

2024 Questionnaire Model

The data from this form are considered official secrets and are used exclusively for statistical purposes
(Law on Statistics of Bosnia and Herzegovina, "Official Gazette of BiH", Nos. 26/2004 and 42/2004).

RESEARCH ON THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN ENTERPRISES IN 2024

MODULE A: INTERNET ACCESS AND USE

A1_N.	AN1: Does your enterprise have access to the internet? (Filter question)	Yes	No
		☐	☐
			GO to Module F
A1.	How many employees have access to the internet for business purposes? (including fixed connection, Wi-Fi connection, and mobile network connection)		
A1_P.	Please estimate the share of employees who use the internet for business purposes (percentage of the total number of employees):	%	
A2.	Does your enterprise use any type of fixed broadband internet connection? (e.g., ADSL, SDSL, FTTP, cable internet, public Wi-Fi)	Yes	No
		☐	☐
			→ Go to A4_N1
A3.	What is the maximum internet connection speed in your enterprise? (select only one answer)		
	a) Less than 30 Mbit/s	☐	
	b) At least 30, but less than 100 Mbit/s	☐	
	c) At least 100, but less than 500 Mbit/s	☐	
	d) At least 500, but less than 1 Gbit/s	☐	
	e) At least 1 Gbit/s	☐	
A4.	Is the speed of the fixed broadband internet connection sufficient for the actual needs of the enterprise?	Yes	No
		☐	☐

A4_N1.	Does your enterprise have a website?	Yes ☐ → Please enter the website below	No ☐
Website name: _____			
A4_N2.	Does your enterprise provide portable devices that enable mobile internet connection using mobile phone networks for business purposes? (e.g., laptops or other portable devices such as smartphones)	Yes ☐	No ☐
A5.	How many employees use a portable device provided by the enterprise that enables internet connection via mobile phone networks for business purposes?		
A5_P.	Please estimate the share of employees who use portable devices (provided by the enterprise) for business purposes that allow internet connection through mobile telephony networks (e.g., laptops or other portable devices such as smartphones).	%	
A5_A.	Does your enterprise have a mobile application for its clients? (e.g., loyalty program, e-commerce, customer support)	Yes ☐	No ☐
		☐	☐
A6.	Does any employee have remote access to the following? (via computers or smartphones)	Yes ☐	No ☐
	a) The enterprise's email	☐	☐
	b) The enterprise's documents (e.g., files, spreadsheets, presentations, charts, photos)	☐	☐
	c) The enterprise's business applications or software (e.g., access to accounting, sales, orders, CRM) <i>Please exclude applications used for internal communication, such as Skype, MS Teams, Yammer.</i>	☐	☐
A7_A.	Does your enterprise use any of the following social networks?	Yes ☐	No ☐
	a) Social networks (Facebook, LinkedIn, Xing, Yammer)	☐	☐
	b) Enterprise blog (Twitter)	☐	☐
	c) Multimedia content sharing sites (Youtube, Flickr, Picassa)	☐	☐
A7.	Does your enterprise hold online meetings (e.g., via Skype, Zoom, MS Teams, WebEx, etc.)?	Yes ☐	No ☐
			→Go to B1

MODULE B: E-COMMERCE

E-commerce is the sale or procurement of goods or services conducted through computer networks using methods specifically designed for receiving or placing orders. Payment and delivery of goods or services do not have to be conducted online. E-commerce transactions **exclude** orders made through manually typed email messages.

B1.	Did your enterprise make web sales of products/services during 2023:	Yes	No
	a) Through your enterprise's own website or mobile application? (including extranet)	☐	☐
	b) Through a website or e-commerce application used by multiple enterprises for trading products on the market? (e.g., e-Bookers, Booking, hotels.com, eBay, Amazon, Amazon Business, Alibaba, Rakuten, TimoCom)	☐	☐
If the answer is "No" to both B1a) and B1b) → skip to question B7			
B2.	What percentage of the total turnover was generated through web sales of goods or services in 2023?	%	
Question B3 should only be answered if both B1a) and B1b) = "Yes"			
B3.	Koliki je procenat vrijednosti web prodaje u 2023. godini za sljedeće: If only answer "Yes" to B1a) is selected, enter 100% under question B3a); If only answer "Yes" to B1b) is selected, enter 100% under question B3b); Question B3 should be answered only by respondents who answered "Yes" to both B1a) and B1b), in which case the responses must add up to a total of 100%.	Total 100%	
(Please refer to the value of web sales you reported in B2)			
	a) Through your enterprise's own website or mobile application (including extranet)		
	b) Through a website or e-commerce application used by multiple enterprises on the market to trade products (e.g., e-Bookers, Booking, hotels.com, eBay, Amazon, Amazon Business, Alibaba, Rakuten, TimoCom)		
		Total 100%	
B4.	What is the percentage of the value of web sales in 2023 by type of transaction?		
(Please refer to the value of web sales you reported in B2)			
	a) Sales to end consumers (B2C)		%
	b) Sales to other enterprises (B2B) and to the public sector (B2G)		%
		Total 100%	
B5.	Did your enterprise achieve web sales to customers located in the following geographic area during 2023?	Yes	No
	a) Bosnia and Herzegovina	☐	☐
	b) European Union country	☐	☐

c) Other countries		☐	☐
EDI – TYPE OF SALE			
EDI-type sales cover orders that customers send via EDI messages (EDI: Electronic Data Interchange), meaning: • in an agreed or standard format suitable for automated processing; • EDI order message created from the customer's business system; • including orders transmitted through an EDI provider; • including automatically system-generated orders based on demand; • including orders received directly into your ERP system (ERP PANTHEON, Dynamics NAV, SAP). Examples of EDI: EDIFACT, KSMML/EDI (e.g., UBL, Rosettanet).			
B7.	Did your enterprise achieve EDI-type sales of goods and services during 2023?	Yes	No
EDI-type sales refer to sales conducted through electronic data interchange. This type of sale implies that the order is in an agreed or standard format suitable for automatic processing (e.g., EDI-EDIFACT, XML-UBL...); without individual messages (such as via email).		☐	☐
			→ Go to B9
B8.	What percentage of the total turnover in 2023 was achieved through EDI-type sales of goods or services?		
Enter the percentage			%
B9.	Did your enterprise use Big Data analysis during 2023?	Yes	No
		☐	☐

MODULE C: ICT EXPERTS AND SKILLS

C1.	Does your enterprise employ ICT specialists? (ICT specialists are employees whose main job is ICT-related (development, operation, or maintenance of ICT systems or applications))	Yes	No
		☐	☐
			→ go to C2b)
C2.	Has your enterprise provided any type of training to employees for developing ICT skills during 2023?	Yes	No
a) Training of ICT specialists (answer "No" if the answer to question C1 is "No")		☐	☐
b) Training of other employees		☐	☐
C3.	Did your enterprise hire or attempt to hire ICT specialists during 2023?	Yes	No

	☐	☐
		→ go to C6

C4.	Did your enterprise have any vacant ICT specialist positions during 2023 that were difficult to fill?	Yes	No
		☐	☐
			→ go to C6
C6.	Who performed ICT functions in your enterprise during 2023?	Yes	No
(For example, maintenance of ICT infrastructure, support for office software, development or support of business management software/systems and/or web solutions, security and data protection)?			
	a) Employees in your enterprise (including employees of parent or affiliated enterprises)	☐	☐
	b) External providers (external collaborators)	☐	☐

MODULE D: ICT SECURITY

D1_N1.	Does your enterprise use the following business software?	Yes	No
	a) ERP – software for enterprise resource planning	☐	☐
	b) CRM – software for customer relationship management	☐	☐
	c) Business intelligence (BI software)	☐	☐
D1_N2.	Does your enterprise pay for cloud services over the internet?	Yes	No
		☐	☐
D0.	Does your enterprise implement ICT security measures on its ICT systems?	Yes	No
		☐	☐
If the answer to question D0) is “No” → go to question E0)			
D1.	Does your enterprise apply any of the following ICT security measures on its ICT systems?	Yes	No
	a) Authentication using strong passwords (e.g., minimum length, use of numbers and special characters, periodic changes, etc.)	☐	☐
	b) Authentication through biometric methods used to access the enterprise’s ICT system (e.g., fingerprint, voice, facial recognition)	☐	☐
	c) Authentication based on a combination of at least two authentication mechanisms (e.g., a combination of one-time password, code generated by a security token or received via phone, biometric methods such as fingerprint, voice, facial recognition)	☐	☐
	d) Encryption of data, documents, or emails	☐	☐
	e) Creating backup copies of data at a separate location (including cloud backup)	☐	☐

f) Network access control (managing user rights within the enterprise network)	☐	☐
g) VPN (Virtual Private Network extends a private network over a public network to enable secure data exchange)	☐	☐
h) ICT security monitoring system that detects suspicious activities in ICT systems and alerts the enterprise, excluding antivirus software	☐	☐

i) Maintaining log files that enable analysis after ICT security incidents		☐	☐
j) ICT risk assessment, i.e., periodic evaluation of the likelihood and impact of ICT security incidents		☐	☐
k) ICT security tests (e.g., testing security alert systems, reviewing security measures, testing backup systems)		☐	☐
D2.	Does your enterprise inform employees about their obligations regarding ICT security in the following ways?	Yes	No
	a) Voluntary training or internally available information (e.g., information on the intranet)	☐	☐
b) Mandatory training courses or mandatory viewing of training materials		☐	☐
c) By contract (e.g., employment contract)		☐	☐
D3.	Does your enterprise have documents on ICT security measures, practices, or procedures? (ICT security and data confidentiality documents include employee training on ICT usage, ICT security measures, assessment of ICT security measures, plans for updating ICT security documents, etc.)	Yes	No
		☐	☐
			→ go to D5
D5.	Did your enterprise experience any ICT-related security incident during the year 2023 that resulted in any of the following consequences?	Yes	No
a) Unavailability of ICT services due to hardware or software failure		☐	☐
b) Unavailability of ICT services caused by external attacks, random attacks		☐	☐
c) Destruction or damage of data due to hardware or software failure		☐	☐
d) Destruction or damage of data caused by attacks (malicious software) — malware or unauthorized access		☐	☐
e) Disclosure of confidential data due to intrusion, identity theft, deliberate actions by own employees		☐	☐
f) Disclosure of confidential data due to own unintentional actions by employees		☐	☐

MODULE E: ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) refers to systems that use smart technologies such as **text mining** (the process of extracting high-quality information from text), **computer vision** (e.g., image recognition), **speech recognition**, **natural language generation** (processing and understanding natural language), **machine learning**, and **deep learning** to collect and/or utilize data for prediction, recommendation, or decision-making at various levels of autonomy, as a means to optimally achieve specific objectives.

E0.	Does your enterprise use artificial intelligence technology?	Yes	No
		☐	☐
If the answer to question E0 is "No," go to the end (Module X: Basic Information); otherwise, go to question E1			
E1.	Does your enterprise use any of the following artificial intelligence (AI) technologies?	Yes	No
	a) Artificial intelligence technology that uses written language analysis (e.g. text mining)	☐	☐
	b) Artificial intelligence technology that converts spoken language into a machine-readable format (speech recognition)	☐	☐
	c) Artificial intelligence technology that generates spoken or written language (natural language generation, speech synthesis)	☐	☐
	d) Artificial intelligence technology that identifies objects or people based on images or video recordings (image recognition and processing)	☐	☐
	e) Machine learning (e.g. deep learning) for data analysis	☐	☐
	f) Artificial intelligence technology that automates various workflows or assists in decision-making (AI-based robotic process automation software)	☐	☐
	g) Artificial intelligence technology that enables physical movement of machines through autonomous decision-making based on observing the environment (autonomous robots, self-moving machines, autonomous drones)	☐	☐
If the answer is "No" to question E1a) through E1g), go to X1.			

E2.	Does your enterprise use artificial intelligence (AI) software or systems for the following purposes?	Yes	No
	a) Use of artificial intelligence for marketing or sales (e.g. customer profiling, price optimization, personalized marketing offers, market analysis, etc.)	☐	☐
	b) Use of artificial intelligence for production or service processes (e.g. for classification or defect detection in products, etc.)	☐	☐
	c) Use of artificial intelligence for organizing administrative and management processes (e.g. business virtual assistants based on machine learning and/or natural language processing, e.g. for document creation, etc.)	☐	☐
	d) Use of artificial intelligence for logistics (e.g. autonomous robots for packing and picking solutions in warehouses, shipping, tracking, etc.)	☐	☐
	e) Use of artificial intelligence for ICT security (e.g. computer-based facial recognition for user authentication, etc.)	☐	☐
	f) Use of artificial intelligence for accounting, control, or financial management (e.g. machine learning to support data analysis for financial decision-making, etc.)	☐	☐

g) Use of artificial intelligence for conducting research and development or innovation activities (excluding AI research) (e.g. data analysis to conduct research, solve problems, and develop new or improved products/services based on research results, etc.)	☐	☐
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MODULE X: BASIC INFORMATION

X1–X3) Available in some countries from Structural Business Statistics (SBS), business register or administrative data and therefore not included; the most recently available information should be provided

X1.	Main economic activity of the enterprise during 2023	
X2.	Average number of employees and self-employed persons (employed persons) during 2023	
X3.	Total turnover (in monetary terms, excluding VAT) for 2023	

Name of the enterprise
Enterprise identification number
Full name
Telephone
Email



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