

Introduction

Objectives of the survey

The aim of this survey is to collect data on the usage of information and communication technologies (ICT) by Luxembourgish enterprises. The collected data are used in the production of harmonised and comparable statistics across the European Union. They are therefore an essential tool for national and European policy makers to measure progress towards the goals concerning the adoption and use of ICT, such as the "Digital Agenda for Europe" of the European Commission.

The results of previous surveys are available on the Luxembourgish Statistics Portal (<https://statistiques.public.lu/en/themes/entreprises.html>), under « Science and technology ».

Scope

The present survey is aimed at resident businesses carrying out market activities according to the statistical classification of economic activities in the European Community (NACE Rev.2) on or from the Luxembourgish economic territory during the observation period.

The definition of the enterprise unit used in this survey includes resident natural persons, legal persons incorporated under Luxembourgish Law or Luxembourgish branches of legal units incorporated under foreign law.

Please exclude any activities relating to any permanent establishments and subsidiaries located in foreign territories such as foreign branches of a legal unit incorporated under Luxembourgish law.

Where not otherwise specified, please consider as reference the current situation (year 2023). The reference period for the percentages of sales/orders data is financial year 2022. Please report all items to the best of your ability, estimates are acceptable.

How to respond to this questionnaire?

This questionnaire is intended primarily for the ICT manager or a senior professional in the ICT department of your enterprise. In any case the respondent should not be someone with responsibilities only in accounting.

The survey is divided into several sections. Each section contains questions about various aspects of ICT at your enterprise. Due to the specialised nature of each question (e.g. financial indicators, human resources records etc.), it may be necessary to collaborate with colleagues in different departments to answer the questions.

 Please take into account all of the legal units listed in the “**List of legal units targeted by this survey**”, that was annexed to the letter inviting you to participate in the survey.

The structure of the questionnaire

This questionnaire is divided into eight sections:

Section A - General information

Section B - Access and use of the internet

Section C - e-Commerce

Section D - Data utilisation, sharing, analytics and trading

Section E - Use of cloud computing services

Section F - Artificial Intelligence

Section G - Invoicing

Section H - Comments and contact coordinates

Disclaimer: References to third-party brands, products and trademarks are for the sake of clarification and are not intended to promote the use of such products.

Section A - General information

A1. Is your enterprise part of an enterprise group?

An enterprise group consists of two or more legally defined enterprises under common ownership. Each enterprise in the group can serve different markets, as with national or regional subsidiaries, or serve different product markets. The head office is also part of an enterprise group.

Yes.....

No

Section B - Access and use of the internet

B1. How many persons employed have access to the internet for business purposes?

Please consider the aggregate number of persons from all the legal units listed in the letter accompanying the survey.

Including fixed line, fixed wireless and mobile telephone network connection.

Answer about your enterprise only for **Luxembourg**. Exclude any subsidiaries, parent enterprises and foreign branches for the purposes of this survey.

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persons

If the value is "0" → Please go to question H1.

Use of a fixed connection to the internet for business purposes

B2. Does your enterprise use any type of fixed connection to the internet?

(e.g. ADSL, SDSL, VDSL, fiber optics technology (FTTP), cable technology, etc.)

Yes..... → Please go to question B3.

No → Please go to question B4.

B3. What is the maximum contracted download speed of the fastest fixed internet connection of your enterprise?

(Please tick one box only)

- 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

Use of mobile apps

B8. Does your enterprise have a mobile app for clients (e.g. for loyalty program, e-commerce, customer support)?

Yes.....

No

Use of Social Media

Enterprises **using** social media are considered those that have a user profile, an account or a user licence depending on the requirements and the type of the social media.

B9. Does your enterprise use any of the following social media?

	Internal	External	No
a. Social networks..... e.g. Facebook, LinkedIn, Xing, Viadeo, Yammer, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Enterprise's blog or microblogs..... e.g. Twitter, Present.ly, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Multimedia content sharing websites or apps e.g. YouTube, Flickr, SlideShare, Instagram, Pinterest, Snapchat, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Wiki based knowledge sharing tools.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

If you answered **No to all items** → Please go to question **B11**.
Otherwise → Please go to question **B10**.

B10. Does your enterprise use any of the above mentioned social media to:

	Yes	No
a. Develop the enterprise's image or market products..... e.g. advertising or launching products	<input type="checkbox"/>	<input type="checkbox"/>
b. Obtain or respond to <u>customer</u> opinions, reviews, questions	<input type="checkbox"/>	<input type="checkbox"/>
c. Involve <u>customers</u> in development or innovation of goods or services.....	<input type="checkbox"/>	<input type="checkbox"/>
d. Collaborate with <u>business partners</u> or <u>other organisations</u> e.g. suppliers, public authorities, non-governmental organisations	<input type="checkbox"/>	<input type="checkbox"/>
e. Recruit employees.....	<input type="checkbox"/>	<input type="checkbox"/>
f. Exchange views, opinions or knowledge <u>within</u> the enterprise	<input type="checkbox"/>	<input type="checkbox"/>

Other use of the internet

B11. Does your enterprise pay to advertise on the internet?

(e.g. adverts on search engines, on social media, on other websites or apps)

Yes..... → Please go to question **B12**.

No → Please go to question **C1**.

B12. Does your enterprise pay to advertise on the internet using any of following targeted advertising methods?

	Yes	No
a. Based on content or keywords searched by internet user	<input type="checkbox"/>	<input type="checkbox"/>
b. Based on the tracking of internet users' past activities or profile	<input type="checkbox"/>	<input type="checkbox"/>
c. Based on the geolocation of internet users	<input type="checkbox"/>	<input type="checkbox"/>
d. Any other method of targeted advertising on the internet not specified above.....	<input type="checkbox"/>	<input type="checkbox"/>

If you answered **Yes to both items** in C1 → Please go to question C3
Otherwise → Please go to question C4

C3. Please provide a percentage breakdown of the total turnover (excluding VAT) from web sales in financial year 2022 (refer to the amount provided in C2) for the following:

- a. via your enterprise's website or "apps" %
including those of parent or affiliate enterprises, extranets
- b. via e-Commerce marketplace websites or "apps" used by several enterprises for trading goods or services %
e.g. e-Bookers, Booking, hotels.com, eBay, Amazon, Amazon Business, Alibaba, Rakuten, TimoCom, etc.

Total (a.+b.)

This percentage refers to the amount indicated in question C2.

%

C4. Please provide a percentage breakdown of the total turnover (excluding VAT) from web sales in financial year 2022 (refer to the amount provided in C2), by type of customer:

- a. B2C (Business-to-consumer, sales to private consumers) %
- b. B2B (Business-to-business, sales to other enterprises) %
- c. B2G (Business-to-government, sales to public authorities) %

Total (a.+b.+c.)

This percentage refers to the amount indicated in question C2.

%

C5. Please provide a percentage breakdown of the total turnover (excluding VAT) from web sales in financial year 2022 (refer to the amount provided in C2), by geographic areas:

- a. Luxembourg %
- b. Belgium, France, Germany, Netherlands %
- c. Other EU countries %
- d. Rest of the world %

Total (a.+b.+c.+d.)

This percentage refers to the amount indicated in question C2.

%

C9. Please provide a percentage breakdown of the total turnover from EDI-type sales of goods or services in financial year 2022, by geographic areas:

a. Luxembourg.....	<input type="text" value=""/>	%
b. Belgium, France, Germany, Netherlands	<input type="text" value=""/>	%
c. Other EU countries	<input type="text" value=""/>	%
d. Rest of the world.....	<input type="text" value=""/>	%
Total (a.+b.+c.+d.)	<input type="text" value="1 0 0"/>	%

This percentage refers to the amount indicated in question C8.

Web or EDI purchases

These can be considered purchases made via any of the following ways:

- via an online store (web shop) or via web forms on a website or an extranet of another enterprise, via “apps”;
- via EDI-type messages (EDI: Electronic Data Interchange) which means messages in an agreed or standard format suitable for automated processing (EDI (e.g. EDIFACT), XML (e.g. UBL), etc.);
- without the individual messages being typed manually.

Purchases of goods or services include the value of all goods and services purchased during the accounting period for resale or consumption in the production process, excluding capital goods the consumption of which is registered as consumption of fixed capital.

C10. During 2022, did your enterprise place orders for goods or services via:

Please exclude manually typed e-mails.

	Yes	No
a. A website or “apps”?	<input type="checkbox"/>	<input type="checkbox"/>
b. EDI-type messages?	<input type="checkbox"/>	<input type="checkbox"/>

If you answered **No to both items** → Please go to question **D1**.
 Otherwise → Please go to question **C11**.

C11. What was the percentage of the total purchases that resulted from orders placed electronically (via a website, “apps” or EDI-type messages), in 2022 (excluding VAT)?

Exclude any subsidiaries, parent enterprises and foreign branches for the purposes of this survey.

%

C12. Please provide a percentage breakdown of the total turnover from orders placed electronically (via a website, “apps” or EDI-type messages) in 2022, by geographic areas:

a. Luxembourg.....	<input type="text" value=""/>	%
b. Belgium, France, Germany, Netherlands	<input type="text" value=""/>	%
c. Other EU countries	<input type="text" value=""/>	%
d. Rest of the world.....	<input type="text" value=""/>	%
Total (a.+b.+c.+d.)	<input type="text" value="1 0 0"/>	%

This percentage corresponds to the proportion of purchases indicated in question **C11**.

Section D - Data utilisation, sharing, analytics and trading

Use of business software

D1. Does your enterprise use the following business software?

	Yes	No
a. Enterprise Resource Planning (ERP)..... An ERP (Enterprise Resource Planning) is a software package used to manage resources by sharing information among different functional areas (e.g. accounting, planning, production, marketing, etc.). ERP software can be off-the-shelf software, customised to the needs of the enterprise or self-created software	<input type="checkbox"/>	<input type="checkbox"/>
b. Customer Relationship Management (CRM) software e.g. Software for managing information about customers (e.g. relations or transactions), CRM facilitates communication with the customer and helps track customer interests, purchasing habits.	<input type="checkbox"/>	<input type="checkbox"/>
c. Business Intelligence (BI) software BI software accesses and analyses data (e.g. from data warehouses, data lakes) from internal IT systems and external sources and presents analytical findings in reports, summaries, dashboards, graphs, charts and maps, to provide users with detailed insights for decision-making and strategic planning.	<input type="checkbox"/>	<input type="checkbox"/>

Data sharing

D2. Does your enterprise share data electronically with suppliers or customers within the supply chain (e.g. via websites or apps, EDI-systems, real-time sensors or tracking)?

This data may be exchanged via websites, networks or other means of electronic data transfer, excluding e-mails not suitable for automated processing or manually typed. Some of the examples of data exchange: information on inventory levels, progress of deliveries, progress in service provision, demand forecasts, products availability, customer requirements, e-commerce data, information regarding production or maintenance.

Yes.....
No

Data analytics

Data analytics refers to the use of technologies, techniques or software tools for analysing data to extract patterns, trends and insights to make conclusions, predictions and better decision-making with the aim of improving performance (e.g. increase production, reduce costs). Data may be extracted from your own enterprise' data source or from external sources (e.g. suppliers, customers, government)

D3. Does your enterprise perform data analytics by own employees?

Please, consider internal and external data sources.

Yes..... → Please go to question D4.
No → Please go to question D5.

D4. Does your enterprise perform data analytics on data from the following sources?

	Yes	No
a. Data analytics on data from transaction records such as sale details, payments records..... e.g. from Enterprise Resource Planning system (ERP), own webshop	<input type="checkbox"/>	<input type="checkbox"/>
b. Data analytics on data about customers such as customer purchasing information, location, preferences, customer reviews, searches e.g. from Customer Relationship Management system (CRM) or own website	<input type="checkbox"/>	<input type="checkbox"/>
c. Data analytics on data from social media, incl. from your enterprise's own social media profiles e.g. personal information, comments, video, audio, images	<input type="checkbox"/>	<input type="checkbox"/>
d. Data analytics on web data e.g. search engine trends, web scraping ³ data	<input type="checkbox"/>	<input type="checkbox"/>
e. Data analytics on location data from the use of portable devices or vehicles..... e.g. portable devices using mobile telephone networks, wireless connections or GPS	<input type="checkbox"/>	<input type="checkbox"/>
f. Data analytics on data from smart devices or sensors e.g. Machine to Machine (M2M) communications, sensors installed in machinery, manufacturing sensors, smart meters, Radio frequency identification (RFID ⁴) tags	<input type="checkbox"/>	<input type="checkbox"/>
g. Data analytics on government authorities' open data e.g. enterprise public records, weather conditions, topographic conditions, transport data, housing data, buildings data	<input type="checkbox"/>	<input type="checkbox"/>
h. Data analytics on satellite data e.g. satellite imagery, navigation signals, position signals Please, include data acquired from enterprise's own infrastructure or from externally provided service (e.g. AWS Ground Station) and exclude location data from the use of portable devices or vehicles using GPS.	<input type="checkbox"/>	<input type="checkbox"/>

D5. Does an external enterprise or organisation perform data analytics for your enterprise?

Please include data analytics based on data from internal and external sources.

Yes.....

No

³ **Web scraping:** use of computer program for extracting data from website

⁴ **A Radio Frequency identification-RFID** tag is a device that can be applied to or incorporated into a product or an object and transmits data via radio waves.

Data trading

D6. During 2022, did your enterprise sell (access to) any of its own data?

e.g. data about your enterprise's customers' preferences, data from your enterprise's smart devices or sensors.

Yes.....

No

D7. During 2022, did your enterprise purchase (access to) any data?

e.g. data about other enterprise's customers' preferences, data from other enterprises's smart devices or sensors.

Yes.....

No

Section E - Use of cloud computing services

Cloud computing refers to **ICT services** that are used **over the internet** to access software, computing power, storage capacity etc., **where the services have all of the following characteristics:**

- are delivered from **servers** of service providers
- can be easily **scaled** up or down (e.g. number of users or change of storage capacity)
- can be used **on-demand by the user**, at least after the initial set up (without human interaction with the service provider)
- are **paid** for, either per user, by capacity used, or they are pre-paid.

Cloud computing may include connections via Virtual Private Networks (VPN).

E1. Does your enterprise buy any cloud computing services used over the internet?

Please exclude free of charge services.

Yes..... → Please go to question **E2**.

No → Please go to question **F1**.

E2. Does your enterprise buy any of the following cloud computing services used over the internet?

Please exclude free of charge services.

	Yes	No
a. E-mail, as a cloud computing service.....	<input type="checkbox"/>	<input type="checkbox"/>
b. Office software, as a cloud computing service..... e.g. word processors, spreadsheets, etc.	<input type="checkbox"/>	<input type="checkbox"/>
c. Finance or accounting software applications, as a cloud computing service	<input type="checkbox"/>	<input type="checkbox"/>
d. Enterprise Resource Planning (ERP) software applications, as a cloud computing service	<input type="checkbox"/>	<input type="checkbox"/>
e. Customer Relationship Management (CRM) software applications, as a cloud computing service	<input type="checkbox"/>	<input type="checkbox"/>
f. Security software applications, as a cloud computing service	<input type="checkbox"/>	<input type="checkbox"/>
e.g. antivirus program, network access control		
g. Hosting the enterprise's database(s), as a cloud computing service	<input type="checkbox"/>	<input type="checkbox"/>
h. Storage of files, as a cloud computing service.....	<input type="checkbox"/>	<input type="checkbox"/>
i. Computing power to run the enterprise's own software, as a cloud computing service	<input type="checkbox"/>	<input type="checkbox"/>
j. Computing platform providing a hosted environment for application development, testing or deployment, as a cloud computing service	<input type="checkbox"/>	<input type="checkbox"/>
e.g. reusable software modules, application programming interfaces (APIs)		

Section F - Artificial Intelligence

Artificial intelligence refers to systems that use technologies such as: **text mining, computer vision, speech recognition, natural language generation, machine learning, deep learning** to gather and/or use data to predict, recommend or decide, with varying levels of autonomy, the best action to achieve specific goals.

Artificial intelligence systems **can be purely software based**, e.g.:

- chatbots and business virtual assistants based on natural language processing;
- face recognition systems based on computer vision or speech recognition systems;
- machine translation software;
- data analysis based on machine learning, etc.;

or **embedded in devices**, e.g.:

- autonomous robots for warehouse automation or production assembly works;
- autonomous drones for production surveillance or parcel handling, etc.

F1. Does your enterprise use any of the following Artificial Intelligence technologies?

	Yes	No
a. Technologies performing analysis of written language (text mining)	<input type="checkbox"/>	<input type="checkbox"/>
b. Technologies converting spoken language into machine-readable format (speech recognition)	<input type="checkbox"/>	<input type="checkbox"/>
c. Technologies generating written or spoken language (natural language generation, speech synthesis)	<input type="checkbox"/>	<input type="checkbox"/>
d. Technologies identifying objects or persons based on images or videos (image recognition, image processing)	<input type="checkbox"/>	<input type="checkbox"/>
e. Machine learning (e.g. deep learning) for data analysis	<input type="checkbox"/>	<input type="checkbox"/>
f. Technologies automating different workflows or assisting in decision making (Artificial Intelligence based software robotic process automation)	<input type="checkbox"/>	<input type="checkbox"/>
g. Technologies enabling physical movement of machines via autonomous decisions based on observation of surroundings (autonomous robots, selfdriving vehicles, autonomous drones)	<input type="checkbox"/>	<input type="checkbox"/>

If you answered **No to all items** → Please go to question **G1**.
 Otherwise → Please go to question **F2**.

F2. Does your enterprise use Artificial Intelligence software or systems for any of the following purposes?

	Yes	No
a. for marketing or sales e.g. - customer profiling, price optimisation, personalised marketing offers, market analysis based on machine learning, - chatbots based on natural language processing for customer support, - autonomous robots for orders processing.	<input type="checkbox"/>	<input type="checkbox"/>
b. for production or service processes e.g. - predictive maintenance or process optimisation based on machine learning, - tools to classify products or find defects in products based on computer vision, - autonomous drones for production surveillance, security or inspection tasks, - assembly works performed by autonomous robots.	<input type="checkbox"/>	<input type="checkbox"/>
c. for organisation of business administration processes or management e.g. - business virtual assistants based on machine learning and/or natural language processing, e.g. for document drafting, - data analysis or strategic decision making based on machine learning, e.g. risk assessment based on machine learning, - planning or business forecasting based on machine learning, - human resources management based on machine learning or natural language processing, e.g. candidates pre-selection screening, employee profiling or performance analysis.	<input type="checkbox"/>	<input type="checkbox"/>
d. for logistics e.g. - autonomous robots for pick-and-pack solutions in warehouses for parcel shipping, tracing, distribution or sorting, - route optimisation based on machine learning.	<input type="checkbox"/>	<input type="checkbox"/>
e. for ICT security e.g. - face recognition based on computer vision for authentication of ICT users, - detection and prevention of cyber-attacks based on machine learning.	<input type="checkbox"/>	<input type="checkbox"/>
f. for accounting, controlling or finance management e.g. - machine learning to analyse data that helps to make financial decisions, - invoice processing based on machine learning, - machine learning or natural language processing for bookkeeping documents.	<input type="checkbox"/>	<input type="checkbox"/>
g. for research and development (R&D) or innovation activity excluding research on AI e.g. - analysis of data for conducting research, solving research problems, developing a new or significantly improved product/service based on machine learning.	<input type="checkbox"/>	<input type="checkbox"/>

Section G - Invoicing

There are invoices in **paper form** and **electronic form**.

Invoices in **electronic form** are of two types:

- **E-invoices** are electronic invoices in a standard structure **suitable for automatic processing** (EDI (e.g. EDIFACT), XML (e.g. UBL)). They may be directly exchanged between suppliers and customers, via service operators or via an electronic banking system.
- **Invoices** in electronic format **not suitable for automatic processing** (e.g. e-mails, e-mail attachment as PDF, images in TIF, JPEG or other format).

If you cannot provide the exact percentages an approximation will suffice.

G1. Of all invoices your enterprise issued/sent during 2022, what percentage was issued/sent as:
Include also invoices sent via intermediaries (e.g. accountants, e-invoice service providers, etc.).

- a. **Invoices in electronic form, in a standard structure suitable for automated processing (e-invoices)?** %
Excluding the transmission of PDF files.
(EDI (e.g. EDIFACT), XML (e.g. UBL), etc.)
- b. **Invoices in electronic form, not suitable for automated processing?** %
Including the transmission of PDF files.
(e.g. emails, images in TIF, JPEG or other format)
- c. Paper invoices? %
- Total number of invoices sent (a.+b.+c.)** %

Section H - Comments and contact coordinates

H1. In the box below, please write any additional comments that you would like to make:

H2. How long did it take to complete this questionnaire?

Hours Minutes

H3. Please indicate the department(s) in your business that provided the information:

ICT.....	<input type="checkbox"/>	Management.....	<input type="checkbox"/>
Finance / Accounting.....	<input type="checkbox"/>	Other	<input type="checkbox"/>
Human resources	<input type="checkbox"/>		

Please provide details of the person we should contact if we have any queries regarding the information returned on this questionnaire.

Name Phone

Position E-mail

Website http://

(location)

(date)

(signature)

Thank you for completing the questionnaire, your response is important.