

DIGITAL TRANSFORMATION

of Greek enterprises
2016-2018



NATIONAL DOCUMENTATION CENTRE

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Foreword



The digital transformation of businesses has already started. One in three Greek enterprises is embedding digital transformation into its central strategic planning. One in two is innovating using digital technologies. It is not just an economic benefit either as the transition to a digital economy is closely linked to ensuring the well-being of citizens in an inclusive digital society.

At the National Documentation Centre, an agency with digital memory and history, we know and understand the many dimensions, the opportunities and the difficulties involved in the continuous process of digital transformation of businesses and organisations. Our role is to support public policies with evidence. We gather data, monitor international affairs, measure and capture critical parameters for the development of the Greek economy.

Our ambition is to systematically collect data and monitor the extent that Greek businesses perceive and respond to the challenges of new digital technologies. We have already launched a specific survey on the impact of the COVID-19 pandemic on the digital orientation of enterprises. The results will be published within the year.

This publication is the first comprehensive recording of the course of the digital transformation of enterprises with more than 10 persons employed in Greece. Using the official statistical survey on innovation, which took place at the end of 2019 and included 12,213 enterprises, we planned a parallel, focused study and collected data on strategies and practices directly linked to the digital transformation of Greek businesses, 2016-2018.

The vast majority of enterprises that innovate in business processes, use digital technologies. It is of particular significance that 1/3 of Greek enterprises have internal capacities, infrastructure and staff to develop digital technologies. The adoption of innovative technologies is still limited, but many enterprises perceive the importance of technologies such as the Internet of Things and big data analysis technologies and cloud computing for their future growth.

Digital transformation is also important for enterprises that did not innovate during the survey period. The publication includes data on the significance of digital transformation within these enterprises, with the aim of providing information useful for the development of appropriate tools and innovation policies.

Greek enterprises appear to understand the need for digital transformation and are moving in this direction. The results of this shift can be maximised if they are integrated into the country's wider policies towards the knowledge-based economy

Dr. Evi Sachini

A handwritten signature in blue ink, appearing to read 'Evi Sachini', with a stylized flourish at the end.

Director EKT

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Introduction

The Digital Transformation of enterprises draws on a set of procedures, skills and models that combine with digital technologies (artificial intelligence and robotics, technologies for interconnecting devices and the Internet of Things etc) fundamentally reshaping the productive fabric and reversing the traditional operational balances, both in the use of capital resources and in transforming the very nature of labour and society as a whole, globally and at national level.

Overall, the Digital Transformation of enterprises reflects the way they respond to the significant changes that occur in the external environment. The road towards this digital transformation does not simply require the use of new technologies. It requires businesses to implement a new organisational model and to connect internal processes and people with technological tools.

The need for the transition of enterprises to the digital economy and society is now essential in the context of the effort to shape a development model for the 4th Industrial Revolution. For both enterprises and the state, the emphasis on digital infrastructures, on appropriate organisational structures, on human capital with digital skills has become key to fostering entrepreneurship in the new digital economy.

Realising that the future of industry as a whole is digital, the National Documentation Centre (EKT), as a national authority of the Hellenic Statistical System (HSS), with the responsibility for the production of national statistics for Research, Technology, Development and Innovation (RDI), carried out a study on the Digital Transformation of these enterprises. within the framework of the 'Innovation in Greek Enterprises 2016-2018 involving a population of 12,213 enterprises with 10 or more persons employed.

This study is the first recording of strategies and practices directly related to the Digital Transformation of Greek Enterprises, 2016-2018.

The study explores the role of Digital Transformation in the strategic planning of enterprises as a continuous development strategy and reflects the main sectors of digital transformation for Greek enterprises. In addition, it sets out factors for the adoption of digital methods of organisation of work, as well as the use of digital practices to gain access to new markets or to increase market share.

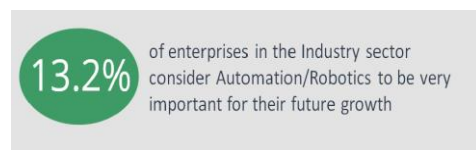
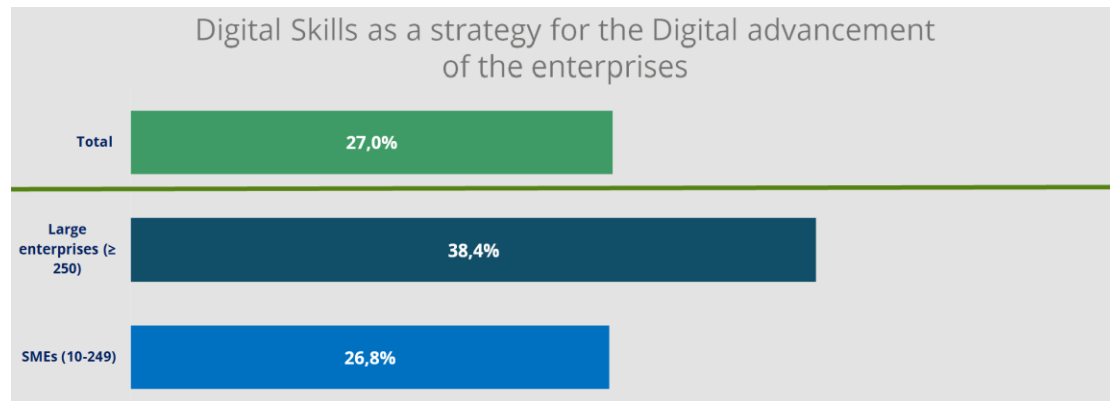
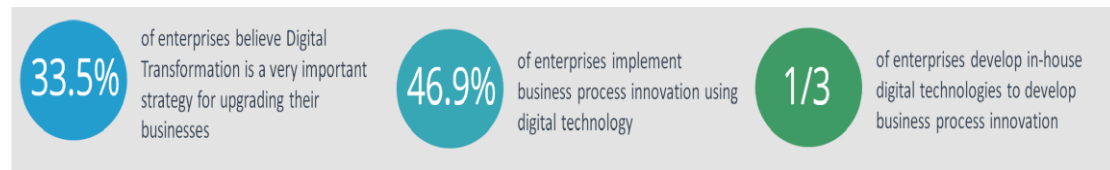
In terms of the contribution of digital technologies to the innovative performance of Greek enterprises, issues such as the extent and intensity of the implementation of digital technologies in innovation development, the internal digital skills of enterprises and the digital skills of their personnel have been explored.

The study also reflects the importance of innovative digital technologies that

enhance business development, from the perspective of Greek enterprises.

In part three, the study focuses on enterprises that have not engaged in innovative activities over the period 2016-2018 and presents data useful for the development of appropriate tools and policies.

Summary



Chapter 1

Digital Transformation as a continuous strategy for Greek enterprises

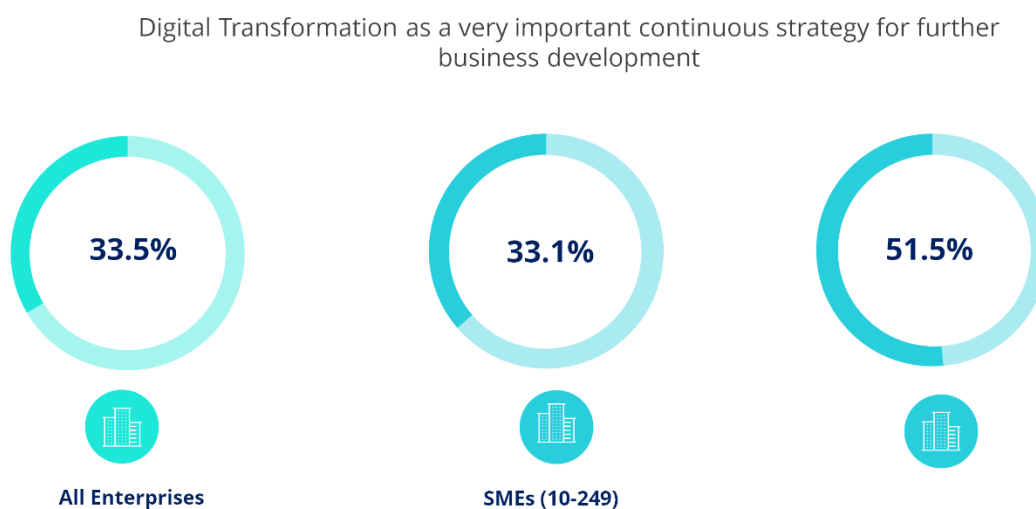
Chapter 1 presents data related to the adoption of Digital Transformation as a 'continuous & overall development strategy' for Greek enterprises. It analyses the data per size of enterprise, sector of economic activity and innovation of enterprises. It presents the main areas of digital transformation with a focus on strengthening the digital skills of an enterprise's personnel. Finally, it reflects the most important innovative digital technologies which strengthen enterprise development from the perspective of Greek enterprises.

Digital Transformation Strategies

In the period 2016-2018, 33.5% of the country's enterprises regarded Digital Transformation as a very important development strategy. Specifically, 4,088 enterprises out of a population of 12,213 enterprises with 10 persons employed or more in Industry and Services, attach great importance to Digital Transformation as a continuous strategy for the further development of their enterprise.

For large enterprises with 250 or more persons employed the share was 51.5%. (Figure 1).

Figure 1: Digital Transformation as a very important continuous development strategy of all the country's enterprises, and distinguishing between small and medium-sized enterprises (SMEs) and large enterprises 2016-2018.



* Percentage in the total of each category

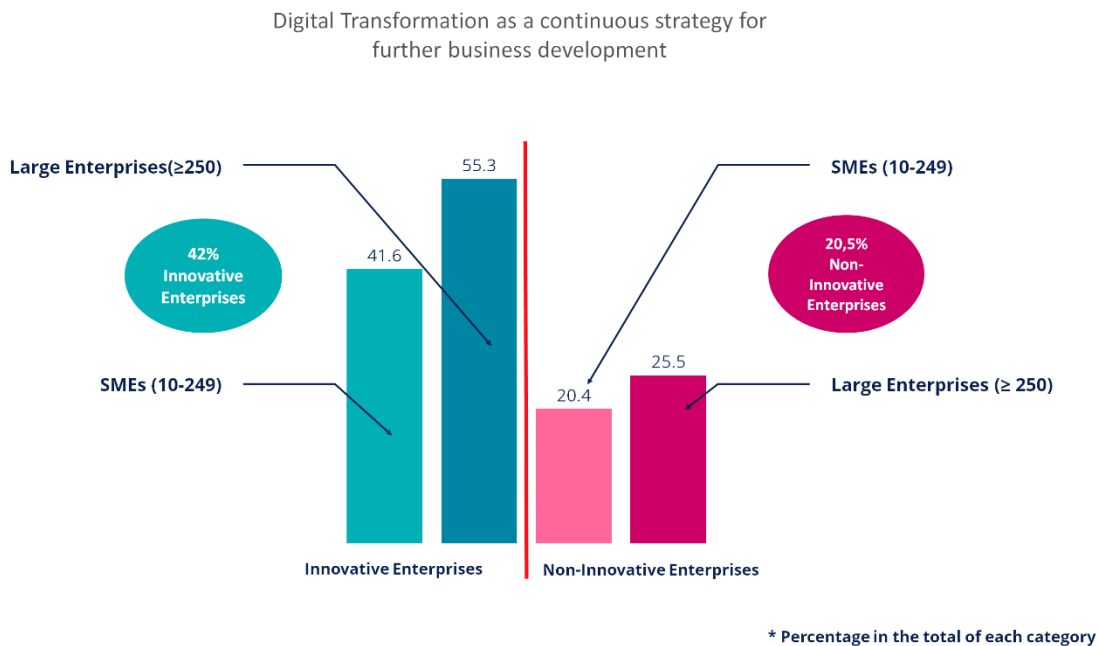
The importance of digital transformation is recorded for both innovative and non-innovative enterprises.

In the period 2016-2018, 7,368 enterprises in Greece innovated (60.3% of the total 12,213 enterprises in the country), according to the official statistics published by EKT. 42% of innovative enterprises (3,097 enterprises) believe Digital Transformation to be a very important development strategy.

Digital Transformation is also believed to be a very important development strategy for 20.5% (991 enterprises) of enterprises that did not innovate during the 2016-2018 period (non-innovative enterprises).

In both groups, innovative and non-innovative enterprises, large enterprises have higher rates than SMEs.

Diagram1: Digital Transformation as a very important continuous development strategy, all the country's enterprises, and distinguishing between innovative and non-innovative enterprises, 2016-2018.



In Diagram 2 and Figure 2 the individual strategies enterprises consider to be very important for their digital upgrading are presented for all the country's enterprises (Diagram 2) and the difference between small and medium-sized enterprises and large enterprises is shown (Figure 2).

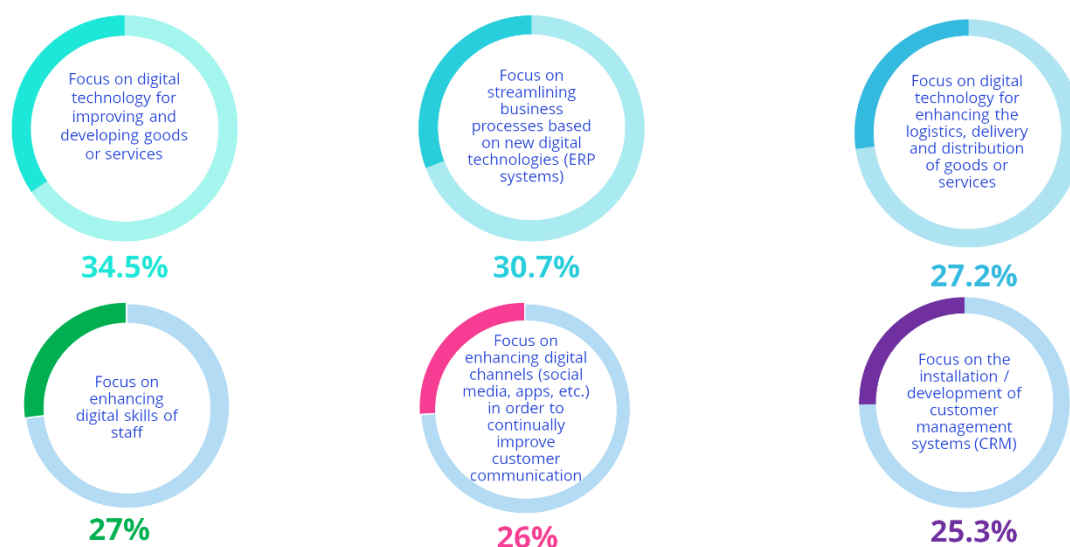
The focus on digital technology for the improvement and development of goods and services is seen as important strategy for the digital upgrading of enterprises, with a share of 34.5% (4,212 enterprises of the total 12,213 enterprises).

Strategy for the reorganisation of business processes using digital technologies follows, with 30.7% (3,746 enterprises out of the total 12,213 enterprises).

On the other hand, a less important strategy is to install customer management systems, with a share of 25.3% of all the country's enterprises.

Figure 2: Strategies considered to be very important for the digital upgrading of enterprises, all the country's enterprises 2016-2018

Strategies for Digital Upgrading of Enterprises



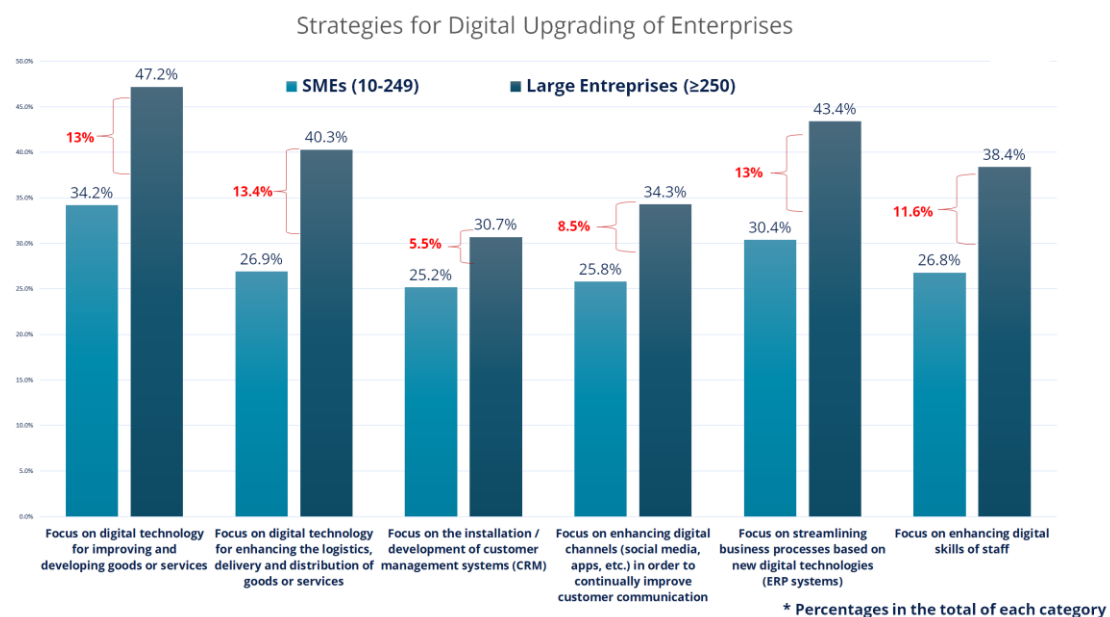
The key factor highlighted by Diagram 2 is the difference between small and medium-sized enterprises when it comes to rating the importance of strategies for digital upgrading.

Strategies for the production of goods and services, improving the supply chain and reorganising business processes are considered by large enterprises to be more important, with differences of over 10 percentage points, in relation to small and medium-sized enterprises.

On the other hand, strategies for improving customer relations and communication (Installation of customer management systems and Enhancement of digital channels to improve communication), for which the lowest percentages were recorded, show the gap in assessment between small and medium-sized and large enterprises was lower, below 10 percentage points.

The difference between the assessment by large enterprises and SMEs of the importance of strengthening the digital skills of their staff is also noteworthy. In this area, there is a difference of 11.6 percentage points, with large enterprises considering it more important to strengthen digital skills as a digital upgrade strategy.

Diagram 2: Strategies considered to be very important for the digital upgrading of enterprises, distinguishing between small and medium-sized and large enterprises, 2016-2018.



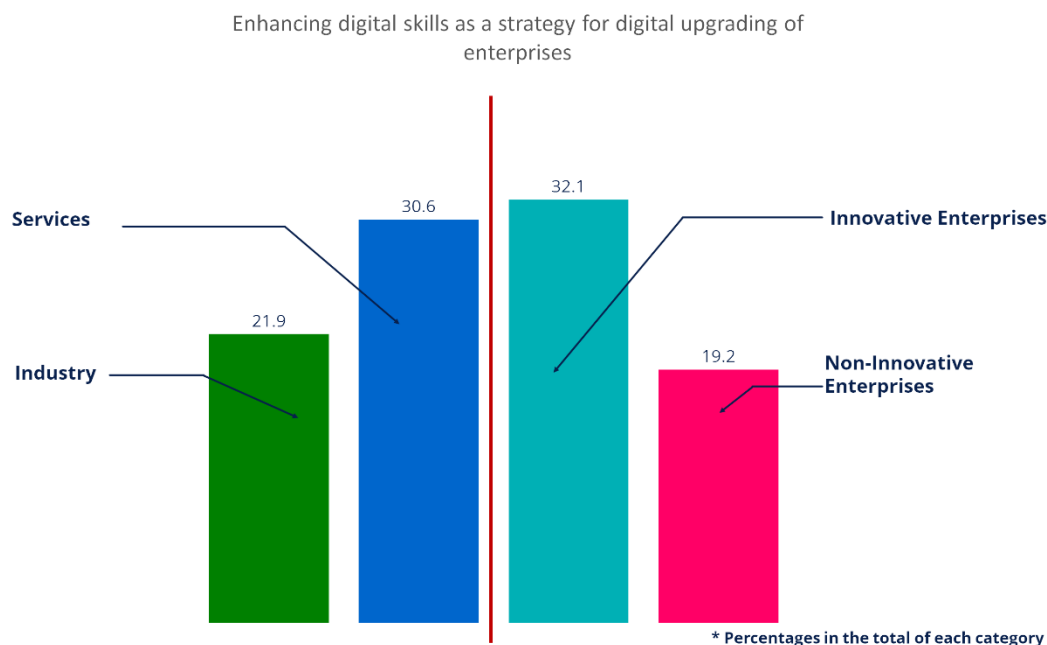
Enhancing digital skills as a strategy for digital upgrading of enterprises

Diagram 3 shows the percentage of enterprises that rated focusing on a strategy to strengthen the digital skills of staff as very important by sector of economic activity and distinguishing between innovative and non-innovative enterprises.

The above rating differs between the two main sectors of economic activity with Services 8.7 percentage points higher than Industry (30.6% and 21.9% of enterprises per sector respectively).

Similarly, strengthening the digital skills of staff is seen as being very important for 32.1% of innovative enterprises, 12.9 percentage points higher than non-innovative enterprises (19.2%).

Diagram 3: Assessment of a Digital Skills Strategy as very important for the digital upgrading of enterprises, distinguishing between the main sectors of economic activity, industry and services, and innovative and non-innovative enterprises, 2016-2018.



Innovative digital technologies for the future development of enterprises

Diagram 4 presents areas of innovative digital technologies¹ rated by Greek enterprises as very important for their future development.

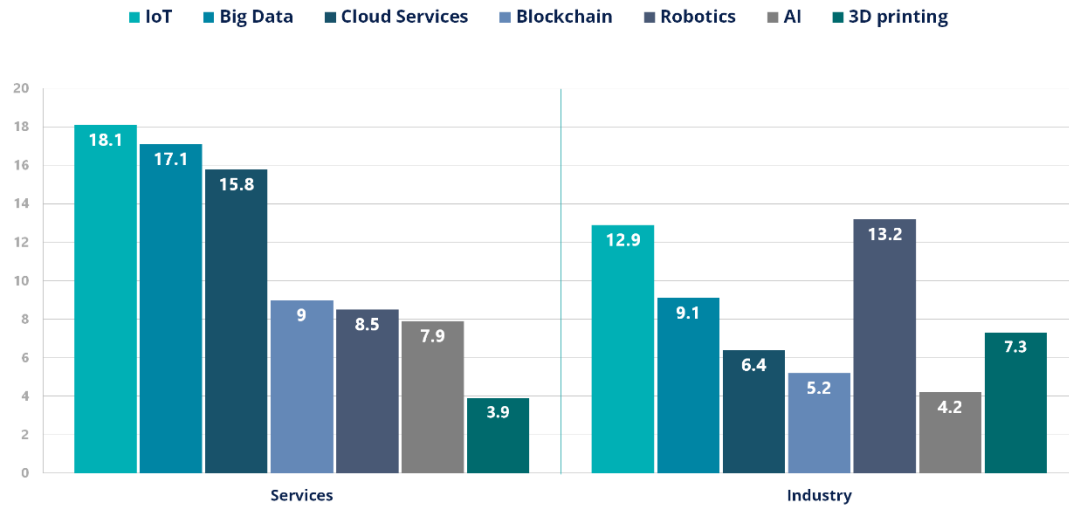
The technologies assessed are: Big Data Analytics, 3D Printing, Automation and Robotics, Artificial Intelligence, Cloud Computing, Internet of Things and Blockchain.

For the services sector, the Internet of Things (IoT) is the most important technology with a rate of 18.1%. In the industry sector, Automation/Robotics is thought most important with a share of 13.2%.

¹ Digital Economy Report (DER) 2019, United Nations

Diagram 4: Evaluation of innovative digital technologies as very important for business development, distinguishing between the main sectors of economic activity, industry and services, 2016-2018.

Innovative digital technologies for the future development of enterprises



Chapter 2

Digital Transformation and innovative enterprises

This part explores the link between Digital Transformation and the innovation in Greek enterprises. In particular, it reflects the application of digital technologies to the innovations of business processes developed by enterprises, while exploring their internal digital capabilities. It presents the individual areas of operational functions in which enterprises innovate using digital technologies, the adoption of digital media for business organisation and the use of digital practices to increase or expand markets.

Use of digital technologies to develop business processes innovations

According to the data on innovation in Greek enterprises published by EKT, 55.2% of the country's enterprises introduced innovations in business processes during the period 2016-2018.

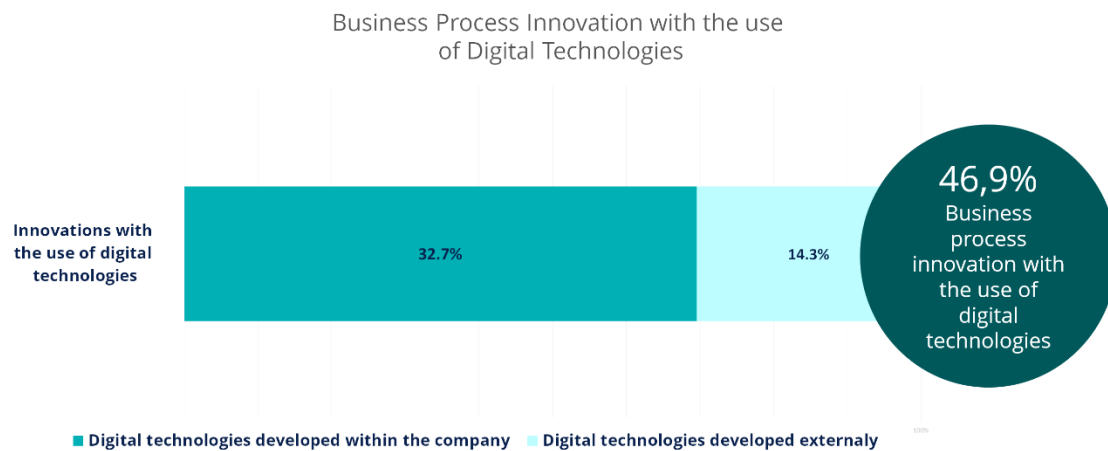
The vast majority of these enterprises, namely 46,9% of the country's enterprises, used digital technologies to develop innovation, which highlights the significant penetration and contribution of digital technologies across all operational functions.

In addition, it is of particular significance that 1/3 of the country's enterprises had the internal capacity and specialised staff to develop the digital technologies used in the of business processes innovations.

32.7% of the country's enterprises developed digital technologies, using exclusively internal resources, or in co-operation with other enterprises or entities with the involvement of company staff specialised in digital technologies² 14.3% of the country's enterprises proceeded in the acquisition of digital technologies, developed by others (Diagram 5).

² The development of processes within the company includes the development of these either by the company itself either by the company in cooperation with other companies or other bodies with the participation of a specialised staff in digital technologies

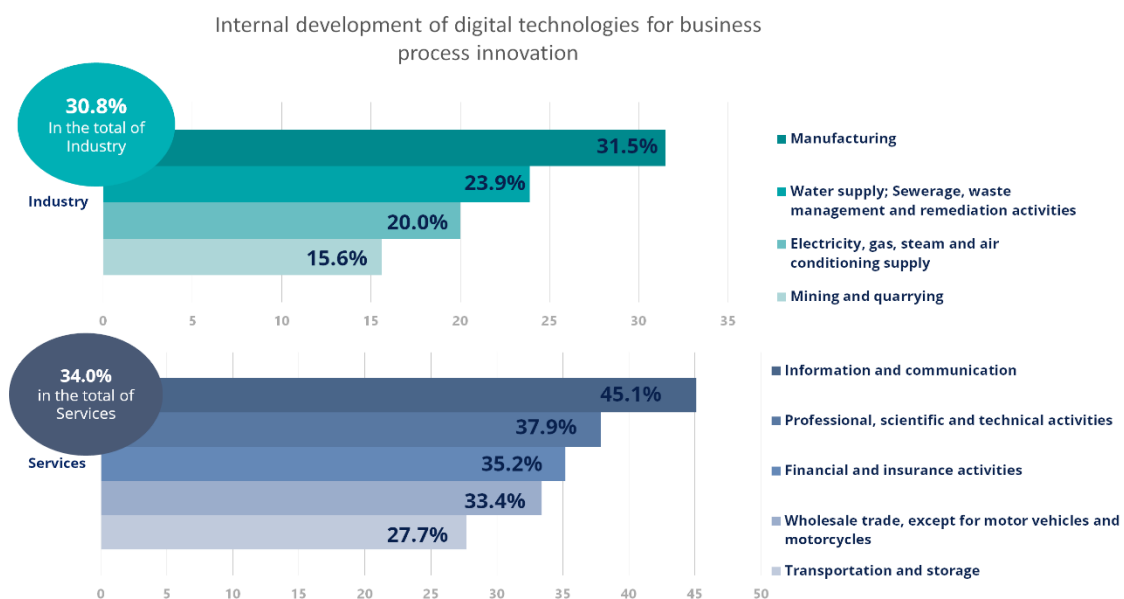
Diagram 5: Use of digital technologies in business processes innovations, distinguishing internally and externally developed, 2016-2018.



In the Industry sector, the percentage of enterprises that developed digital technologies within the enterprise is 30.8%. The highest proportion of enterprises with internal development of digital technologies (31.5%) was recorded for the Manufacturing sector. (Diagram 6)

In the Services sector, this proportion reached 34%. The highest rate was recorded for the Information and Communication sector. The smallest share (27.7%) of enterprises with development of internal digital technologies was in the Transportation and Storage sector. (Diagram 6)

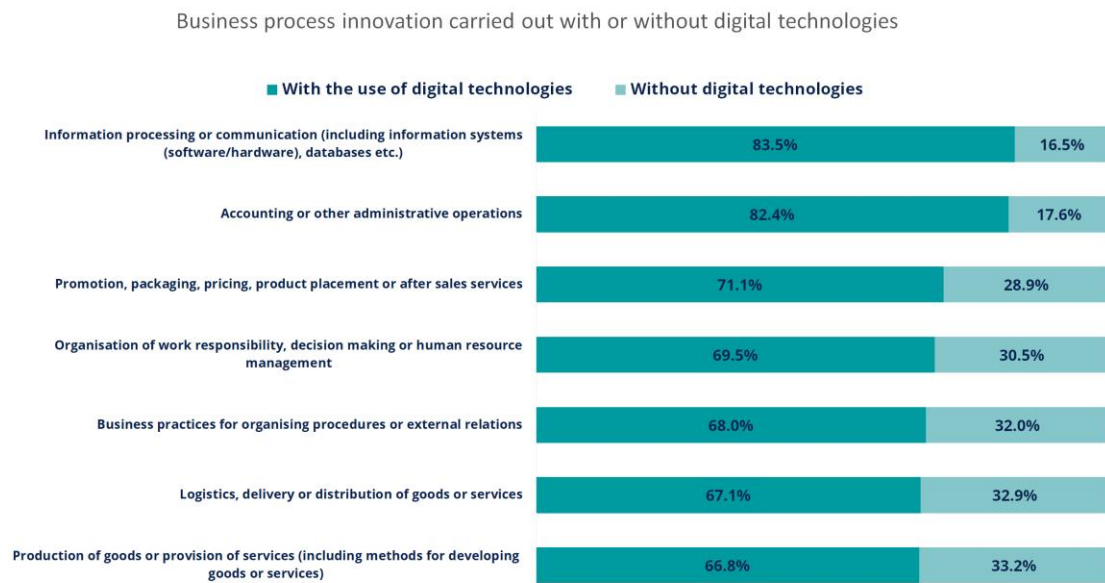
Diagram 6: Internal, intra-enterprise, development of digital technologies for business process innovation, by sector and branch of economic activity, 2016-2018



Business processes developed using digital technologies

Diagram 7 details the innovations of business processes developed using digital technologies over the period 2016-2018. The highest rate of use of digital technologies is recorded for information or communication processes (83,5%) and is followed by business processes for accounting or other administrative operations with a percentage of 82.4% and business marketing processes (71,1%). The smallest percentage in the use of digital technologies (66.8%) was in business processes for the development of goods or services.

Diagram 7: A detailed presentation of business process innovation carried out with the use or without digital technologies, 2016-2018.



Digital transformation practices for innovative businesses enabling expansion into new markets and increase in market share

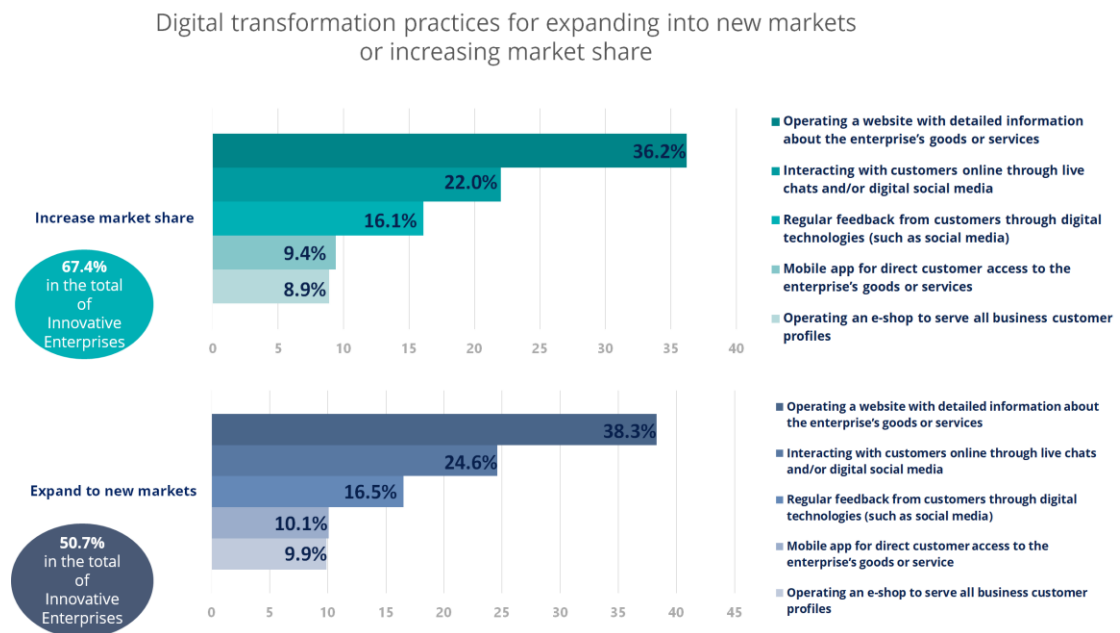
Over the three-year period 2016-2018, 67.4% of innovative enterprises in Greece increased their market share in domestic/foreign markets.

Of these, 36,2% considers that the operation of an enterprise's specialized website with detailed information was very important for increasing market share. 22% considers that interaction via Live chats and social media effectively strengthened the increase in market share.

Over the same period 50.7% of innovative enterprises expanded into new domestic/external markets

Of these, 38,3% considers that the operation of an enterprise's specialized website with detailed information was very important for expansion into new markets, and 24.6% considers that the contribution made by interaction via Live chats and social media is a very important practice.

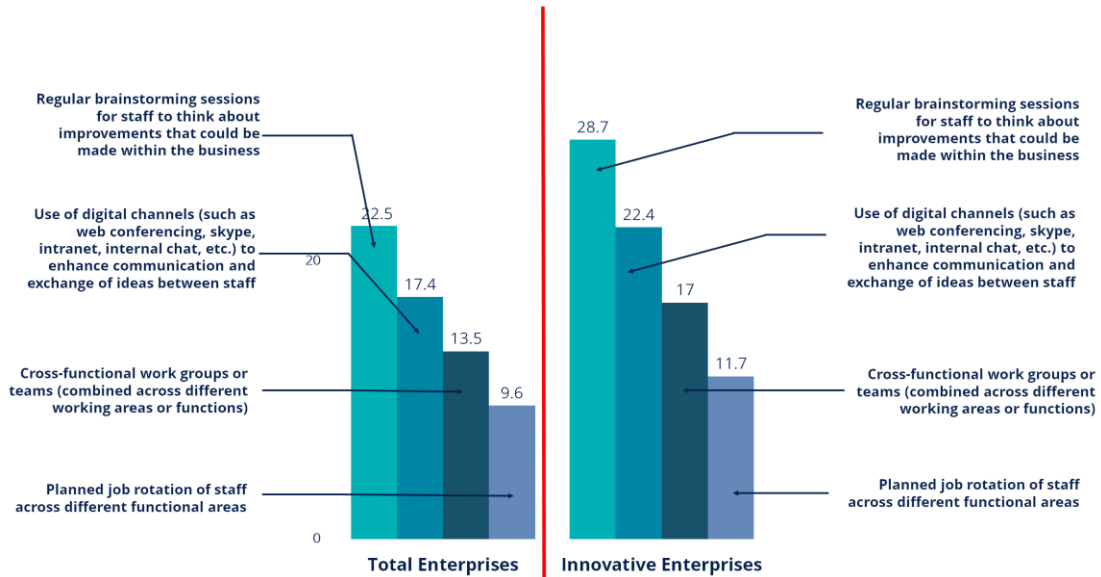
Diagram 8: Presentation of digital transformation practices considered by innovative enterprises as very important for expanding into new markets or increasing market share, 2016-2018.



Organisation methods for business management

The use of digital channels to enhance communication and the exchange of ideas between staff is considered by innovative enterprises, with a rating of 22.4%, to be the second most important method of organising work in an enterprise. The corresponding percentage of all the companies in the country is 17.4%.

Diagram 9: Work organisation methods for business management, all enterprises in the country and innovative enterprises, 2016-2018.



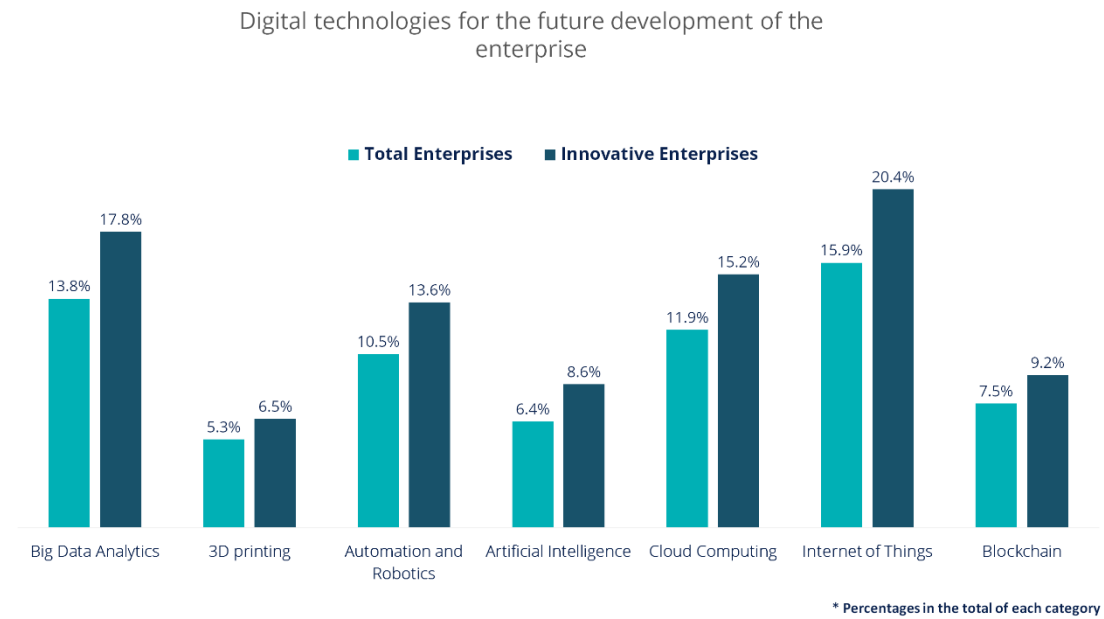
Innovative digital technologies for future development of innovative enterprises

The Internet of Things (IoT) technologies are considered to be very important for the future growth of enterprises by 20.4% of all innovative enterprises and 15.9% of the total number of the country's enterprises.

Big Data Analytics is the second most important area with 17.8% and 13.8% for all innovative enterprises and the total number of the country's enterprises respectively.

In contrast, the technology considered to be less important by enterprises is 3D printing, with 6.5% and 5.3% for all innovative enterprises and the total number of the country's enterprises respectively.

Diagram 10: Assessment of innovative digital technologies for the future development of the enterprise, all the country's enterprises and innovative enterprises, 2016-2018.



Chapter 3

Digital transformation of enterprises that did not innovate in 2016-2018

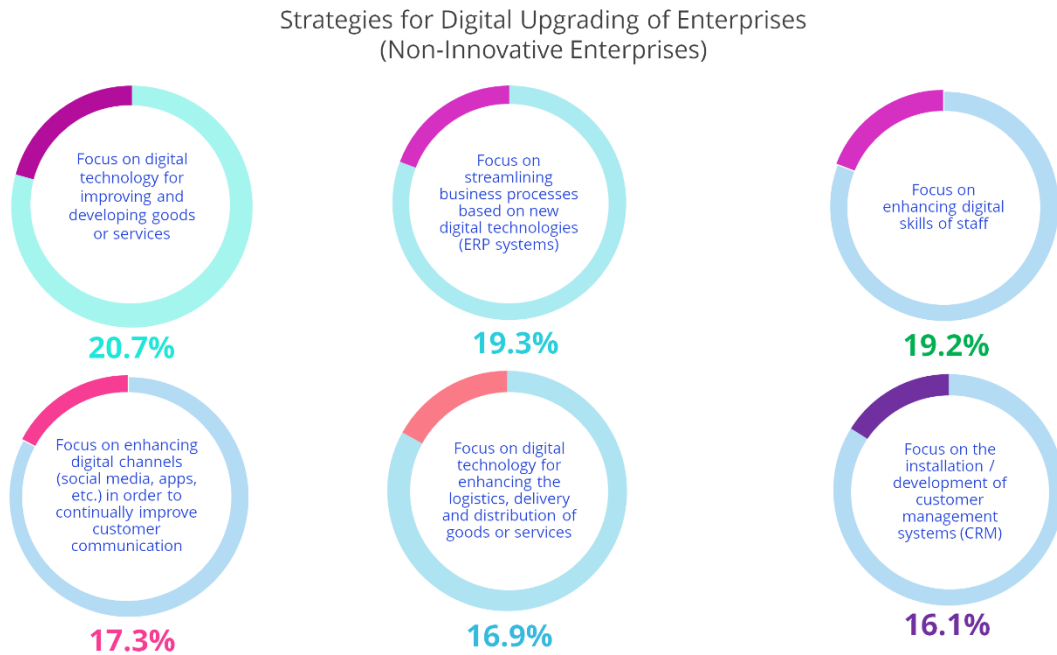
In the period 2016-2018, 4,846 enterprises out of a population of 12,213 enterprises in Greece did not implement innovative activities for a number of reasons, such as lack of equity, difficulties in accessing finance, lack of appropriate co-operation or appropriate staff, etc. This section sets out data on Digital Transformation in these enterprises aiming to provide input for the development of appropriate tools and innovation policies.

Digital transformation strategies for non-innovative enterprises

As stated in part 1, Digital Transformation as a 'continuous development strategy' is believed to be very important for 20.5% (991 enterprises) of enterprises that did not carry out innovative activities over the 2016-2018 period (non-innovative enterprises).

20.7% of these enterprises, consider focusing on digital technologies to improve/develop products or services to be the most important strategy for their digital upgrading. The second very most important strategy with 19.3% is the reorganisation of processes using digital technologies and the third is strengthening the digital skills of their personnel, 19.2%.

Figure 3: Strategies considered to be very important for the digitalisation of non-innovative enterprises, 2016-2018.



Digital transformation practices for non-innovative businesses enabling expansion into new markets and increase in market share

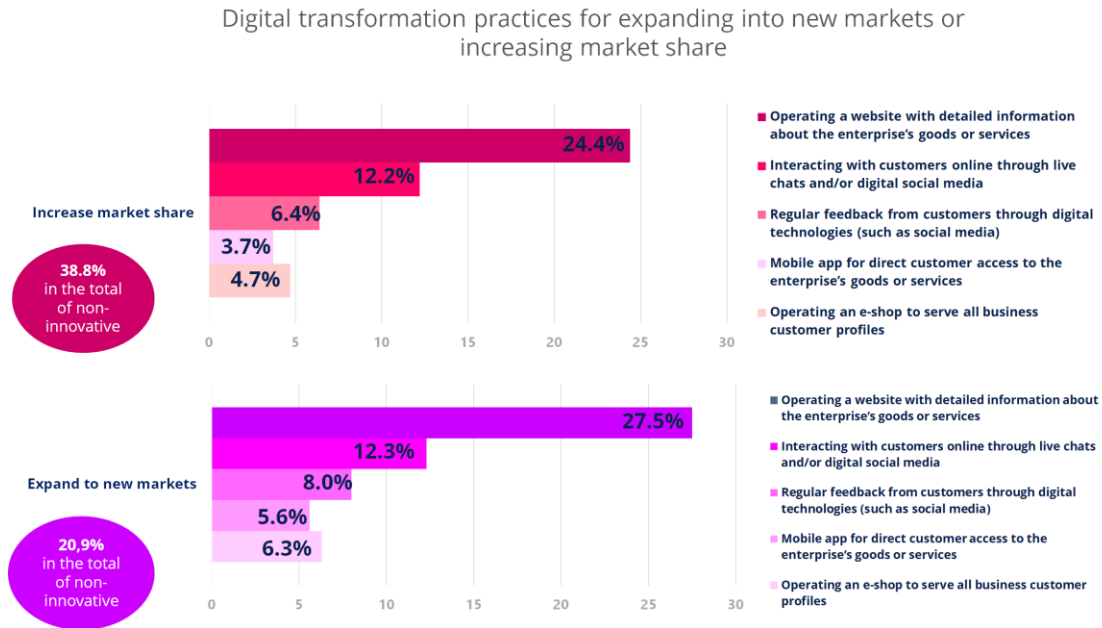
Over the three-year period 2016-2018, 38.8% (1,878 enterprises) of all enterprises that did not non-innovate (4,846 enterprises) increased their market share in domestic/foreign markets.

Of these, 24.4% considers that the operation of an enterprise's specialised website with detailed information was very important for the expansion into new markets, while 12.2% considers that interaction via Live chats and social media effectively strengthens the increase of their market share.

At the same time, during the three-year period 2016-2018, 20.9% (1,012 enterprises) of all non-innovative enterprises (4,846 enterprises) expanded into new domestic/foreign markets.

Of these, 27.5% considers that the operation of an enterprise's specialised website with detailed information was very important for the expansion into new markets, and 12.3% considers that the contribution made by interaction via Live chats and social media is a very important practice.

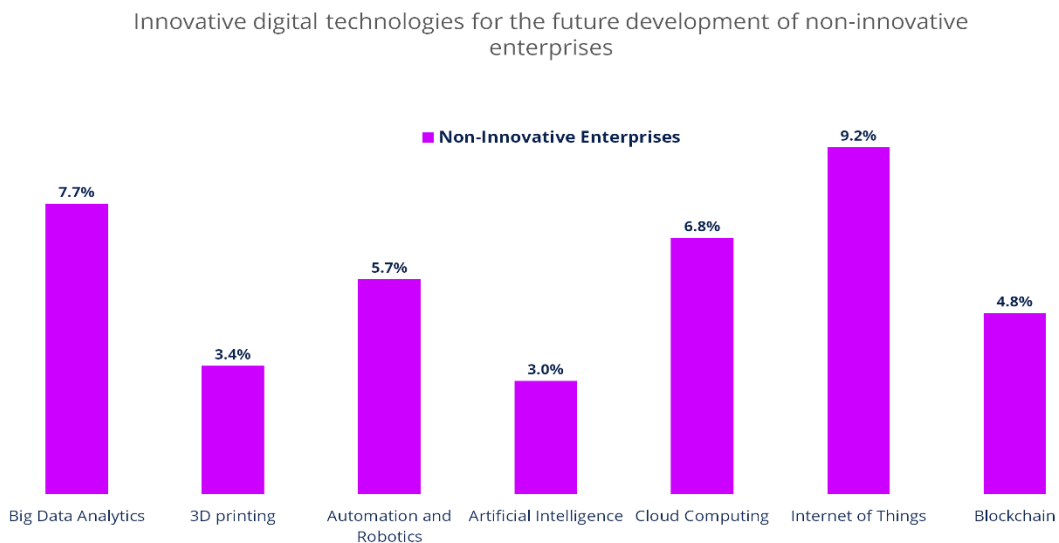
Diagram 11: Presentation of digital transformation practices considered by non-innovative enterprises as very important for expanding into new markets or increasing market share, 2016-2018.



Innovative digital technologies for future development of non-innovative enterprises

The Internet of Things (IoT) technologies are considered to be very important for the future growth of non-innovative enterprises by 9.2% followed by Big Data Analytics, 7.7%.

Diagram 12: Assessment of innovative digital technologies for the future development of non-innovative enterprises, 2016-2018.



Chapter 4

Methodological notes

Survey objective

This publication presents data that reflect aspects of the Digital Transformation of enterprises in Greece for the period 2016-2018.

The primary data were collected within the framework of the official statistics for 'Innovation in Greek Enterprises 2016-2018', which was carried out by EKT as the competent national authority of the Hellenic Statistical System, and included a population of 12,213 enterprises with 10 or more persons employed, in various sectors of economic activity.

The Community Innovation Survey is the official European statistical survey on innovation in European Union countries, ensuring high quality and comparability of the indicators produced by the EU Member States.

The survey examines not only the connection between the activities of enterprises and innovation but also the introduction of innovation by enterprises. Data are collected on product innovations (goods or services), business process innovations, the introduction of new products to the enterprise and the market, strategies, knowledge flows and business partnerships, various forms of financing, the impact of legislation on innovation activities, as well as the barriers that enterprises face in developing innovation.

In the 2016-2018 survey, additional variables relating to strategies, practices and the use of technologies connected with the digital transformation of enterprises were considered.

Key concepts in measuring innovation

The measurement of innovation is based on the concepts and definitions stipulated in the Oslo Manual, a joint publication of the OECD and Eurostat. In 2018, the revised 4th edition of the Oslo Manual was published and was used for the reference period 2016-2018.

The two types of innovation are defined as follows:

Product innovation: a new or improved product (good and / or service) that differs significantly from the enterprise's previous products and has been introduced to the market. Also included are products that were originally developed by other enterprises or organisations but are new / improved for the enterprise.

Business process innovation: new or improved business process, for one or more business functions of the enterprise, which differs significantly from the previous business processes of the enterprise.

Business processes include not only the main operational functions of the production of goods and services, but also all other support activities, such as logistics, accounting, computer applications, work organisation and marketing activities. Business processes can be developed either within the business or sourced externally.

Legal Framework

The National Documentation Centre (EKT) (www.ekt.gr) is the competent national authority of the Hellenic Statistical System for the production of official Research, Development and Innovation statistics (GG 4671/19.12.2019). EKT has carried out the collection and processing of the statistics on innovation in enterprises since 2012, the first reference period being the three years 2010-2012.

Survey population

The target population of the survey for the three-year period 2016-2018 was the total population of enterprises with 10 or more persons employed in any of the following sectors of economic activity:

Industry: B (05-09): Mining and Quarrying

C (10-33): Manufacturing

D (35): Electricity, gas, steam and air conditioning supply

E (36-39): Water supply: Sewerage, waste management and remediation activities

Services: G (46): Wholesale trade, except for motor vehicles and motorcycles

H (49-53): Transportation and storage

J (58-63): Information and communication

K (64-66): Financial and insurance activities

M (71-73): Professional, scientific and technical activities (Architectural and engineering activities; technical testing and analysis/Scientific research and development/Advertising and market research

According to the statistical business register of the Hellenic Statistical Authority, the survey population consists of 12,213 enterprises, 5,032 in the field of Industry and 7,181 in the Services sector.

Survey method

Data for the Community Innovation Survey was collected by using a combination of census and sample survey. The statistical unit was the enterprise.

The census survey included enterprises with 500 or more employees persons employed and enterprises with significant R&D activity (based on the results from the statistical survey on R&D carried out by EKT with reference to the year 2018).

Remaining enterprises of the target population were surveyed using a sample drawn from the statistical business register that is maintained by the Hellenic Statistical Authority. A one-stage stratified sampling was applied with the following stratification criteria for the enterprises:

- Regions (NUTS-2 level): total 13 regions
- Two-digit sector of economic activity: total 11 clusters (as presented in the above table)
- Size class of the enterprise: 10-49, 50-249, 250-499 persons employed and more employees

The size of the sample of enterprises was calculated according to the specifications and the precision levels recommended by Eurostat in the survey methodological guidelines.

In all, 6,616 enterprises from the population participated in the survey with 208 being covered by census and 6,408 comprising the survey sample.

Data Collection

EKT conducted the Community Innovation Survey in Greece in co-operation with the Hellenic Statistical Authority (ELSTAT).

The data collection was carried out using electronic questionnaires via a specially designed online platform, developed by EKT, that is based on open-source technologies. Automatic procedures for monitoring the progress of the survey in real time and validating the collected data, based on predefined quality indicators, were implemented.

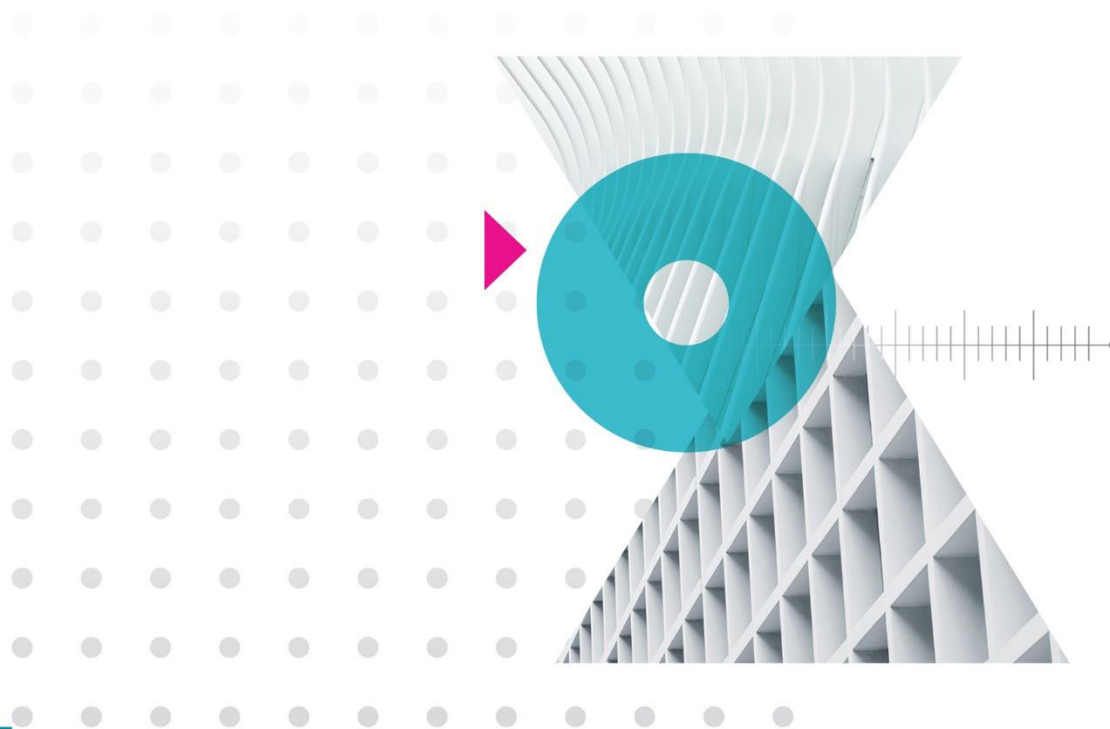
200 Around 180 interviewers drawn from the ELSTAT register of interviewers were authorised to collect the data for the needs of the CIS. The established network of co-operation with the interviewers as well as with the regional statistical offices of

ELSTAT ensured the quality of the data collection and the optimisation of the fieldwork period.

Using the data collected from more than 4,000 enterprises across Greece, EKT proceeded to with the processing and analysis analyse of the data and the production of the survey indicators.



INNOVATION IN GREEK ENTERPRISES



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