INSTITUTO NACIONAL DE ESTADISTICA

Survey on the use of Information and Communication Technologies and e-commerce in Enterprises

Methodology

October 2024

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I Introduction

The rapid development of Information and Communication Technologies (ICT), its incremental use in enterprises, public administrations and households and, more notably, the strong growth of the Internet began to have a significant economic and social impact.

Statistics on the Information Society (IS) constituted themselves a new statistical field that deals with the development and repercussion of the use of ICTs in the economy and society. More specifically, the statistics on the Information Society encompass issues related to the production, preparation for use and impact of ICTs, and of digital content services.

Both the OECD and the Statistical Office of the European Union (Eurostat) created working groups in order to investigate the core activities of the IS

Naturally, the National Statistics Institute (INE) participates in these OECD and Eurostat working groups.

In the year 2002, the Member States of the EU carried out, for the first time, SICTEC 2001, with harmonised criteria for the writing of the questionnaire and estimation of variables, for the purpose of achieving a general perspective of the implementation and use of ICTs and electronic commerce within the European area and the preparation of the indicators for the corresponding reference frameworks for measuring compliance with the European strategies within the scope of the IS.

Once the general questionnaire was structured, the subsequent editions of the SICTEC have been developed annually using this same structure.

II European Legislation

In the year 2004, European Parliament and Council Regulation No. 808/2004, of 21 April 2004, was passed, regarding community statistics of the IS.

The objective of this Regulation is to create a common framework for the systematic production of community statistics of the IS.

The Regulation considers the collection of most of the statistical information necessary for the compilation of the indicators for the corresponding reference framework. Moreover, it collections all that information necessary for analysing the IS in a given short term, both in enterprises and in households.

Each year, and over the agreements adopted within the heart of the Eurostat Working Group on IS Statistics, a legal act is prepared, specifying the criteria for implementing the Regulation. This document details the area of study and the variables to study during the period, both for enterprises and for households. This document is published in the European Union official journal.

Section Variables and their definition includes the most important modules that have been asked during the survey years, although not all of them are compulsory according to the European Regulation or appear in every edition of the survey.

On January 1, 2021, the European Regulation 2019/2152 on European business statistics came into force, which repeals, among others, 808/2004

In the 2021-2022 edition, as an application of the European regulation 2019/2152, the statistical unit of the ICT SURVEY was modified, becoming the Statistical Enterprise as defined in the European Union Regulation 696/93, on the statistical units for the observation and analysis of the production system in the Community.

III New for the 2021-2022 edition: new practical implementation of the “enterprise” statistical unit

The statistical definition of the “Enterprise” statistical unit is established by a regulation of the European Union (696/93) that defines it as the “smallest combination of legal units that is an organized unit producing goods or services and that enjoys a certain degree of decision-making autonomy, particularly when using the resources available to it.” The enterprise exercises one or more activities in one or more places. An enterprise can correspond to a single legal unit.”

Up until the ICT SURVEY 2020-2021, the INE, like most of the European Union’s statistics offices, has been **identifying**, for operational purposes, the statistical unit enterprise with the legal unit (in the Spanish case, through the NIF). Thus, **for statistical purposes each Legal Unit formed an enterprise**.

However, the progressive complexity of the way in which **enterprise groups** operate internally nowadays caused the European Statistical System (ESS) to search for an improvement as regards the way in which the activity of these groups is reflected in enterprises’ official statistics. Legal Units that belong to enterprise groups sometimes sell their products or provide their services exclusively or mainly within the group, without being market-oriented or having decision-making power over the entire production process.

For all these reasons, and in accordance with the European Statistical System (ESS), based on data with reference 2021-2022, **the Survey on the use of ICT and Electronic Commerce in companies establishes a new practical application of the statistical concept of Enterprise**, by which an 'enterprise' can be:

– An independent Legal Unit that is not part of the enterprise group, meaning that it should have decision-making autonomy.

– An enterprise group formed for one or more Legal Units.

– A subset of one or more Legal Units of an enterprise group.

This change in the treatment of enterprises, which has also been implemented in the *Statistical Use of the Central Enterprise Register (SUCER), was announced by the INE in a Press Release dated December 17, 2019*:

https://www.ine.es/prensa/nueva_definicion_empresa.pdf

It should be noted that most of the Enterprises are independent Legal Units, so the Enterprise=Legal Unit identity remains valid. The change will only affect Legal Units (LU) that are part of Enterprise Groups (3.1% of the total). The latter are quite important in economic and employment terms, however, meaning that the Inward ICT Survey data series prepared under the new Statistical Enterprise approach is not strictly comparable to that of previous years, prepared under the traditional criteria based on separate Legal Units.

In order to elaborate the ICT SURVEY under this new 'Statistical Enterprise’ approach, a method was developed based on the following steps, each of which will be described in greater detail in the corresponding sections of this methodological document.

1. Delineation of the Statistical Enterprises that operate in enterprise groups using the so-called *Profiling* methodology and typification of the Legal Units comprising them (see details in section 3.3 of this document)

2. Adjustment of the sample design and the information collection phase (see details in sections 5 and 6 of this document).
3. Aggregation of the Legal Units that make up each sample Statistical Enterprise and study of the combinations of typologies of said Legal Units (see details in section 7.2.1).
4. Consolidation of sample Statistical Enterprises that consist of more than one Legal Unit and that have relationships between them. For these enterprises, flows between their Legal Units are identified to proceed with the cancellation of intra-enterprise transactions (see details in section 7.2.2).
5. Construction of complete statistics, based on Statistical Enterprises, whether they are independent Legal Units or enterprise group Enterprises (see details in section 7.2.3).

The essential idea is that if the Legal Units of a Statistical Enterprise exclusively or primarily serve other Legal Units of the same Enterprise (for example, selling products under a vertical integration of the production process or providing services as an auxiliary relationship), these servile Legal Units must be combined with the others which they support to form the authentic "Enterprise" statistical unit. As such, the corresponding variables must be combined and consolidated. Legal Units that are not part of groups continue to be considered Enterprises in and of themselves.

The implementation strategy for the statistical unit 'enterprise' in the ICT SURVEY in terms of sample design and information collection is based on three points:

– **The basic information unit is still the Legal Unit.**

  This point is based on the fact that it is at this level that it is easier for the informant to obtain the required information on the use of ICTs and CE. While it does not provide all the information necessary to generate the S. on the use of ICTs and the CE, this information is the main basis for it.

  Information at the Statistical Enterprise level will be derived from a process of grouping and consolidating information from the Legal Units that comprise it.

– **The statistical burden on informants must be neutral.**

  That is, in no case should the statistical burden on enterprises be increased.

– **In view of the needs of the National Statistical Plan (PEN), it must be possible to provide information both from the perspective of the Legal Units and the Enterprises as a statistical unit.**

  It must be considered that there are PEN operations, such as those related to National Accounts, which require information at a level other than that of the Statistical Enterprise. The procedure established should allow for these estimates to be obtained.

This new Statistical Enterprise approach was implemented in the S. on the use of ICT and CE in companies in the 2021-2022 edition and is the one that prevails for subsequent exercises. Since the statistical results of the ICT SURVEY and its distribution by activities and enterprise size is affected by the change, both data from the traditional approach (based on Legal Units) and the new approach (based on Statistical Enterprises) were disseminated for the 2021-2022 reference year, so that users of these statistics are able to compare.

IV Methodology of the Survey on the use of Information and Communication Technologies (ICT) and Electronic Commerce in Companies

1 Objetives

The objective of the SICTEC is to analyse, using the research on a sample, the implementation and use of the information and Communication Technologies (ICT) and Electronic Commerce in the business sector.

The fact of using a methodology that is widely accepted internationally allows for reaching the objective of international comparability of the results obtained, and contributing our national experience to those studies regarding the implementation of the IS in enterprises.

2 Survey scope

The scope of the survey is defined with regard to the population studied, to the time and to the area.

The SICTEC uses a questionnaire model that has been send to all enterprises in the sample (including those with fewer than 10 wage earners, a stratum that is considered to be optional among the INE commitments to Eurostat).

2.1 POPULATION SCOPE

The SICTEC studies the population comprising all enterprises whose main activity is described in sections C, D, E, F, G, H, I, J and L, divisions 69 to 75 of section M, section N and group 95.1, according to NACE.

That is, the sectors to be analysed are the manufacturing industry, supply of electrical energy, gas and water, construction, wholesale and retail trade, repair of motor vehicles and motorcycles, transport and storage, accommodation services, food and beverage services, information and communications, real estate activities, professional, scientific and technical activities, administrative and support services activities, and repair of computers and communications equipment.

The complete list of sections, divisions and groups is presented in Table 1 of Annex I.

In the 2020-2021 edition, division 75 not previously studied, is added to the population scope.

2.2 TIME SCOPE

The SICTEC is an annual survey, which in order to guarantee the objective of the international comparability of results, has two reference periods. On the one hand, the variables for the infrastructure, equipment and use of ICTs refer to the first quarter of the year of collecting data (t).

On the other hand, the variables regarding electronic commerce, as well as those for the general information on the enterprise, refer to the entirety of the year t-1. The data relating to employment is requested as an annual average for t-1.

2.3 GEOGRAPHICAL SCOPE

All of the statistical units located in Spain constitute the research subject.

3 Statistical unit and Reporting unit

3.1 STATISTICAL UNIT

The **statistical unit** of analysis may be defined as the element or component of the target population to which the tabulation of data and the aggregated statistics obtained as a result of the surveys refer.

The basic statistical unit for these operations is **the enterprise**, which is understood as the *'smallest combination of legal units that forms an organizational unit producing goods or services and that enjoys certain decision-making autonomy, particularly when using the resources available to it. The enterprise can carry out one or more activities in one or several places.' A business can correspond to a single legal unit*." (definition of the Regulation of the European Union 696/93).

As in section III, a new operational concept for 'Enterprise' was applied for the 2021-2022 ICT SURVEY, which we will hereinafter call the "Statistical Enterprise" and which differs from previous years in that, beginning this year, the Enterprise = Legal Unit analogy will no longer always be true. In other words, some Statistical Businesses may be made up of two or more Legal Units.

3.2 REPORTING UNIT

The reporting unit, or rather, the unit from which the basic information is obtained. Response is facilitated due to it being perfectly defined and located and having necessary accounting and employment data, and homogeneous information is obtained. Legal Units can be companies with legal personality (limited companies) or natural persons (individual entrepreneurs).

Obtaining the information from the Legal Units proceeds from direct collection by completing the questionnaire.

Thus:

– When using the Legal Unit as a statistical unit, information is obtained from the Legal Units, and statistics are compiled under said Legal Units.

– When using the Statistical Business as a statistical unit, information is obtained from each of the Legal Units that make up the Business, and statistics are compiled by grouping (and in the necessary cases, consolidating) variables for all Legal Units that form the Business.

3.3 DELINEATION OF STATISTICAL ENTERPRISES USING THE *PROFILING* METHODOLOGY

This process -essential for SICTEC preparation in Statistical Enterprise terms- was developed by the INE Board of Directors Unit. The rules agreed upon in the European Statistical System working groups were applied, based on which the Profiling methodology (delineation of companies) was established as the best procedure for identifying companies when analysing Legal Units operating in group settings.

The delineation of companies within groups is carried out using a series of criteria whose final result is not only the definition of the Enterprises that operate within a group, but also the links between the Legal Units that comprise them and their primary characteristics.

Details can be found in the Methodology available on the INE website, at the following link:

https://www.ine.es/metodologia/t37/t3730200_profiling.pdf

Some of the principles and criteria used for enterprise delineation are highlighted below, especially those that affect the subsequent preparation of the *SICTEC.*

To start with, *Profiling* takes into account the following questions:

– **Market / non-market criteria.** All Legal Units that make up market-producing statistical enterprises must also be market-based. The Institutional Sector Code is, therefore, a critical variable in the enterprise creation processes. A unit is defined as market if it is classified as S11, S12 or S14 in terms of its Institutional Sector (non-financial corporations, financial institutions and Households as individual entrepreneurs, respectively). If it is classified as S13, S15 or S2 it will be considered non-market.

– **Holdings and Headquarters**. These are units with very specific functions within enterprise groups (codes NACE rev.2 6420 and 7010). Given the needs of various users, these activities are considered *productive.*

Through the *Profiling* methodology, each of the Legal Units of an enterprise group is perfectly assigned to the enterprise of which it is part. The following relationships occur:

– An enterprise group can have a single enterprise or be made up of several enterprises.

– Each enterprise can contain a single Legal Unit or several Legal Units.

When a market-producing enterprise (institutional sectors S11, S12 or S14) is made up of several Legal Units, *Profiling* also identifies certain relationships between these Units, such as:

– **Progressive vertical integration**. This type of integration occurs when different Legal Units carry out different stages of the same production process. The outputs of the early stages are the inputs for the later ones, with the particularity that only the final stage output is sold to the market. For example, Activity 29.3 (Manufacture of components, parts and accessories for motor vehicles) is considered an *upstream* activity of Activity 29.1 (Manufacture of motor vehicles) which is the *downstream* activity.

The following types of Legal Units arise from this relationship:

- U for the *Upstream* at the beginning of the chain (in the previous example, the Legal Unit with Activity 29.3)
- D (or X if also integrated in an industry-commerce chain, which will be described in the subsequent point) for the *Downstream at* the end of the chain (in the previous example, the Legal Unit with Activity 29.1)

To identify these Legal Units, we start from a predefined list of activity combinations and verify certain non-relevant conditions in the affected Legal Units.

– **Backward Integration Industry-Wholesale Trade.** This type of integration occurs when several Legal Units in the same Statistical Enterprise are in charge of different phases of a chained industrial-commercial process; that is, when a trade unit is in charge of selling products from the industrial unit with which it is connected within the Enterprise to the market. For example, activity 45.1 (motor vehicle trade) and activity 29.1 (Manufacture of motor vehicles)

  The following types of Legal Units arise from this relationship:

  - C for the Legal Unit that markets the product (in the example, the Legal Unit whose activity is 45.1)
  - I (or X, if it also forms part of a progressive Industrial chain, already explained in the previous point) for the Legal Unit that manufactures the product (in the example, the Legal Unit whose activity is 29.1)

  To identify these Legal Units, we start from a predefined list of activity combinations and verify certain non-relevant conditions in the affected Legal Units

– **Auxiliary units (A)** : Auxiliary Legal Units that provide services to other Legal Units in the Statistical Enterprise.

– **Productive units**. Legal Units that have not been identified with the aforementioned characteristics (U, D, I, X, C, A) are classified as productive

In summary, the Legal Units that make up a Statistical Enterprise will always be classified into one of the following types:

– U: Legal Units with Upstream activity in vertical integration (can be considered the industrial auxiliary unit).

– D: Legal Units with Downstream activity in vertical integration (can be considered the industrial productive unit).

– I: Industrial Legal Units that make up the Industry-Trade chain.

– C: Trade Legal Units that make up the Industry-Trade chain.

– X: Industrial Legal Units that are part of both a vertical integration and an industry-trade chain.

– A: Auxiliary Legal Units that provide services to other Legal Units in the Statistical Enterprise.

– P: Productive Legal Units that are not part of Upstream-Downstream or Industry-Trade chains

These typologies of market enterprise Legal Units, defined in the enterprise delineation process according to the *Profiling* methodology, will facilitate the subsequent task of consolidating the Statistical Enterprise variables.

4 Variables and their definition

Enterprise's main economic activity

The economic activity carried out by an enterprise is defined as the creation of added value through the production of goods and services. The main economic activity is understood to be that which generates the greatest added value. Considering the difficulty implied for companies in calculating added value when they carry out several activities, the main activity is considered to be that which generates the greatest turnover, or failing this, that which employs the most persons.

Dimension or size of the enterprise

The size of enterprises is one of the most important variables when it comes to identifying enterprise's behaviour. This dimension may be established in terms of the magnitude of the turnover or the production value, or by considering the number of persons who comprise the enterprise's staff. As a result, the questionnaire for the ICT Survey includes both questions, in order to quantify both variables.

A. General information of the enterprise

I. PERSONNEL EMPLOYED IN THE ENTERPRISE

This is the number of persons who work in the enterprise, as well as the number of persons who, working outside of the enterprise, are part of the enterprise's staff and are paid by the enterprise (for example, trade representatives and personnel dedicated to the delivery of orders, repair and maintenance who work for the enterprise). This includes paid, unpaid and independent personnel.

Paid employed personnel includes those workers linked to the enterprise by a work contract, and who are paid with set or periodical amounts in the form of a salary, wages, commission, piecework pay or payment in kind. This may be permanent staff (with a permanent contract or labour link) and temporary staff (with a temporary contract). A worker from a temporary employment agency is an employee of the agency and not an employee of the unit (enterprise) where they work.

Also considered as paid personnel are: those students with a formal commitment, by which they contribute to the production process of theenterprise in exchange for payment and/or educational services, those employees hired through a contract that is specifically intended to encourage the hiring of unemployed persons, in-house workers if there is an explicit agreement in the sense that they are paid according to the work that they do and they are included on the payroll.

Paid personnel also includes part-time workers, seasonal workers and persons on strike or who have been on a short-term leave of absence, but excludes those who have been on a long-term leave of absence.

Those persons who actively manage or participate in the enterprise's work activities but do not receive fixed remuneration or a salary constitute *unpaid personnel*. Self-employed personnel are included in this type of personnel.

Independent personnel (freelancer) or individual businesspersons are considered to be those individuals who habitually, personally and directly carry out the economic activity for payment, without a work contract, though using the paid service of other persons.

Responsibility of the freelancer is unlimited, being liable for business activities in terms of all their present and future assets, such that no distinction is drawn between the personal assets and that of the enterprise.

II. TURNOVER

This includes those amounts invoiced by the enterprise during the reference year, due to the provision of services and sales of goods that are the object of activity of the enterprise. Sales are recorded without including the VAT charged to the client.

These are counted in net terms, deducting returns of sales, as well as rebates on sales. Not deducted are cash discounts, nor discounts for prompt payment. Turnover does not cover the sale of fixed assets or production subsidies received. The amount of turnover is calculated as the sum of net sales of goods and the rendering of services.

B. Computer use

ICTs are understood to be the set of tools, customarily of an electronic nature, used for the collection, storage, processing, dissemination and transmission of information.

ICTs are considered to be both physical devices (computer equipment, communications networks, terminals, etc.) and software or computer applications that run on these devices.

This section aims to obtain information on the use made by companies of technological devices such as desktop computers, laptops, tablets, smartphones, etc.

Information is requested regarding the computing resources of the enterprise's staff (personnel that uses PCs for business purposes).

It also asks about the use of open source software typologies (operating systems, internet browsers, office applications, web/internet servers,...);.

C. ICT experts and profiles

In this section, the informant must specify whether the enterprise employs ICT specialists and whether the enterprise provided training activities in order to develop and improve the ICT skills of their staff.

Since the 2017 edition, the percentage of women ICT experts in the enterprise is required.

Moreover, the informant is asked whether ICT specialists were hired – or an attempt was made to- and whether difficulties arose when trying to fill an ICT specialist vacancy. The type of difficulty experienced by the enterprise is also requested.

D. Internet access and use

This section intends to measure Internet use, that is, to quantify the main characteristics associated with Internet use by companies, and the reasons why the enterprise does not have such a service.

As regards Internet access, information is requested on the different types of Internet connections: connection Fixed and and connection through mobile telephone networks.

For the *Fixed Connection to the Internet*, information must be broken down into three items: DSL connection (ADSL, HDSL, SDSL, VDSL…), Cable and fibre optic networks (FTTP) and Other fixed connections (PLC, leased line, satellite…). Information is also requested regarding the maximum download speed contracted for the Fixed Connection to the Internet.

On the other hand, the *Mobile Internet connection* refers to Internet access using mobile devices through mobile connection networks.

Mobile devices allowing an Internet connection are as follows:

– Portable computers (notebook, netbook, laptop, tablet PC, etc.)

– Other portable devices (smartphone, PDA phone, etc.)

Information is requested on the use of mobile Internet connection and its use through such devices, and on staff using them for business purposes.

Another aspect to bear in mind in the study of Internet use by companies is to ascertain whether the enterprise has a website/page, as well as what services it offers online, distinguishing between the following: presentation of the enterprise, privacy policy statement, ease of access to product catalogues or price lists, possibility of clients customising or designing products, carrying out online orders or reservations, carrying out online payments, online monitoring of orders, customisation of the website for regular clients, and advertising of job vacancies or online receipt of job applications.

The enterprise is also asked whether it allows teleworking by its employees and the percentage of employees who telework regularly per week.

In addition, information is requested on the use of Social Media (SM) or applications based on Internet technologies or communication platforms to connect, create or exchange online content with clients, suppliers/partners, or within the enterprise itself as part of carrying out the activity.

Additionally, it is asked whether the enterprise pays for advertising on the internet and whether it uses targeted advertising methods.

E. Data analysis

It is requested whether it performs data analysis and, if so, on which sources it performs this analysis. In addition, it is asked whether another external enterprise or organisation performs data analytics for the enterprise.

F. Cloud computing

This section is included to collect information on the enterprise's use of the technology model. It is a technology model that allows ubiquitous, tailored and on-demand networked access to a shared pool of configurable computing resources (e.g. networks,

servers, storage, applications and services); examples of cloud computing solutions are Dropbox, Google appEngine, Microsoft Azure, Vcloud, eyeOS,...).

G. Artificial Intelligence

Through this module, the use of artificial intelligence systems is measured.

Artificial intelligence systems can be purely software-based or embedded in devices.

The enterprise is asked to provide information on the purpose of use and how it acquired the software or AI systems it uses. It is also asked whether the enterprise processes data on individuals using Artificial Intelligence and whether it has any measures in place to check the results generated by AI technologies for possible biases.

In addition, in the case that the company does not use Artificial Intelligence systems, the reasons why it does not use them are requested.

H. ICT security

The main objective of this module is to understand the ICT security measures employed by the enterprise, i.e. controls and procedures applied to ICT systems to ensure the integrity, authenticity, availability and confidentiality of data and systems.

I. E-Commerce

Electronic commerce (*eCommerce*), is understood to be all those transactions carried out through networks based on Internet protocols (TCP/IP) or over telematic networks other than the Internet.

Goods and services are procured or reserved over these networks, buy payment or distribution may be off-line. Moreover, except where it involves a digital product (digital good or service), goods will reach their addressee generally via traditional distribution channels.

Orders carried out by telephone, fax or email and registered manually are not considered to be electronic commerce. Structured forms on some websites for placing an order to the enterprise, and which are handled as e-commerce ARE included.

The structure of this block comprises two sections: sales by e-commerce and purchases by e-commerce.

Sales are structured in two blocks: (1) Web Sales: sales made through (1a) the website or mobile application (app) or (1b) via digital platform (marketplace) and, (2) EDI Sales: sales made through messages like Electronic Data Interchange, in a format agreed upon that may be processed automatically.

Web sales are divided by sales channel and by type of customer.

Purchases are structured in two blocks: (1) those purchases made via an online store or website or extranet or mobile applications, and (2) those purchases made via Electronic Data Interchange (EDI)-type messages, in a format agreed upon that may be processed automatically.

J. Expenditure on ICT

It includes the expenses made on ICT products, broken down by group of products.

Said information divided into four sections:

– Total Expenditures on ICT security.

– Expenditure on AI systems

K. Internal R&D activities

The objective is to ascertain the creative work carried out within the enterprise, which is undertaken systematically in order to increase the volume of knowledge to develop new applications, such as products (goods and services) and new or significantly improved processes of companies with less than 10 employees.

5 Sample design

In order to give data at the level of the Statistical Unit Enterprise (SUE), indirect sampling is applied, in the sense that results are given by SUE from the sample of Legal Units (LeUs). So there is a difference between the design based on LeUs and the one based on SUE.

The sample design applied at the LeU level is the one that has usually been carried out, random stratified. In each stratum, a random sample is obtained, except the one formed by LeUs with 500 or more employees, in which all form part of the sample. Other units of smaller size but relevant to the survey are also included in the sample, in a certain or exhaustive way.

The estimators are those of expansion, adjusted for the lack of response, changes in stratum and excess coverage.

For the sample design based on SUE, indirect sampling is applied, applying the methodology set forth by Lavallée and Labelle-Blanchet in their article: "Indirect Sampling applied to Skewed Population," Survey Methodology, June 2013, Vol 39, Statistics Canada.

We say that a SUE belongs to the sample of SUEs if any of its LeUs belong to the sample of LeUs.

Each of the sample design stages is detailed below.

5.1 SAMPLING FRAME

The sampling framework is obtained from the National Business Register (NBR), which is updated once a year with administrative sources -primarily tax and Social Security- and with information from the INE's statistical operations.

The NBR is a tiered integrated information system, in which the following are ordered, from least to greatest: establishment, Legal Unit, Statistical Business, and business group. The NBR contains information on the main economic activity and on the number of employees, variables that are used in the sample design, and on identification and location data, which are necessary for correct information collection.

5.2 DETERMINATION OF EXHAUSTIVE UNITS

Exhaustive units are those that enter the sample in a certain way, with probability 1, which is why they are also known as self-represented. The following exhaustive units are considered:

– All LeUs, with 500 or more employees,

– Other units of smaller size but relevant to the survey are also exhaustively included.

5.3 STRATIFICATION

The population under study, contained in the framework of LeUs, is divided into homogeneous groups with respect to what is intended to be studied and disjoint, called strata. Each stratum constitutes an independent population for sampling purposes.

Each stratum is formed by crossing autonomous community or city × main economic activity × size group, measured by the number of wage earners.

1. ***Size of the legal unit***, according to the number of employees. The following brackets are considered:
   - From 0 to 2
   - From 3 to 9
   - From 10 to 19
   - From 20 to 49
   - From 50 to 99
   - From 100 to 199
   - From 200 to 499
   - 500 or more
2. ***Branches of activity*** according to NACE rev.2, offered in detail in Table 1.

All activities are stratified by autonomous community or city except for the '56' economic division, which is only stratified by size.

3. **Autonomous Community or Autonomous City** in which the headquarters of the legal unit is located. This considers the following:
   - Andalucía
   - Aragón
   - Asturias, Principado de
   - Balears (Illes)
   - Canarias
   - Cantabria
   - Castilla y León

- Castilla-La Mancha
- Cataluña
- Comunitat Valenciana
- Extremadura
- Galicia
- Madrid, Comunidad de
- Murcia, Región de
- Navarra, Comunidad Foral de
- País Vasco
- Rioja, La
- Ceuta
- Melilla

5.4 SAMPLE DESIGN

The sample size is calculated using an allocation between uniform and proportional, requiring a minimum of 3 units per stratum and trying to respect the elevation factors (quotient between the population size and the sample size per stratum) over time.

The sample size obtained is 24,997 LeUs (15,109 with 10 or more employees and 9,888 with less than 10 employees).

Table 2 of Annex I shows the distribution of the sample according to the CNAE 2009 and size group, and Table 3 shows the distribution of the sample according to the autonomous community or city and size group.

5.5 SAMPLE SELECTION

The selection of the sample is carried out negatively coordinating with the other surveys obtained from the same frame population in a given year. Para ello se utiliza la técnica de los números aleatorios permanentes.

5.6 ESTIMATORS

Estimator of the total at the Legal Unit (LeU) level:

Estimators are those of expansion, adjusted for the lack of response, changes in stratum and excess coverage.

The estimator of the total of a characteristic X in domain m is given by:

$$\hat{X}_m = \sum_{j \in m} X_j \cdot F_j$$

where:

Xj is the value of characteristic X in questionnaire j belonging to domain m.

Fj is the elevation factor from questionnaire j which is calculated as follows:

a) If enterprise j was selected in a stratum h, and, according to the questionnaire's data, it is in a different stratum k, then:

$$F_j = \frac{N_h}{n_h}$$

b) If enterprise j continues to belong to the same stratum h, where it was selected, then:

$$F_j = \frac{\hat{N}_h^*}{n_h^*}$$

c) In general, for exhaustive (self-represented) companies or for outliers F_j=1.

Variables used

N_h, number of legal units in the directory in stratum h.

n_h, number of legal units selected in stratum h.

n^*_h, number of legal units that have replied, that were selected in stratum h and that have not changed stratum.

$$\hat{N}_h^* = N_h \left(1 - \frac{n''_h}{n_h}\right) - \sum_{k \neq h} \sum_{j=1}^{n_h^k} F_j$$

where:

n''_h, number of legal units selected in stratum h and having duplicate out of scope.

n_{kh}, number of legal units selected in stratum h, and which are in a different stratum k, according to the questionnaire.

Sample errors are also calculated by expressing the variation of the estimator of the total stratified sample.

Estimator of the total at the level of the Statistical Unit Enterprise (SUE):

Let be the estimator of the total of Y given by:

$$\hat{Y} = \sum_{i=1}^{n^B} w_i Y_i \quad ,$$

Where n^B is the number of SUE belonging to the sample and the elevation factors w_i, are those obtained by the indirect sampling methodology:

$$w_i = \frac{m_i}{\sum_{j \in i}^{M_i} (F_{hj})^{-1}}$$

Being:

M_i : Number of LeUs j of SUE i

m_i : Number of LeUs in the sample of SUE i

F_{hj}: LeU j elevation factor in stratum h

Y_i : Y value of SUE i

5.7 SAMPLING ERRORS

Sampling errors for the estimator of the total by LeU

Let be the estimator of the total of X for a domain 'm' (any subgroup of the population, which does not have to coincide with the strata):

$$\hat{X}_m = \sum_{h=1}^{H} \sum_{j=1}^{n_h^e} \hat{F}_{hj}\, x_{hj} z_{mhj}$$

Where:

n_h^e: effective sample size of LeUs (that have responded) in stratum h.

$\hat{F}_{hj}$: Final elevation factor associated with unit j of stratum h.

z_{mhj}: random variable that takes value 1 if unit j of stratum h belongs to domain m and 0 otherwise.

X_{hj}: value that X takes in unit j of stratum h.

The relative sampling error, for the total estimator of X in domain m, is given by the following expression:

$$\widehat{CV}(\hat{X}_m) = \frac{\sqrt{\hat{V}(\hat{X}_m)}}{\hat{X}_m} \times 100$$

To calculate $\hat{V}(\hat{X}_m)$ the Raulin formula is used, which gives a good approximation to the direct method and is given as follows:

$$\hat{V}(\hat{X}_m) = \sum_h \frac{n_h^e}{n_h^e - 1} \sum_{i=1}^{n_h^e} \hat{F}_{hj}(\hat{F}_{hj} - 1)\ (x_{hj} z_{mhj} - \hat{\bar{X}}_{mh})^2$$

Where:

$$\hat{\bar{X}}_{mh} = \frac{\sum_{j=1}^{n_h^e} \hat{F}_{hj}\, \mathrm{x_{hj} z_{mhj}}}{\sum_{j=1}^{n_h^e} \hat{F}_{hj}}$$

Sampling errors for the estimator of the total by SUE

To calculate the sampling errors at the SUE level, the estimator of the total of Y in the m-domain can be expressed as a Horvitz-Thompson estimator as follows:

$$\hat{Y}_m = \sum_{h=1}^{H} \sum_{j=1}^{n_h^e} \hat{F}_{hj} \theta_{hj} z_{mhj} \qquad j \in i$$

Where:

$$\theta_{hj} = \frac{(\hat{F}_{hj})^{-1}}{\sum_{j=1}^{M_i} (\hat{F}_{hj})^{-1}} y_i \qquad j \in i$$

z_{mhj}: Is a random variable that takes value 1 if the LeU j of the SUE i of stratum h belongs to the domain m and 0 if otherwise.

y_i: value that Y takes in SUE i

This estimator takes the same form as in the case of the estimator of the total at the LeUs level. The Raulin formula can therefore be applied analogously to errors due to LeUs.

6 Information collection

The information is collected during the first quarter of the year of publishing by the information collection units (URCEs) of Valencia, Madrid, Ciudad Real and the Large Enterprise Unit, which send it to the Centralised Collection Unit (URCE), which in turn submits it to the responsible department.

The INE contacts the informant of the Legal Unit that is in the sample to remind him of the suitability of filling in online, this being the fastest and most secure method. Nonetheless, if the respondent wishes to receive the questionnaire in print format, they may request it and it will be sent to them.

The personnel in the collection units, in accordance with the previously established work quotas, carried out the collection tasks, targeting those companies that had not completed the questionnaire online or by post, for the purpose of asking them for the information, advising them as necessary and obtaining the completed questionnaire.

Following the calendar for the fieldwork and the quality control of the information obtained has been carried out each fortnight from the Central Services of the INE through the reports on the situation and the analysis of the information contained in the files submitted by the URCE with the recorded and filtered questionnaires.

7 Processing of information

7.1 INFORMATION PROCESSING FOR THE LEGAL UNIT

The phases for the processing of the information of the Legal Units are the following:

Control and cleaning of the questionnaire by the units that carry out the fieldwork, for the purpose of recovering the possible lack of data or correcting the errors in the questionnaires prior to their recording and posting to the Central Services.

- Interactive recording with filtering and error correction of the information obtained by the units carrying out the fieldwork.
- Control of the information received in the responsible department.
- Control of coverage and processing of identification errors.
- Validation of the quality of the information.
- Filtering and interactive correction of inconsistencies in the validated information.
- Preparation of a first phase of tables analysing the results.
- Macro-edition of the main aggregates in order to correct those errors not detected in prior micro-filtering phases.
- Analysis of the data.
- Creation of the definitive file with the data of the Legal Unit .

7.2 INFORMATION PROCESSING FOR THE STATISTICAL ENTERPRISE

7.2.1 Aggregation of the Legal Units that make up the sample Statistical Enterprises and study of the Legal Unit typology combinations

For this sub-process, we work with the sample Statistical Enterprises, that is, those for which at least some of the legal units are in the SICTEC sample.

For the sample Statistical Enterprises, complete information must be available on each and every one of the component legal units. This information comes either from the direct collection of questionnaires or or assignment techniques are used to complete the required information.

Once all the information is available for all the Legal Units of the Statistical Enterprise, the consolidation is carried out according to the rules of section 7.2.2.

In addition, each Statistical Enterprise is typified according its combination of the different **types of Legal Units that comprise it** (see section 3.3 of this document). Statistical Enterprises may present any of the following combinations:

a) P only. Formed only by productive units.

b) P+A only. Formed by production and auxiliary units.

c) P or P+A, and also with U+D chains and/or with I+C chains

If the Statistical Enterprise is formed only by productive Legal Units (case a) it is not necessary to discount internal flows in the economic variables, it is only necessary to add said type of variables of all the productive Legal Units that form it.

In the remaining situations (cases b and c), the statistical enterprises contain Legal Units with linking relationships. It is thus necessary to identify the flows between them in order to cancel the Statistical Enterprise's internal transactions.

7.2.2 Consolidation

For this subprocess, we work with the sample Statistical Enterprises formed by more than one Legal Unit.

The objective of the consolidation is that, once it has been determined that there are Legal Units in the Statistical Enterprise with intra-enterprise relations (that is, relations of vertical process integration, and/or industry-trade relations and/or relations of auxiliary) the servile Legal Units must be combined with the others which they support to identify and subtract these intra-enterprise transactions. The corresponding variables must therefore be combined and consolidated.

The consolidation rules applied are based on documents provided by Eurostat, and are the result of working groups and experiences from various countries.

7.2.2.1 Additive and non-additive variables

According to the criteria adopted by Eurostat, the quantitative variables are classified **as additive and non-additive.**

As an example, the number of companies and employees are considered additive; while variables such as turnover, sales or purchases of goods and services through electronic commerce are not additive.

Qualitative variables are not additive.

7.2.2.2 Consolidation of variables by type of variable

Dichotomous variables (YES/NO): The variable of the Statistical UnitEnterprise (SUE) will have a value of "SI" if any legal unit had a value of "SI" in that variable.

Non-dichotomous qualitative variables: In this case, there is the maximum download speed of the fixed Internet line contracted: the maximum of all the responses of the LeUs that belong to a SUE is chosen.

Some examples of consolidation of quantitative variables.

Turnover: The internal flows of the legal units that do not have market activity are discounted and the business figures of the legal units that have market activity within the SUE are added.

7.2.3 Construction of statistics based on Statistical Enterprises

Once processing of the sample Statistical Enterprises formed by various Legal Units is completed, the files of the consolidated enterprises are integrated with those of Statistical Enterprises that are independent Legal Units to give the complete statistic, that is:

- Sampling set of independent Legal Units
- Sample set of Statistical Enterprises whose records condense information from one or more Legal Units of enterprise groups

After that, we proceed to calculate the elevation factors for Statistical Enterprises. This will generate high statistical results which, after appropriate analysis, will form the SICTEC based on the Statistical Enterprise.

8 Tabulation and dissemination of results

The tabulation of results is presented, considering three classification variables:

– Main activity grouping, according to NACE-2009.

– Size according to the number of employees.

– Autonomous Community

Moreover, results tables may be obtained that meet the information requirements of national and international institutions, as well as individual users interested in the subject; in all cases, statistical secrecy is maintained, with the limits delimited by the sample errors. This publication is available in the INEbase database, which may be accessed via the INE website (www.ine.es) annually.

Annex I

Table 1. Population scope of the SICTEC survey, according to NACE

Tract	Division	Group Class	Name according to NACE rev.2
C	10-33		MANUFACTURING INDUSTRY
	10-18		Manufacture of food products; Manufacture of beverages; Manufacture of tobacco products; Manufacture of textiles; Manufacture of leather and related products; 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; Publishing activities; Printing and reproduction of recorded media.
	19-23		Manufacture of coke and refined petroleum products; Manufacture of chemicals and chemical products; Manufacture of basic pharmaceutical products and pharmaceutical preparations; Manufacture of rubber and plastic products; Manufacture of other non-metallic mineral products.
	24.25		Manufacture of basic metals; Manufacture of fabricated metal products, except machinery and equipment.
	26-33		Manufacture of computer, electronic and optical products; Manufacture of electrical equipment; Manufacture of machinery and equipment n.e.c.; Manufacture of motor vehicles, trailers and semi-trailers; Manufacture of other transport equipment; Manufacture of furniture and other manufacturing industries; Repair and installation of machinery and equipment.
D	35		ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY;
E	36-39		WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES
F	41-43		CONSTRUCTION.
G	45-47		WHOLESALE AND RETAIL TRADE; REPAIR OF MOTOR VEHICLES AND MOTORCYCLES.
H	49-53		TRANSPORTATION AND STORAGE
I	55		ACCOMMODATION
	56		FOOD AND BEVERAGE SERVICE ACTIVITIES
J	58-63		INFORMTION AND COMMUNICATIONS
L	68		REAL ESTATE ACTIVITIES
M	69-75		PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES
			Professional, scientific and technical activities, with the exception of veterinary activities.
N	77-82		ADMINISTRATIVE AND SUPPORT SERVICES ACTIVITIES
	77-82 (WITHOUT 79)		Rental and leasing activities, Employment activities, Security and investigation activities, Services to buildings and landscape activities and Office administrative, office support and other business support activities.
	79		Travel agency, tour operator and other reservation services and related activities.
S		95.1	Repair of computer and communication equipment

Table 2. Distribution of the sample, according to NACE rev.2 and size of legal unit

CNAE 2009	Number of employees				
	0 a 9	From 10 to 49	From 50 to 249	250 and more	Total
Total	**9,888**	**7,478**	**4,471**	**3,160**	**24,997**
C. Manufacturing industry	827	1,921	1,313	723	4,784
D, E. Electricity, gas, steam and air conditioning supply, Water supply, sewerage waste management and remediation activities	153	236	153	120	662
F. Construction	1,358	880	270	115	2,623
G. Wholesale and retail business; repair of motor vehicles and motorcycles	2,829	1,614	841	560	5,844
H. Transport and storage	858	568	368	269	2,063
I. Accommodation	769	382	309	247	1,707
J. Information	677	408	280	279	1,644
L. Real estate activities	528	164	62	21	775
M. Professional, scientific and technical activities	1,047	626	373	312	2,358
N. Administrative and support services activities	670	659	490	507	2,326
Group 95,1. Repair of computer and communication equipment	172	20	12	7	211

Table 3. Distribution of the sample according to the Autonomous Community and size of the legal unit

Autonomous Community	Number of employees		
	0 to 9	10 and more	Total
Total	9,888	15,109	24,997
Andalucía	871	1,452	2,323
Aragón	458	581	1,039
Asturias	435	397	832
Baleares	505	570	1,075
Canarias	550	750	1,300
Cantabria	400	319	719
Castilla y León	529	612	1,141
Castilla-La Mancha	520	580	1,100
Cataluña	941	2,291	3,232
Comunidad Valenciana	725	1,356	2,081
Extremadura	442	346	788
Galicia	556	811	1,367
Madrid	842	2,712	3,554
Murcia	465	604	1,069
Navarra	424	425	849
País Vasco	527	926	1,453
La Rioja	348	246	594
Ceuta	164	71	235
Melilla	186	60	246