SECTOR ANALYSIS

Particular features and challenges regarding the IT&C sector in the West Region

2009

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FOREWORD

The IT&C sector is of major importance for the economic development and contributes to higher national and regional competitiveness. In this context, we need to encourage the regional research regarding the economic impact of the expansion of the information society on the increase of productivity.

The general aim of the present study, initiated by RDA West in 2008, is to diagnose the particular features and challenges of the IT&C sector in the West Region. In order to achieve this general aim, we have resorted to a range of specific aims. These refer to:

- Identifying the economic features of the companies in the IT&C sector in the West Region on at least 3 levels: the selling of hardware, consultancy services in the IT&C sector, new products generated by the companies;
- Analysing the features and the dynamics of the workforce in the West Region IT&C sector;
- Analysing the appreciation of the factors influencing the mid-term development of the IT&C sector: the cost of labour, of utilities, the business environment, the government support, the quality of education, the R&D potential, and the skills of the human resources.

The Use of advanced applications and services will bring productivity gains, both for the business environment and for individuals or households. The generalized and horizontal introduction of the use of IT&C into the productive processes may well be a prerequisite for improving the relations and the interconnectivity among companies.

The main contribution of the IT&C sector to the economic growth is sustained mainly by the assimilation of this sector at the level of enterprises. The use of IT&C stimulates the extensive and intensive development of the production of goods and services. Therefore, the present study highlights companies' perception of the sector as one enabling them to tap into new markets, whether at regional, national, or global level.

This study is divided into seven sections. Section 1 shows the general context of the study, as well as the components to be analysed. Section 2 provides an overview of the IT&C sector at European level. Section 3 analyses the IT&C sector in Romania. Sections 4 and 5 provide a presentation of the IT&C sector at regional level, both overall and focusing on a predefined sample. The strengths and weaknesses, as well as the opportunities and threats identified in the IT&C sector are described in section 6. The document ends with a few conclusions concerning the general, regional, and sample level.

Chapter 1. INTRODUCTION

1.1 Defining the concept of Information and Communication Technology

The phrase **information and communication technology (IT&C)** has been widely used the past few decades. To better understand this complex concept, an understanding of the following concepts is required: information, technology, communication, and information technology.

In the context of this study, information is a notion designating the new elements in relation with prior knowledge, contained within the structure of a message, in the meaning of a symbol/group of symbols (written text, spoken message, graphic images, instrument reading, etc.).

The concept of **technology** has a double meaning. On the one hand, technology is the science of the methods and means for processing (raw) materials and data. On the other hand, technology is the group of processes, methods, procedures, operations used in obtaining a certain industrial or commercial product.

In this context, the concept of **information technology** is a general term designating any technology that contributes to the production, manipulation, storage, transmission, and/or dissemination of information.

Technically speaking, **communication** is the channel, the link between two different points, and the technical system used in order to carry out this instance of communicating. Even though communications usually define both the transport infrastructure and the telecommunications infrastructure, this study only focuses on the latter aspect, namely the electronic communications infrastructure.

Putting together the definitions above, we can say that **information and communication technology (IT&C)** is a generic term describing a series of technologies used for collecting, storing, rendering, processing, analysing, and conveying information.

The information society is that kind of society in which the production and consumption of information is the most important type of activity, information is recognized as a main resource, information and communication technologies are fundamental technologies, and the informational environment, together with the social and the ecological one, is an environment in which people live. This information society became a reality during the last decade of the 20th century, with the Internet boom. In other words, the information society is that kind of society that relies on the Internet.[1]

[1] Academician Mihai Drăgănescu - *The Information and Knowledge Society. The Vectors of the Knowledge Society.* A theme study in the volume "The Information Society - The Knowledge Society - Concepts, Solutions, and Strategies for Romania", Bucharest, 2001

There is currently a transition from the information society to the **knowledge society**. According to Mihai Drăgănescu[2], the knowledge society is much more than the information society and the informatics society, encompassing the latter. The knowledge society is more than the information society, given the important role of knowledge-information in society.

1.2 Features of the IT&C sector

As concerns the IT&C sector, we can say that it shows common features and characteristics regardless of the location of the statistic reports.

Firstly, the IT&C sector is one of the most **dynamic** and **competitive** sectors in the world economy. The IT&C market still has good dynamics and a high development potential.

Secondly, the market is dominated by specialized **global players**. Thus, Fortune 500[3] lists high-profile names in the IT&C sector. France Telecom, Vodafone, Nokia, Motorola, Cisco Systems, Ericsson, and Alcatel Lucent are a few names of large companies making telecommunications equipment. Software giants Microsoft and Oracle are also listed here. At the same time, we find the large PC or office equipment manufacturers: IBM, Hewlett-Packard, Dell, Asustek Computer, Xerox, and Lenovo Group. Within the sector, we shall include the big names among the electronic component manufacturers, Intel and Flextronics.

The IT&C sector is one in which **innovation** is omnipresent. It is a vital sector for the achievement of globalization by boosting innovation, creativity, and competitiveness everywhere in the economy.

At the same time, the IT&C sector may be considered a sector with a high potential for **new businesses**. The main feature of the information society consists in the widespread use of the means of processing information and communication in every field of the economic and social life.

At the same time, the IT&C sector is a sector that **influences** the individual's **daily life** to a great extent. The new information technologies have a deep impact on the way in which we get our information, the way we communicate, and the way we approach our own education.

1.3. IT&C sector components

a. Hardware

The term **hardware** defines all the physical components of a computer, as well as the programs that provide instructions for the operation of these components. Communication technology includes, in addition to hardware, equipment and devices such as landline and mobile phones, television sets, stereos, etc., which are integrated

[2] ibidem

[3] According to Fortune 500, the segment with the highest growth rate in the industry is that of the telecommunications equipment, at 22.6%, followed by telecommunications, with an annual growth rate of 12.2%, and the PC and office equipment segment, at 9.9%.

in the electronic communications infrastructure, an aspect that we shall look into below.

b. Software

The term **software** is a generic term used to designate an organized collection of data and instructions for a computer. There are two main categories of software, namely system software and application software.

The **system software** is responsible for the control, integration, and management of the individual hardware components. A system software generally consists of an operating software and several essential utilities, such as disk formatting, file management, text editors, authentication services, etc.

On the other hand, the **application software** is used for fulfilling specific tasks. An application software may consist in a single program, it may be a small collection of programs (also called a software package) operating together for the fulfilment of a task, or it may be a larger collection (also called a software suite) of independent, but linked programs with a shared user interface.

c. The electronic communications infrastructure and services

The electronic communications infrastructure is materialized in the existence of communication networks, which form the foundation on which the information society is built, as they are meant to provide information and data access services. Since the information society focuses on the user's interests, in the context of a free society and a market economy, only the competition among various suppliers can ensure quality services at lower prices. The concepts of **multi-supplier services** have thus emerged, taking place in an **interoperable environment**, using **multi-technology networks**. This makes it necessary to have **network interconnection**, **service interoperability**, as well as the application of the **open network** concept.[4]

The electronic communications infrastructure comprises components such as: landline telephony networks, mobile telephony networks; cable television networks; radio networks; computer networks (Internet).

d. Web services

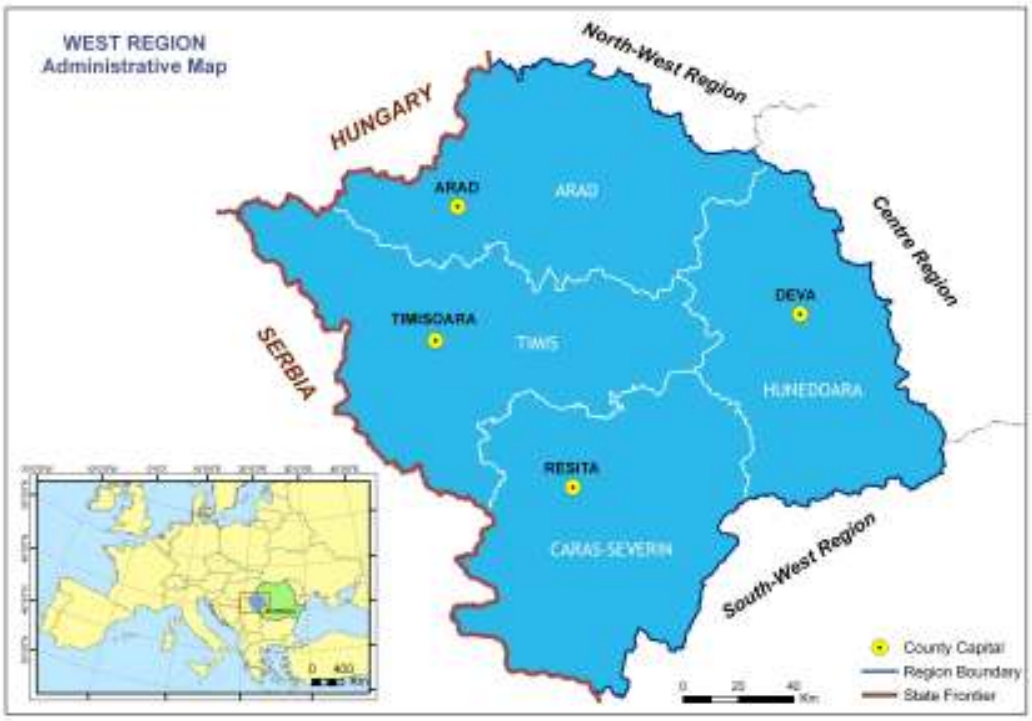
Web services are those services supplied over the Internet, forming a particular case of electronic communications services. Web services have become the most frequently accessed and used electronic services, especially in the developed economies, due to their multiple advantages. The most popular and intensely used web services worldwide are: e-Government, e-Business, e-Banking, e-Commerce, e-Tax, e-Health, e-Learning, e-Procurement.

[4] Ion Stănciulescu – *Communications Infrastructure.. Access And Safety*. A theme study in the volume "The Information Society - The Knowledge Society - Concepts, Solutions, and Strategies for Romania", Bucharest, 2001

Chapter 2. THE IT&C SECTOR IN THE WEST REGION

2.1. West Region Overview

The West Development Region lies in the west of Romania, at the border between Hungary and Serbia, consisting of **four counties** from an administrative-territorial point of view: Arad, Caraş-Severin, Hunedoara, and Timiş (see **map 1** below). The West Region has an area of 32,034 km^2, accounting for 13.4% of the country's area.



Map 1. Administrative-territorial organization of the West Region

On July 1, 2007, the *West Region had a population of **1,924,442 people***, accounting for 8.93% of Romania's population. The West Region has the smallest population of all the country's region, while also being the only region with less than 2 million inhabitants.

The economic indicators have had a significant evolution in the West Region: both the total GDP and the per capita GDP have risen every year, in agreement with the national tendency, but at a faster rate.

Table 1. The GDP at national and regional level, 2001-2006

Year/ Region	2001	2002	2003	2004	2005	2006
Romania	5.210,94	6.950,06	9.090,30	11.372,00	13.326,8	**15967,6**
West	5.521,16	7.527,41	10.265,19	13.042,91	14.960,4	**18570,1**

Source: Romanian Statistical Yearbook, 2008, INS, 2009

Enterprise activity in the West Region

There were **48,460** enterprises operating in the West Region in 2007, with those in industry, constructions, and services accounting for 9.5% of the total number of enterprises in Romania, continuing the upward trend from the previous period (see chart below).

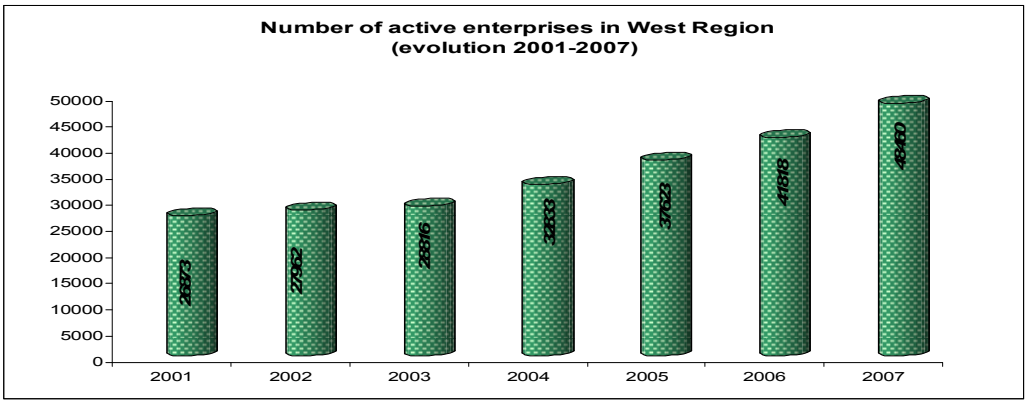
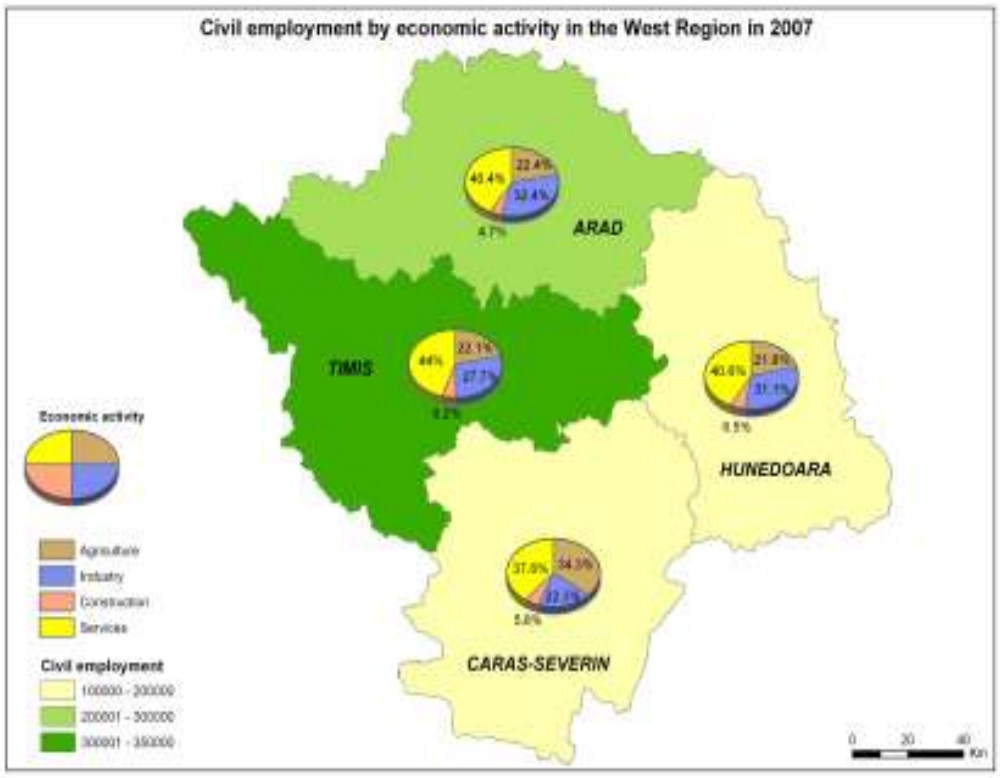


Chart 1. Evolution of the number of active enterprises in the West Region between 2001-2007

The transition towards the market economy has left its mark on the features of the labour market, causing significant changes regarding the volume and structure of the main indicators. According to statistics, the active population in the West Region consisted of 885,000 people in 2007. **The employed population** was 835,000 people that year, and the **unemployed population** was 50,000 people, according to the International Labour Office.

The employment rate of the population at the level of the main sectors of economic activity in the West Region is shown in the map below.



Map 2: Civil employed population by sector of economic activity in the West Region in 2007

As a consequence of the demographic changes seen in recent years, namely the decreasing population and increasing outward migration, the school population displays continuous downward trend at all educational levels. Thus, in the West Region, the analysis shows a decrease in the number of students enrolled in education institutions during 2001-2007, down 22,497 students, namely from 417,371 in the academic year 2001/2002 to 394,874 in the academic year 2007/2008.

2.2. The features of the sector in the West Region

The Romanian information and communication technology sector, one of the most important ones considering its value, has been constantly evolving the past years.

Landline telephony

Local phone calls account for most of the time spent in telephone conversations at regional level (10.5% of the local calls at national level). Next come the long-distance national calls. International calls also have a significant share. While most minutes spent in domestic calls are in Timiş County (47.1%), most international call minutes are in Arad County (51.1%).

Two landline networks account for most of the call minutes (54.2%). Nevertheless, in 3 of the 4 counties, a preference can be seen for calls between landline and mobile networks. This is the case in the counties of Caraş-Severin (53%), Hunedoara (52%), and Timiş (59%).

Radio-TV subscriptions

About 510,163 radio and 553,645 TV subscriptions were recorded in 2007 at regional level, accounting for about 10% of the national values. At county level, the population distribution is preserved. Thus, Timiş County has the largest population and the most numerous radio-TV subscriptions. Regarding the rural-urban distribution of these subscriptions, we notice a higher share in the urban environment (63.14% for radio and 65% for TV subscriptions).

Access to broadband Internet

Unrestricted access for all citizens to modern communication technologies will be provided through the implementation of broadband communication solutions, another sector that is currently in full swing in Romania.

According to the latest report by ANRCTI[5] the total number of Internet connections has reached almost 5.8 million, recording a 76% growth in 2007 compared with 2006, while the number of dedicated access connections (excluding dial-up and mobile access) to broadband Internet has reached 2.1 million, whereby the penetration rate has doubled. Unfortunately, this report does not provide a regional perspective on the issue.

E-commerce stores

There is no surprise in the geographic distribution of the e-commerce stores in Romania. The large commercial centres with a tradition regarding the Internet lead the charts.

Table 2. E-commerce stores in the West Region counties, 2007

County	Store number	%
Arad	12	27
Caraş-Severin	1	3
Hunedoara	5	11
Timiş	26	59
West region	44	100

Source: ANRCTI

2.3. The IT&C companies in the West Region

We will now look at the 278 companies based on the information available at the National Trade Register Office concerning the form of association, the subscribed share capital, turnover, net profit, revenues and expenditures, as well as the number of employees.

The traditional forms of association used in Romania when setting up a business are: joint-stock company, limited liability company, and dealership. As illustrated in the chart below, most companies included in the analysis are limited liability companies, since we are mainly referring to small companies.

[5] ANRCTI – Statistics concerning the evolution of the communications market in 2007

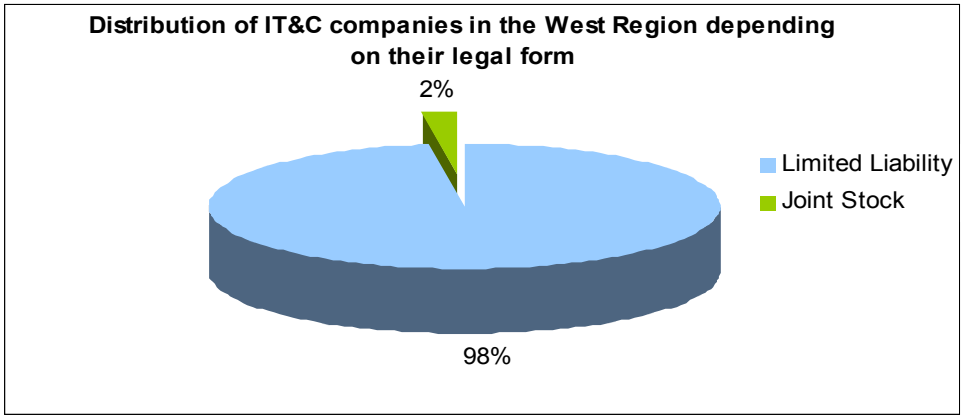


Chart 2. Distribution of IT&C companies in the West Region depending on their legal form

As concerns the **stock capital**, this is defined as the sum of all contributions made by the shareholders in order to set up and operate a commercial enterprise. This aspect has both a legal and an accounting meaning. When the company is set up, the capital stock is equal to the patrimonial assets, but as the company obtains profit, the patrimonial assets surpass the capital stock.

Law 31 of 1990, republished in 2004, with the amendments in effect, establishes the following minimum stock capital ceilings for business enterprises.

- RON **200** - for limited liability companies (SRL);
- RON **90,000** - for joint-stock companies (SA).

As can be seen in the chart below, 127 of the enterprises analysed were set up with the minimum stock capital of RON 200, the amount of stock capital remaining unchanged up to the present. From the analysis of the subscribed capital, we can also see that there is a significant number of companies (106) with a stock capital ranging from 201 to 10,000 lei. The least numerous group is that of companies with a stock capital exceeding 100,000 lei.

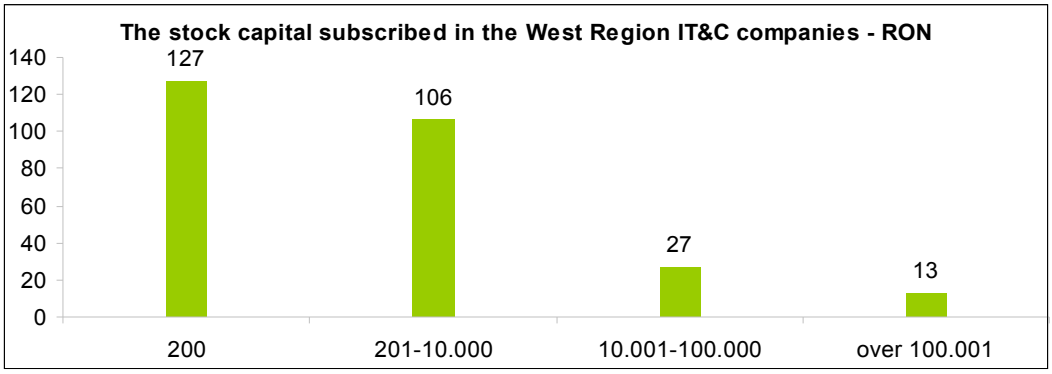


Chart 3. The stock capital subscribed in the West Region IT&C companies

The table below shows a summary of the stock capital analysis of the sample, with information taken from the financial year 2007.

Table 3. The stock capital of the West Region-based IT&C companies

Social Capital - RON	
Minimum	200,0
Maxim	5.144.740,0

Total value	10.457.880,0
Average	38.307,3
No. of companies	273
N/A	5

Source: Own calculations, based on the information made public by the National Trade Register Office.

The **turnover** is the sum total of the revenues generated by the company's trade operations, namely the sale of merchandise and products over a given period of time. The turnover does not include financial and exceptional revenues. To be correct, the turnover is the sum of all revenues generated from goods delivered, works and services rendered.

Judging by this indicator, the chart below shows that most companies had a turnover between 25,001 and 125,000 euros in the financial year 2007[6], with 40% of the companies belonging to this category. A significant number of companies (24%) are included in the 250,000 - 2.5 million euro range.

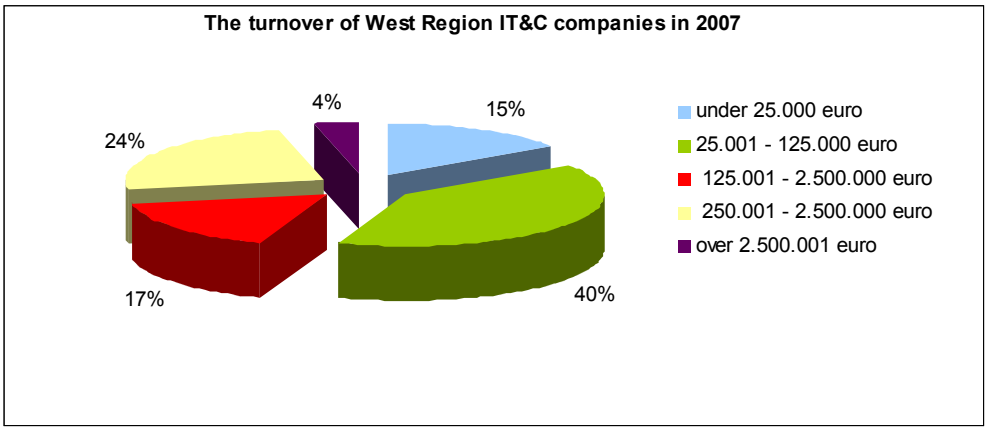


Chart 4. The turnover of West Region IT&C companies in 2007

The table below shows a summary of the sample turnover analysis, with information taken from the financial year 2007.

Table 4. The turnover of the West Region-based IT&C companies

Turover - RON	
Minimum	11.050
Maxim	663.827.484
Total value	1.374.285.934
Average	4.943.474
No. of companies	274
N/A	4

Source: Own calculations, based on the information made public by the National Trade Register Office.

The following analysis concerns the revenues and expenditures recorded by the enterprises in this sector. We can see very wide variations regarding the minimum and maximum revenues obtained by the companies.

[6] We used an exchange rate of 4.0 lei for 1 euro in this study.

Table 5. The revenues of the West Region-based IT&C companies

Revenues - RON	
Minimum	11.050,0
Maxim	748.696.302,0
Total value	1.506.615.762,0
Average	5.478.602,8
No. of companies	275
N/A	3

Source: Own calculations, based on the information made public by the National Trade Register Office.

As can be seen in the chart below, most companies (39%) had revenues in the 25,001 - 125,000 euro bracket.

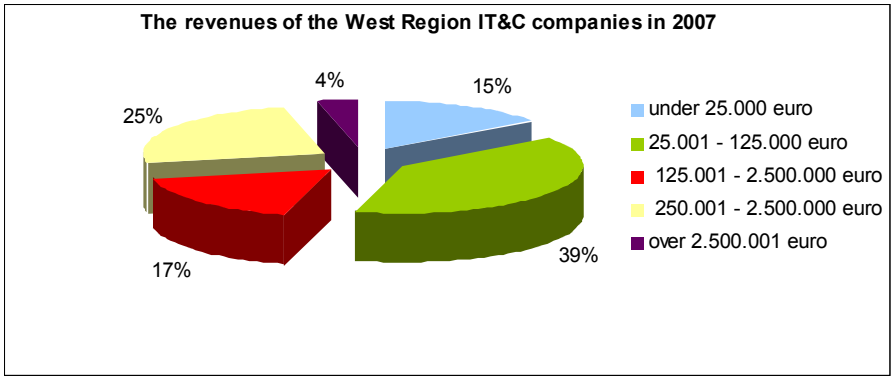


Chart 5. The revenues of the West Region IT&C companies in 2007

As concerns the expenditures, they were at the same level as the revenues, sometimes even higher. From the comparative analysis of the minimum revenue and the minimum expenditures, we can see that the latter were higher.

Table 6. The expenditures of the West Region-based IT&C companies

Expenditures - RON	
Minimum	4.169,0
Maxim	653.553.318,0
Total value	1.394.569.415,0
Average	5.071.161,5
No. of companies	275
N/A	3

Source: Own calculations, based on the information made public by the National Trade Register Office.

As can be seen in the chart below, most companies (38%) had expenditures in the 25,001 - 125,000 euro bracket, just like in the revenue chart.

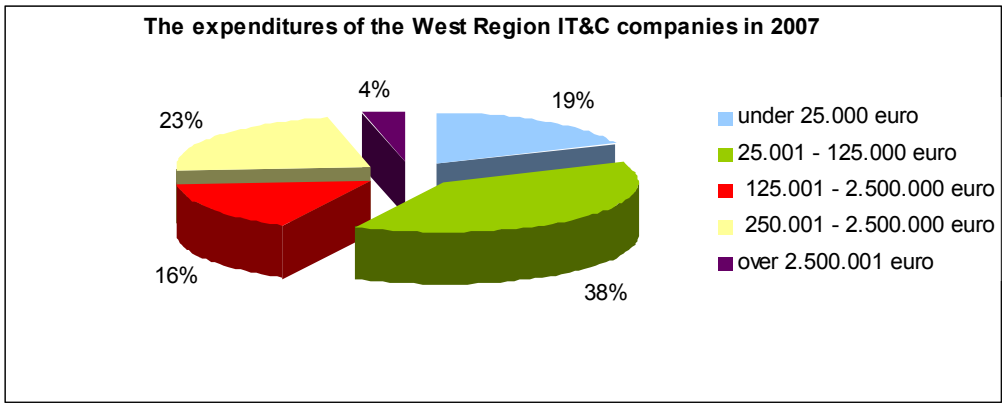


Chart 6. The expenditures of the West Region IT&C companies in 2007

Profit is, in the narrowest sense, the revenue obtained by companies as a product of capital usage. In its widest sense, profit is what companies gain in excess of the production costs. In the case of joint stock companies, after the payment of the legal taxes, the net profit is distributed to the shareholders in the form of annual dividends, proportional to their participation to the stock capital.

The table below shows a summary of the sample net profit analysis, with information taken from the financial year 2007.

Table 7. Profits among the West Region-based IT&C companies

Profit - RON	
Minimum	21,0
Maxim	71.967.872,0
Total value	111.974.266,0
Average	476.486,0
No. of companies	235

Source: Own calculations, based on the information made public by the National Trade Register Office.

As can be seen, not all the companies analysed made a profit in operational year 2007. The chart below shows the losses recorded by the companies analysed.

Table 8. Losses among the West Region-based IT&C companies

Losses - RON	
Minimum	-383,0
Maxim	-29.201.051,0
Total value	-31.182.957,0
Average	-725.185,1
No. of companies	43

Source: Own calculations, based on the information made public by the National Trade Register Office.

Based on the information gathered from the 278 companies, grouped in the 4 categories mentioned in law 346 from July 2004 (updated and amended) regarding the incentives for the setup and development of small and medium-sized companies, we can see that most companies employ between 1 and 9 employees. See the chart below as well.

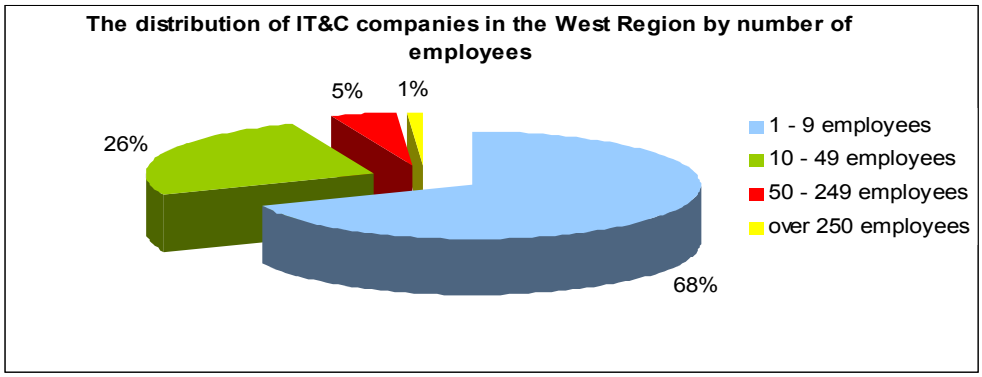


Chart 7. The distribution of IT&C companies in the West Region by number of employees

The chart below shows a summary of the analysis of the 278 companies regarding the number of employees, with information dating from the end of 2007.

Table 9. The number of people employed by the West Region-based IT&C companies

Number of employed people	
Minimum	2
Maxim	1.789
Total value	7.071
Average	25,5
No. of companies	277
N/A	1

Source: Own calculations, based on the information made public by the National Trade Register Office.

The IT&C industry in the West Region is more than "just" the companies operating here: it also includes the **products** resulting from these companies' activities. The main products made by the companies in the West Region were grouped into categories. The chart below shows these product categories.

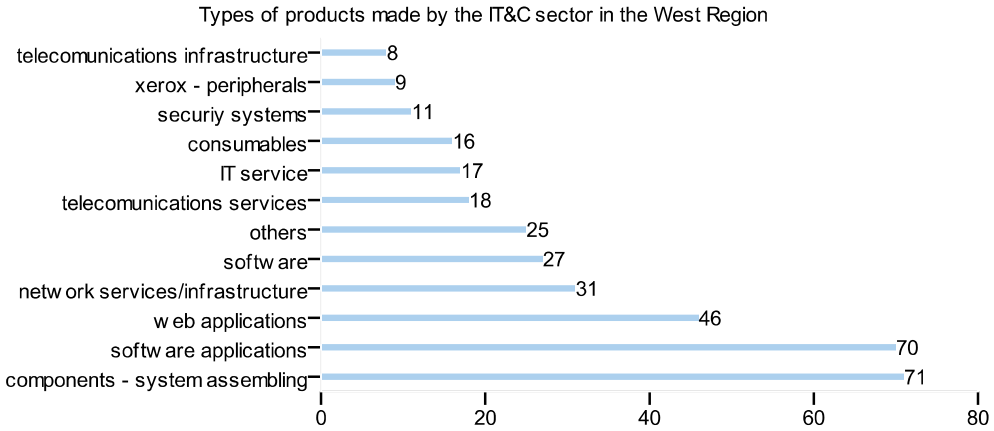


Chart 8. Types of products made by the IT&C sector in the West Region

While discussing the products in the IT&C sector, we also classified these large categories into own products, consulting activities, and trade. The results are given in the chart below.

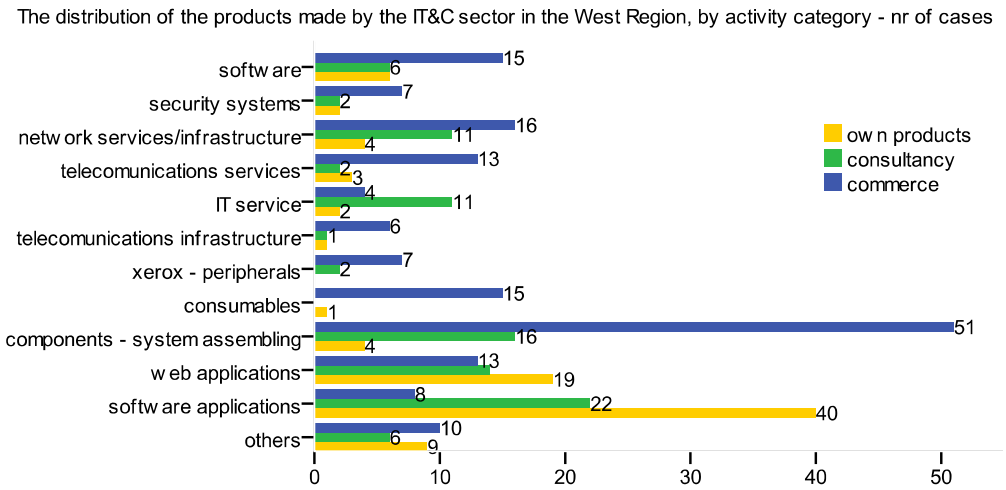


Chart 9. The distribution of the products made by the IT&C sector in the West Region, by activity category

The types of clients of the sector were analysed by integrating the qualitative (free) answers into a few general categories that were meant to encompass all the 240 answers received.

The distribution thus obtained was put into a chart, leading to the following conclusions:

- most products address a wide range of companies (banks, companies in industrial sectors, constructions, etc.);
- the second category of clients is represented by local public institutions, with wide-ranging categories being found here too (town halls, schools, etc.);
- the third category of clients is made up of natural persons;
- the fourth category are the national public institutions (the railway company, the police, Romsilva) and various other public institutions.

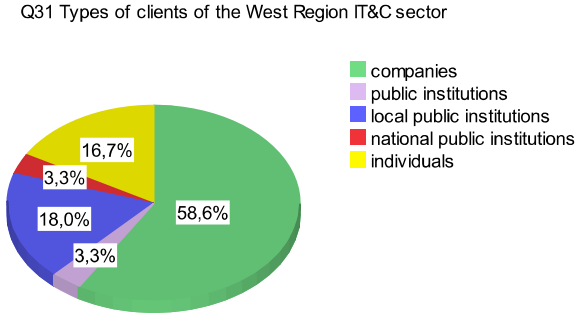


Chart 10. Types of clients of the West Region IT&C sector

2.4. The IT&C sector support infrastructure

The Timişoara Software Business Incubator

The Timişoara Software Business Incubator (UBIT) aims to support Timiş County based companies specialized in developing software services, by granting them special terms on office leases, access to communication networks, providing secretarial services, assistance in the entrepreneurial development, consultancy, and promotional services.

The idea of building a business incubator focusing on the IT field was first discussed in the 1990's. The incubator concept was implemented and funded by a local consortium of public institutions from February to April 2004. The incubator was officially inaugurated in May 2004. Also in May, a first set of companies were admitted following the evaluation of their business plans. The actual activity of the first companies in the incubator started on July 1, 2004.

The Timişoara Software Business Incubator was set up and funded by a consortium consisting of three local public institutions and a German public agency: The Politehnica University of Timişoara; the City Hall and Local Council of Timişoara; the Timiş County Council; GTZ – the German Society for Technical Cooperation.

The incubated companies enjoy the following services throughout the 3-year incubation period:

- Space for carrying out their activity (20 and 40 sqm rooms);
- Access to promotional events (exhibitions, fairs);
- Access to communication networks (Internet, telephony);
- Secretarial services, access to fax, photocopier;
- Training sessions within the incubator;
- General entrepreneurial assistance;
- Access to training and meeting rooms;
- Legal and fiscal consultancy;
- Facilitated contacts with university teaching staff, researchers, and students.

As concerns its external clients, the incubator can offer the following services:

- Mediation of business meetings with the incubated companies;
- Interfacing the contact with its own network, with representatives of the university environment or of the local and regional administration;
- Information and consultancy services;
- Facilitating the selection of the most suitable local service suppliers in the field of accounting, marketing, legal consultancy, banks, human resources, real estate business, equipment, services, and IT&C infrastructure.

Eligibility criteria for companies:

- They must be registered in Timiş County, with the registration date no earlier than 2 years prior to the application;
- Most of the stock capital should belong to one or several Romanian natural or legal persons;
- They must have a distinct legal status (they should not be development departments of other companies);

- They must operate in the field of IT, software, or telecommunication product development;
- They must prove a high development potential (substantiated by a convincing business plan and a credible team of associates and employees);
- They must accept the semestral evaluation of their economic-financial evolution regarding the maintaining of the admission criteria;
- They must intend to carry out significant activities in the field of research and development;
- Their turnover should not exceed 100,000 euros;
- They must have no more than 7 employees.

Of the 19 companies incubated by UBIT, four have graduated, and one has withdrawn from the incubator.

2.5 Regional initiatives in support of the IT&C sector

2.5.1 The innovation pole in the IT&C sector

Context

The preparation of the project entitled Innovation Pole in the Sector of Information and Communication Technology was carried out by means of regional consultancy during a project planning session (*Goal Oriented Project* Planning) and was completed with a Master Plan, with the IMPACT programme for supporting projects in order to access the Operational Programme "Increase of Economic Competitiveness", Axis 2, "Research, Technological Development and Innovation for competitiveness".

Description

The aim of the project is to create a regional pole of excellence in the field of Information and Communication Technology (IT&C) in the West Region by employing the substantial resources present at regional level in this field and by coordinating the innovative activities of the major players in the region based on a common development strategy.

To this end, the project will catalyze the transformation of the already existing IT&C agglomeration in the West Region into a regional pole of excellence that will support the increase of the companies' competitiveness and the improvement of the performance of the public sector in the region. The strategic partnerships and the new RDI infrastructure created through the project will allow the ITC companies in the region to produce innovative ITC solutions, services, and products that can be used by a wide range of beneficiaries.

The project has the following strategic aims:

- The institutional-based initiation and support of the transition from the current regional aggregation existing in the West Region ITC field to a pole of excellence that will group the innovative companies in this field (with a special accent on SME's), the education and research institutions, the business support organizations, based on a shared long-term development strategy;
- The creation of a shared RDI information, and communication infrastructure among the ITC players in the West Region, that will stimulate horizontal cooperation and the shared use of resources, as well as the stimulation of staff

mobility and participation in collective projects, with positive consequences regarding the staff training level in the ITC sector at regional level;
- The promotion of innovation, both within the ITC sector (especially the SME segment) and the other business sectors, through the innovative applications and solutions produced within the pole of excellence;
- The increase of the competitiveness of the region's economic and administrative players based on the innovative solutions and applications produced within the pole of excellence.

The Regional Innovation Pole in the field of information and communication technology will be created in three stages, each of them marking the essential elements of creating the foundation for the initiative. In the first stage, the Pole Development Strategy will be drafted, through an extensive process of consulting, consensus, and decision-making; in the second stage, the main technical and administrative office of the Pole will be built and the "satellite" locations will be fitted out; in the third stage, the competencies, tools, and services of the Pole will be developed, in an integrated package supported by communication, marketing, and internationalization plans.

2.5.2 The Timişoara Information Technology Park

Context

The processes and activities connected with the setting up of the Timişoara Information Technology Park were carried out based on Law 50 of January 21, 2003 for the approval of Government ordinance 14/2002 regarding the setting up and operation of the scientific and technological parks, published in the Official Gazette Issue 70/03.02.2003.

Based on the above mentioned law, the consortium for the creation of the Timişoara Information Technology Park was set up in January 2004. The members of the consortium are: the West University of Timişoara; the "Politehnica" University of Timişoara; the e-Austria Institute of Timişoara; the Timişoara Local Council; the Timiş County Council.

Based on the same legislation, the joint stock company "IT Park Management" was set up on April 30, 2004, having as sole aim that of managing the activity of the park. The members of the park administration company are the same as those of the consortium. The company is led by a board of directors.

Description

The main objectives of the IT Park are as follows:
- to develop the scientific, technical, and economic potential at regional level;
- to develop the high tech industry in the IT field;
- to support the setting up of new companies in the field of IT, especially by creating an incubation environment;
- to facilitate the technological transfer of the new IT results to the companies interested in using the products or product packages and services with a commercial value and to utilize these on the domestic and foreign market;
- to facilitate the implementation in the industrial sector and the marketing of the results of the top-level IT research, especially the research carried out in universities and local research institutes, mostly at UVT, UPT, and IeAT;

- to create alternatives on the labour market in the field of advanced technologies and thus to support the industrial restructuring;
- to integrate higher education students and graduates into the socio-economic environment;
- to bring highly professional specialists into the field of research and higher education;
- to initiate and develop the cooperation between the university and research environment and the industrial sector;
- to attract private funding into education and research;
- to attract foreign companies willing to invest in research, technological transfer, and production;
- to create new jobs in the field of advanced technologies;
- to stimulate companies in order to obtain an active participation of the private sector to the development and utilization of IT research and innovation, by creating high-tech commercial products;
- to stimulate the innovative and technical-scientific potential of the staff employed in software production, of university teaching staff, of researchers, and students.

The park will be developed in three stages:

1) The initial stage: Application for funding (year 1);
2) The implementation stage: The development of a location provided by the Timişoara Local Council or the purchase of a plot that will be prepared for hosting the companies included in the Park (years 2-4);
3) The expansion stage: The development of infrastructure and facilities in the Torontal area, on a plot of about 2 ha, provided by the Timiş County Council, as well as in the Freidorf area, in the space allocated by the Local Council to the Timişoara Industrial Park. In principle, the intention is for companies or banks to lease land for building infrastructure used exclusively for IT activities (years 5-10).

Chapter 3. QUESTIONNAIRE ANALYSIS

3.1 Presentation of the methodology

In order to complete the survey with field data, the questionnaire survey was started among the companies in the IT&C sector. The data collection procedure relied on field operators.

The use of a quantitative method of this kind relied on the specific advantages it involves: the possibility of standardizing some of the responses, the facilitation of the statistical analysis, the descriptive and synthetic potential when using specific tools, charts, maps, SWOT analysis.

An important aspect of the quantitative methods, especially of the questionnaire-based survey, is that of defining the indicators that will allow a high degree of measurement and description of the phenomenon investigated. This stage, also known as the concept operationalization stage, is presented synthetically in the following table, organized in four general dimensions: the economic dimension, the managerial dimension, the strategic dimension, and regional competitiveness. A set of indicators was designed for each dimension.

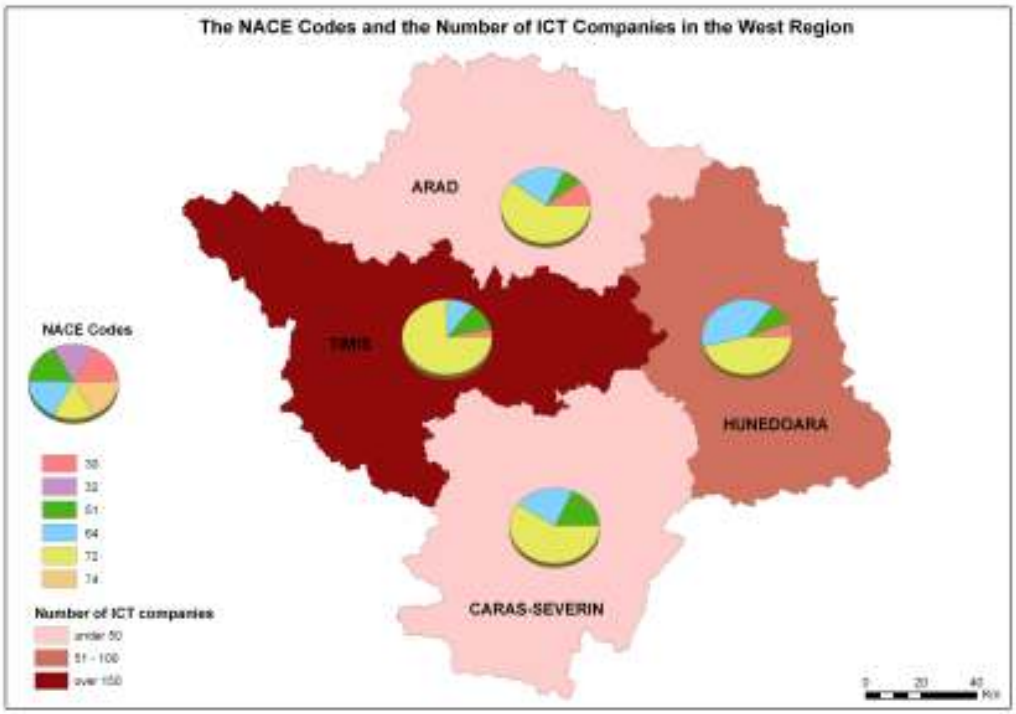
The instrument used in the field survey was the semi-structured questionnaire, drawn up based on the indicators identified, totalling 38 items. The questionnaire contains open, closed, half-open, filter-type, and opinion questions, addressing people in management positions in the companies. The estimated time needed to apply the questionnaire was 20 minutes, with the questionnaire being filled in by means of direct interviewing.

The main challenge of the research was to determine the surveyed population, considering that the IT&C sector covers several CAEN fields. All the CAEN codes corresponding to the IT&C sector were thus included in the analysis; the conclusion was that there were 1,374 companies in the West Region that belong to one of the CAEN codes shown in the table below.

NACE code	NACE definition
3002	The manufacturing of computers and other electronic equipment
3220	The production of radio-TV transmitters, telephone and telegraph equipment and devices
5184	Wholesale trade with computers, peripherals, and software
6420	Telecommunications services
7210	Consultancy in the field of computing equipment (hardware), apart from consultancy and program supply
7221	Software product editing services
7222	Software supply and consultancy services
7230	IT data processing
7240	Database-related services
7250	Services of maintenance and repairs for office equipment, accounting equipment, and computers
7260	Other related IT services
7420	Architecture, engineering, and technical consultancy service connected with these

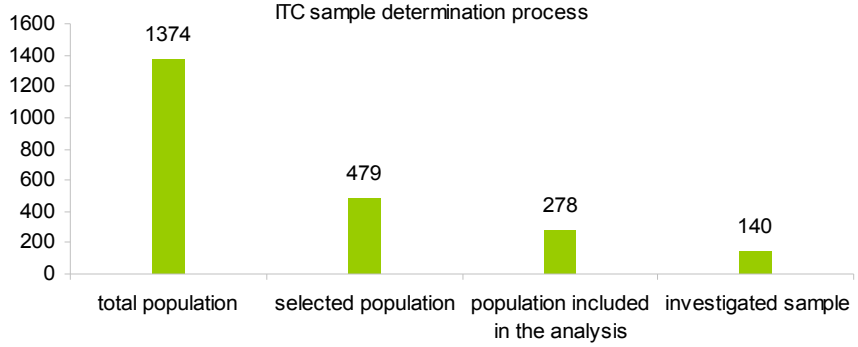
Table 10. NACE Code in IT&C

After applying two criteria (at least 2 employees and a turnover of at least RON 10,000), their number dropped to less than half. Considering that the mere selection by company profile (CAEN code) may cause some errors in the assessment of whether companies belong to the IT&C field, a checking was performed on the companies, which led to the database being populated with 497 main companies, distributed both geographically and according to the main CAEN code. Following the in-depth analysis at the level of these companies, as well as due to the field observations, we reached a number of 278 companies that were considered for the general analysis of the sector.

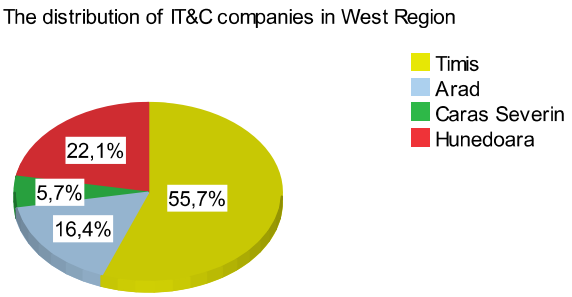


Map 3: NACE codes and the number of IT&C companies in the West Region

Corresponding to the main population, a volume was calculated of the 140-company sample distributed throughout the West Region, proportional to the number of the existing companies, thus ensuring a high degree of representativeness. The stratification criteria employed were: localization by county and the CAEN code.



A first criterion refers to the county distribution of the 140 companies that responded to the questionnaire, taking into account the regional character of the research. The distribution is shown in the chart below.



3.2 Interpreting the questionnaires

The questionnaires were interpreted along the 4 general dimensions described in the methodology presentation through quantitative (statistical) analysis, using specific software: SPSS version 16 and Microsoft Office Excel.

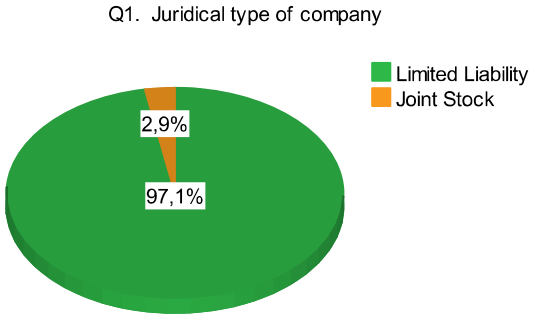
The main statistical tools used were:
- **frequency analyses** – expressed in absolute numbers and percentages;
- **specific indicators** – minimum value, maximum value, total;
- **central tendency indicators** – the average applied to strings of absolute numbers or percentages;
- **dispersion indicators** – the standard deviation (the statistical indicator of the degree to which an individual value from a probable distribution tends to vary compared to the average value of the distribution);
- **coefficients of association** (the hi^2 test) – a test used in order to identify the degree of association between two variables, based on the differences recorded between the probabilistically estimated frequencies and the ones obtained. This test confirms/disproves whether the statistical distribution of two variables (e.g. the type of company and the intention to become part of a cluster) is accidental or not, and whether there is any connection between them;
- **correlation coefficient** – a statistical tool for measuring the degree of dependency between two variable, starting from the assumption that the growth tendency of one of them correlates with the growth (positive correlation) or the reduction (negative correlation) of the other one. The correlation coefficient (**r**) thus varies between -1 and +1, most of the times getting fractional values. At negative values, the coefficient indicates a reversed correlation, and when it is equal to zero, it indicates the lack of a correlation.

I. THE ECONOMIC DIMENSION

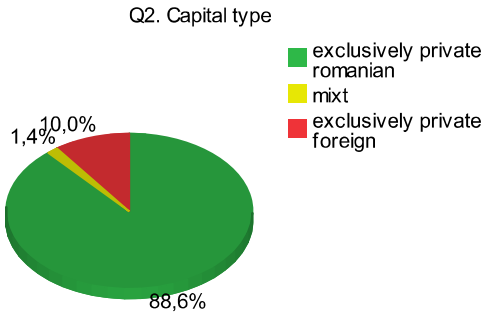
This section looks at the main indicators describing the business activity of the companies and offering an overview of the company profile, the dynamics of the activity, the outlet, and the financial results.

GENERAL INVESTMENT INFORMATION

A first indicator refers to the legal form of organization, most companies (97.1%) in this study going for the simplest form, namely the limited liability company (SRL).

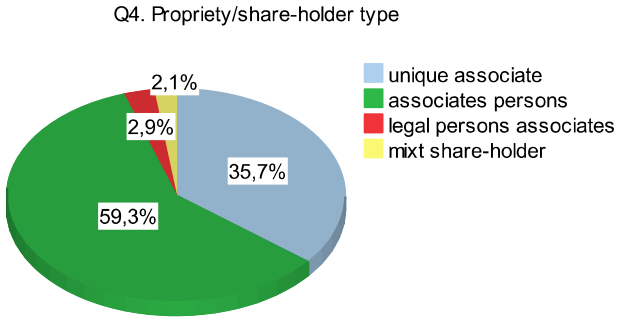


An in-depth analysis of the form of capital revealed that most of the companies (88,6%) have all-Romanian capital, followed by 10% with all-foreign capital, and a very small part (1.4%) with mixed capital.



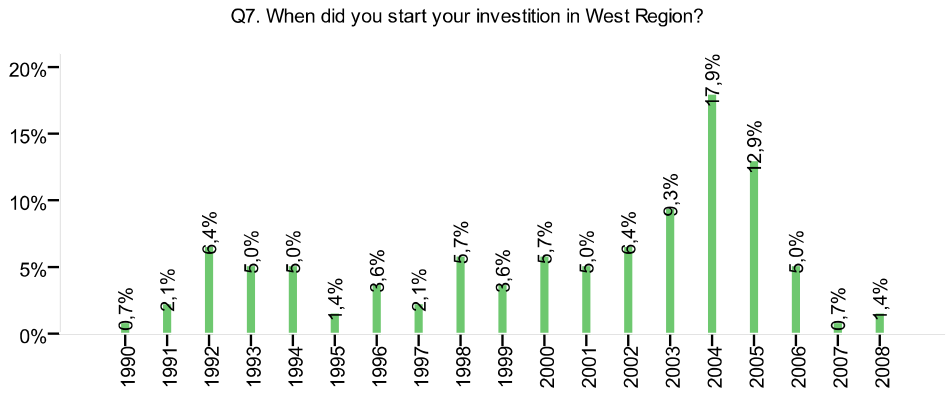
Germany	4
Austria	2
Italy	2
SUA	2
France	1
Hungary	1
Belgium	1
Nederland	1
Switzerland	1

As concerns the shareholders, 59.3% of the companies have natural person shareholders, followed by sole shareholder companies (35.7%). The fewest companies in the sample have legal person shareholders (2.9%) or mixed share holders (2.1%).



Another indicator concerns the investment starting year, the distribution revealing two key moments:

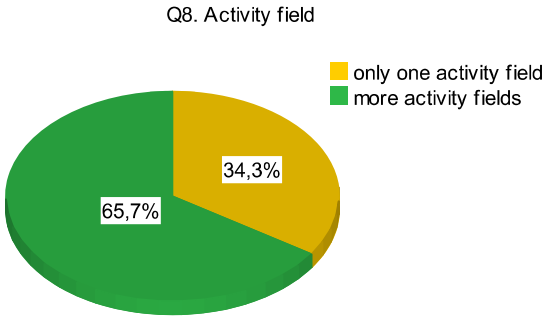
- the years 1992-1994, when the opportunities at the time in Romania were utilized;
- the years 2003-2005 – the peak being 2004, at a time when Internet access was spreading fast among corporate and home users, while businesses in the sector were becoming specialized.



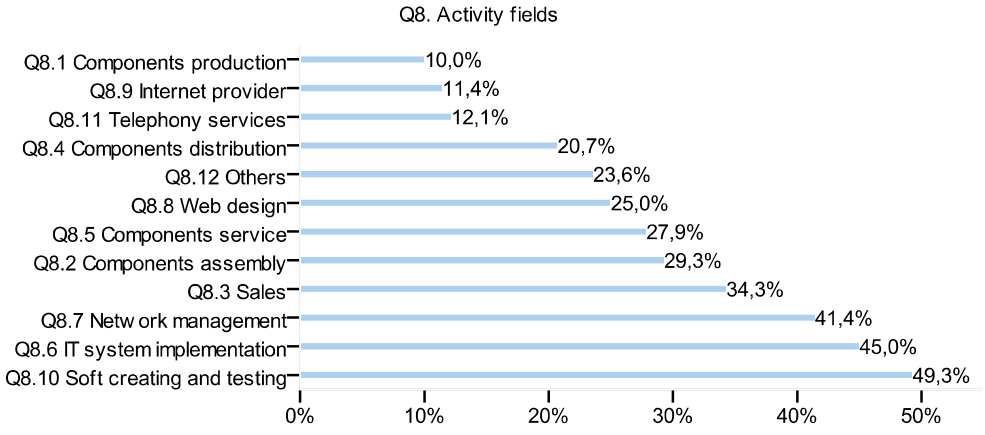
GENERAL PRODUCTION INFORMATION

A closer look at the field of operation, besides the one described by the CAEN code, revealed a dynamic dimension of the activity carried out in the IT&C sector, explained by the fact that about 2/3 of the companies operate in several fields, while 1/3 operate in one field.

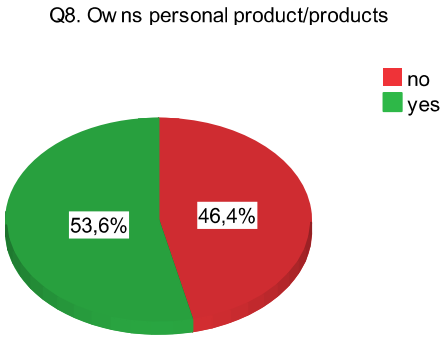
The phenomenon can be explained by the factors influencing the sector:
- the market and the expectations of the market where companies try to find niches;
- the world dynamics of the sector, added to the technological development, thus making it possible to succeed in new fields.



The most frequent fields of operation target software creation and testing (49.3%), IT system implementation (45%), and network administration (41.4%).

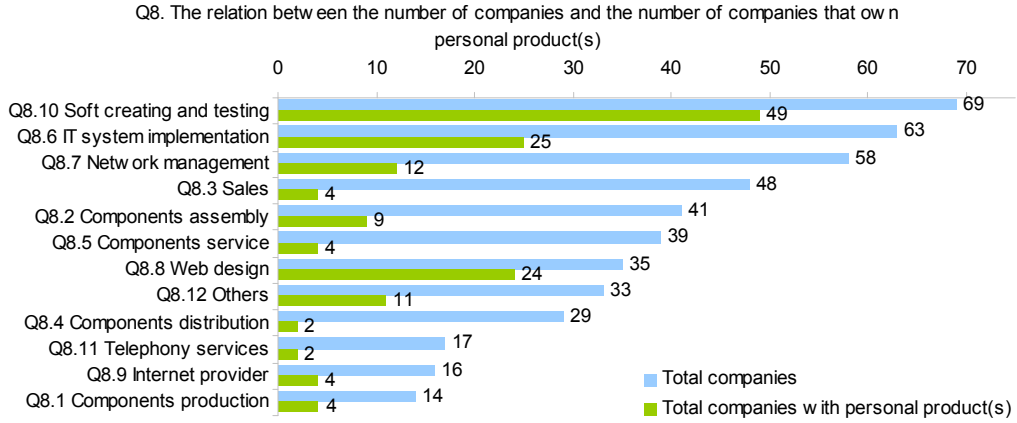


A particularly significant aspect in the analysis of the IT&C sector is the identification of companies' own products. The statistical distribution shows that 53.6% have an own product in at least one field, thus contributing to the regional competitiveness of the sector.

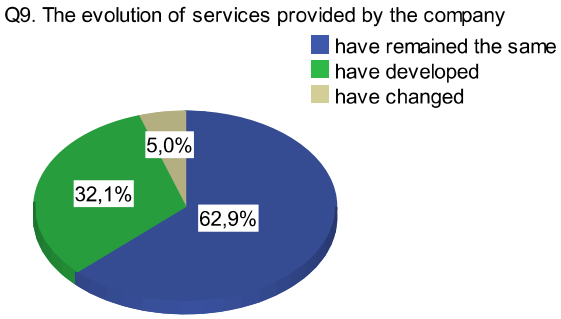


A closer statistical analysis showed that most companies having their own products operate in the field of software creation and testing (35%), followed by those implementing IT systems (17.9%) and those working in web design (17.1%).

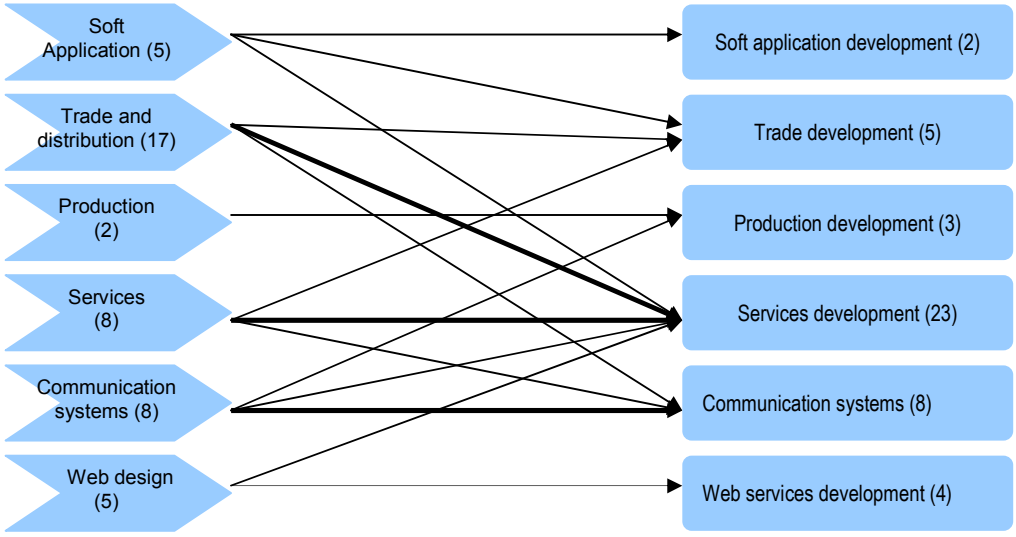
The following chart shows the ratio between the total number of companies by field of operation and the number of companies that have their own products. Thus, within the strategic field of software creation and testing, 49 of the 69 companies have their own products.



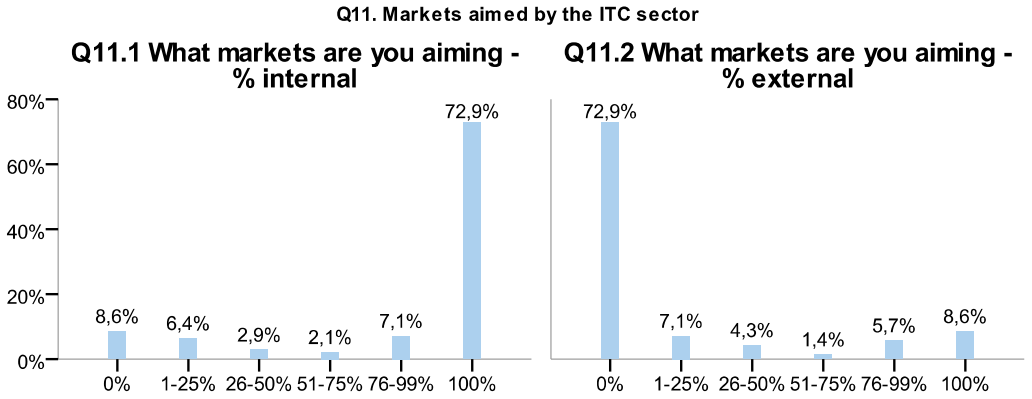
Another aspect connected with the dynamics of the activity compared with the market demands or with the technological changes concerns the evolution of the services offered by the company. Thus, we can see that 62.9% of the companies maintained their field of operation, 32.1% developed their services, and 5% changed their field of operation.



While most companies (17) were operating in the field of trade and distribution, 23 companies subsequently turned towards service development. At a closer look, the statistical analysis showed that the dynamics of the companies regarding the development/diversifying of their activity occurs not only in their own field of operation, but in related fields as well. The following table presents this subsample, and the drawing shows the development of the services offered.

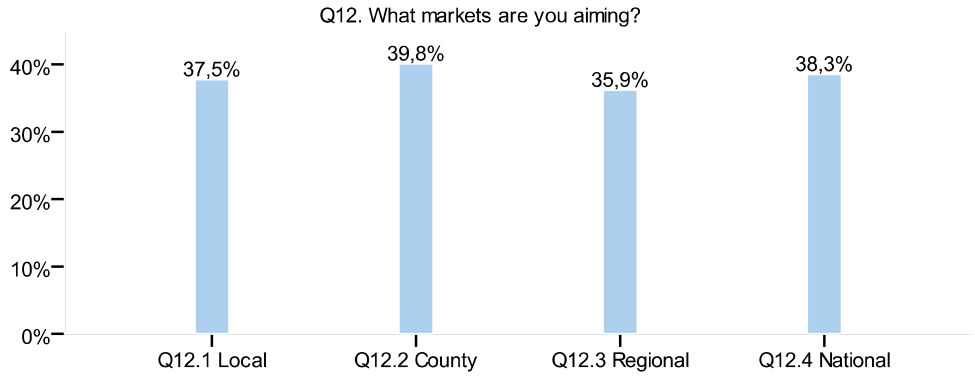


The comparative analysis of the percentage distribution on the two types of outlets of the products and services showed that 72.86% of the companies sell exclusively on the domestic market, while 8.57% (12 companies) sell exclusively on the foreign market. The percentage differences refer to the different shares allocated by each company to a mixed market.



The coverage of the domestic market was then analysed. The distribution shows very small differences between the type of participation and the four types of domestic markets: local, county, regional, and national.

	Subsample	Total cases
Q12.1 What is your focus area on the domestic market? - local	128	48
Q12.2 What is your focus area on the domestic market? - county	128	51
Q12.3 What is your focus area on the domestic market? - regional	128	46
Q12.4 What is your focus area on the domestic market? - national	128	49



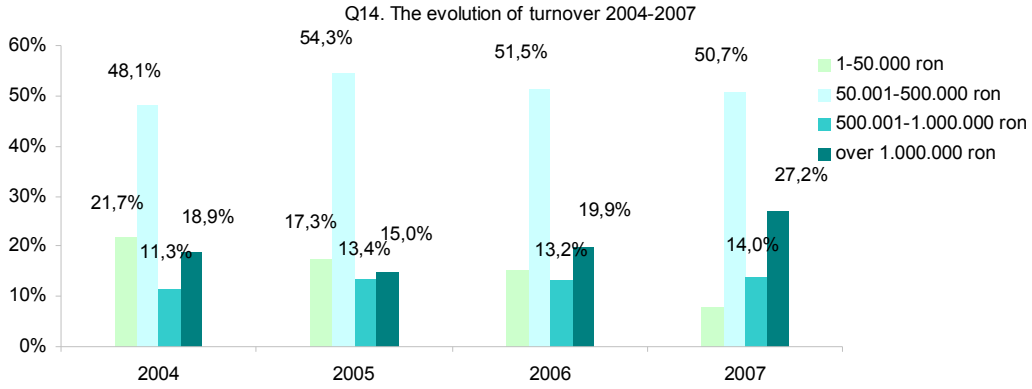
As concerns the existing competition, 17.1% of the companies did not name any competitor, while most identified up to 10 competitor companies. On the whole, competition is high in the sector.

THE ECONOMIC INDICATORS OF THE SECTOR

The analysis of the turnover evolution between 2004-2007 revealed an upward trend for both the total and the averages obtained, which denotes sustained growth of the IT&C sector. However, we must take into account that in the period under analysis (2004-2007), the total number of companies rose as well, due to new companies being set up, which quantitatively increased the total turnover and the average value.

	Nº of companies	Minimum	Maximum	Total amount	Average
Q14. Turnover in 2004	106	2.918	26.754.739	94.156.997	888.273,56
Q14. Turnover in 2005	127	3.506	33.144.966	125.078.958	984.873,69
Q14. Turnover in 2006	136	7.819	49.915.637	174.555.550	1.283.496,69
Q14. Turnover in 2007	136	11.050	73.241.179	234.768.836	1.726.241,44

The turnover was then converted to value intervals, shown in the following chart for the 2004-2007 periods.



The following conclusions can be mentioned regarding the overall dynamics of the turnover in this sector:

- the obvious drop in the number of companies with turnover up to RON 50,000;
- the slight fluctuation of the number of companies with a turnover between RON 50,001-500,000, these being the most numerous;
- the slight increase in the number of companies with a turnover between RON 500,000-1,000,000;
- the obvious increase in the number of companies with a turnover above RON 1,000,000.

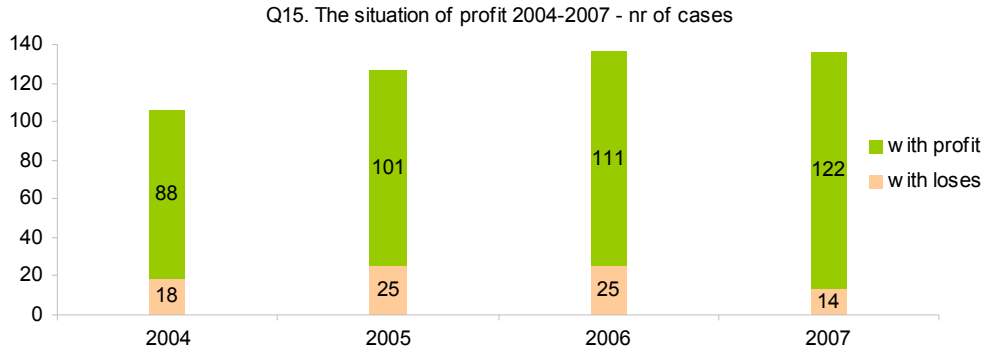
Another indicator used in the analysis of the economic dimension of the sector is profit. The analysis of the evolution of the total and average profit during 2004-2007 showed a clear upward trend, despite some companies that recorded losses.

The companies were then divided in two categories and the main statistical indicators were recalculated.

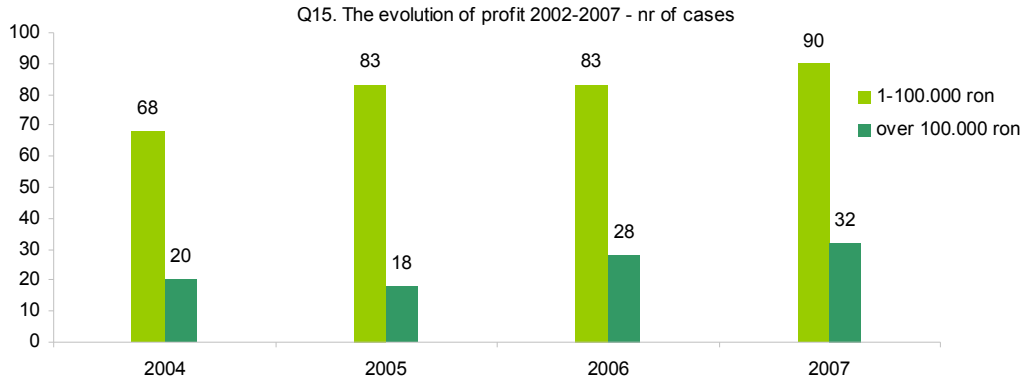
	Nº of companies	Minimum	Maximum	Total amount	Average
Q15. Overview of companies with losses in 2004	18	-579	-199.458	-427.067	-23.725,94
Q15. Overview of companies with losses in 2005	25	-573	-288.293	-1.103.734	-44.149,36
Q15. Overview of companies with losses in 2006	25	-44	-174.707	-610.166	-24.406,64
Q15. Overview of companies with losses in 2007	14	-383	-206.428	-493.022	-35.215,86

Q15. Overview of companies with profits in 2004	88	386	525.045	6.923.379	78.674,76
Q15. Overview of companies with profits in 2005	101	151	1.038.888	7.396.122	73.228,93
Q15. Overview of companies with profits in 2006	111	35	1.949.626	11.948.845	107.647,25
Q15. Overview of companies with profits in 2007	122	110	1.689.069	12.552.160	102.886,56

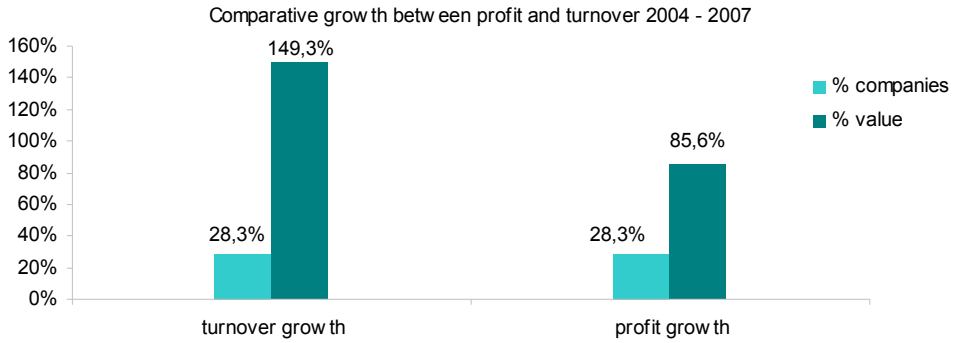
The following chart was obtained by separating companies that made a profit from companies that did not. On the whole, the losses are limited, affecting less than 25% of the total number of companies for each separate year.



The profit obtained was later converted to value intervals, shown in the following chart for 2004-2007, which only covers the companies that recorded profits. The chart shows that most companies had profits under RON 100,000.



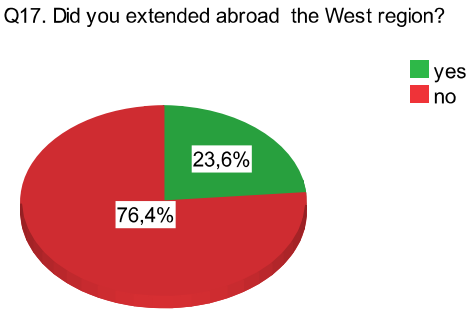
The following chart compares the turnover and profit in 2004 and 2007 respectively; it should be mentioned that the number of companies rose in this period. Thus, comparing 2007 to 2004 from the point of view of the number of companies, a 28.3% growth was recorded, but the total turnover rose by 149% and the profit by 85.6%.



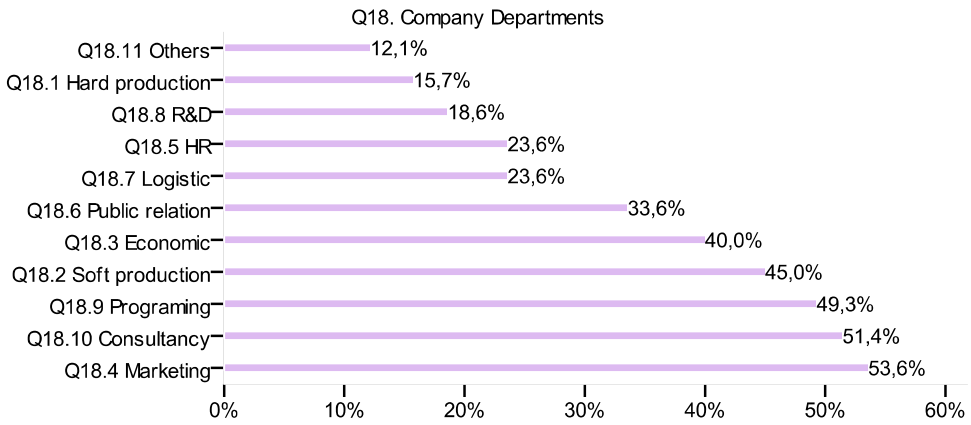
II. THE MANAGERIAL DIMENSION

This section looks at the main indicators describing management-related aspects both formally (the structures present) and functionally (existing management practices). A distinct group of indicators targets the human resource issue, as a factor with strategic and economic implications at the level of the West Region.

Also as part of the organizational dimension, we looked at the coverage of the structures (offices, branches, etc.) outside the West Region, 23.6% of the companies being in this position.

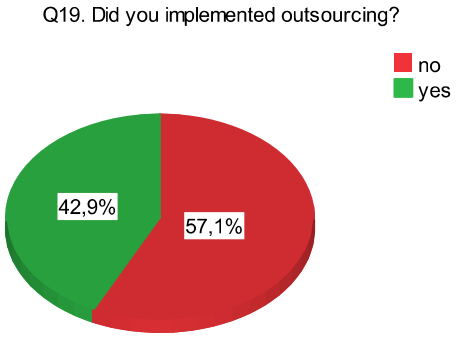


The analysis was extended to the internal organization structure. Considering the profile of the existing companies, we can say that the structure of the departments was also influenced, so that most have the marketing and sales department, followed by consultancy, programming, and software production. Following this first category of departments, there are those focusing on the administrative aspects, namely: economic, public relations, logistics, and human resources. The human resource department constitutes a category apart.



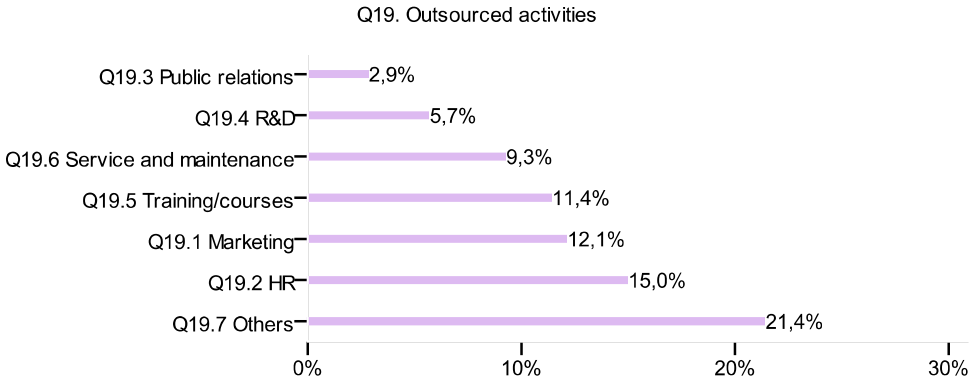
On the whole, companies have a diversified organizational structure, so that the average number of departments is of 3.66 per company.

For the analysis of managerial practices, we used another indicator that checks how open the companies are towards outsourcing the company activities, as a solution to optimize internal costs. The following chart shows that 42.9% of the companies have outsourced at least one service, which indicates a high degree of organizational flexibility.



The analysis of the outsourcing degree shows an average of 1.82 activities per company among the 60 companies that took this decision.

Below are the types of outsourced activities, the highest rate of occurrence belonging to the "other" category (21.4%), containing the business-accounting services (used by small companies), as well as legal, production, copyrighting, labour safety, warranty, and photo services. The second level contains the human resource (15%) and marketing services (12.1%).

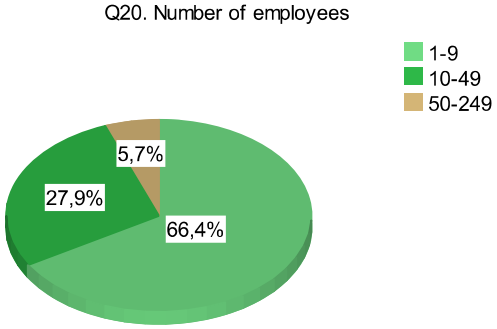


HUMAN RESOURCES

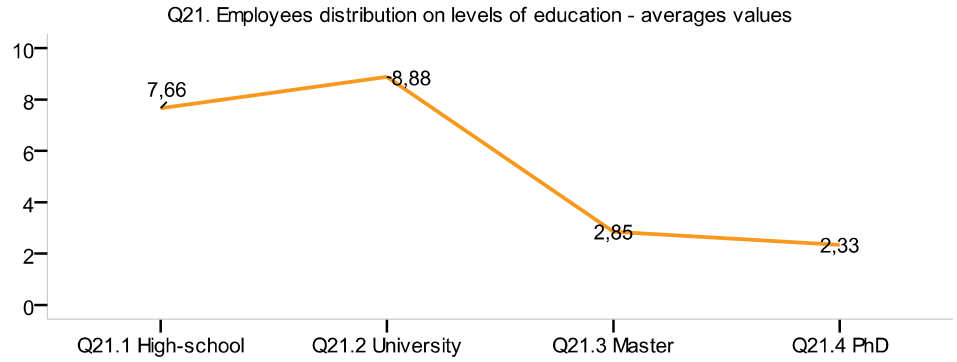
The analysis of the human resource component is a very important aspect in understanding the dynamics and impact on the regional economy. Our sample of IT&C companies in the sector employ 1962 people, with an average of 14 people per company, ranging between 2 and 240 employees per company.

	Minimum	Maximum	Total	Average
Q20. Total number of employees	2	240	1962	14,01

The classification of the companies according to the total number of employees indicates the prevalence of small and medium-sized companies with up to 49 employees.

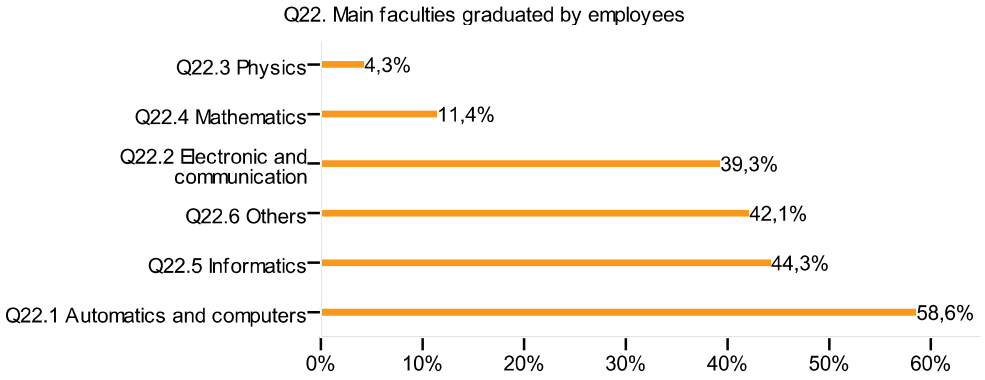


Another factor contributing to the sector's regional competitiveness is the employees' level of studies. The distribution of the employees by level of studies indicates that, on average and on the whole, most employees have university studies; these are present in 130 companies throughout the sample. They are followed by employees with vocational training, present in 94 companies and totalling 720 people, the average number being of 7.66 per company in this subsample.



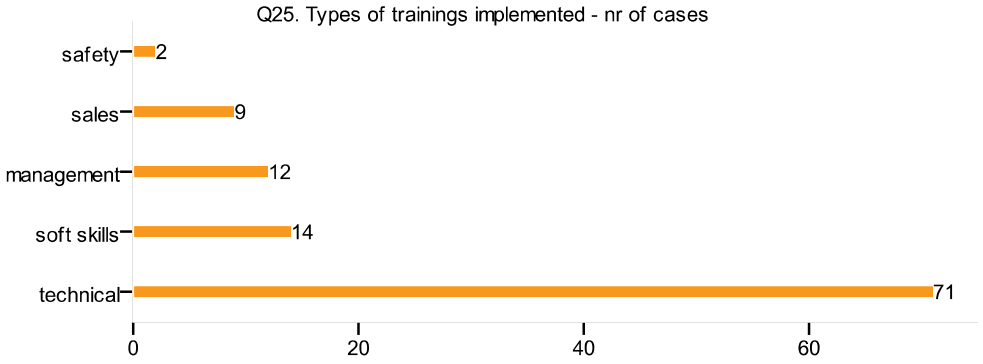
Starting from the assumption that most employees working in the IT&C sector have university studies, their origin was also analysed from the point of view of the type of faculty they graduated from.

Thus, the distribution shows that most are automation and computer hardware graduates (58.6%), followed by computer software (44.3%) and electronics and telecommunications (39.3%). A special category is that of economics graduates and technical studies graduates (mechanics, construction electro mechanics, etc) (42.1%), all these being part of the "other" category.

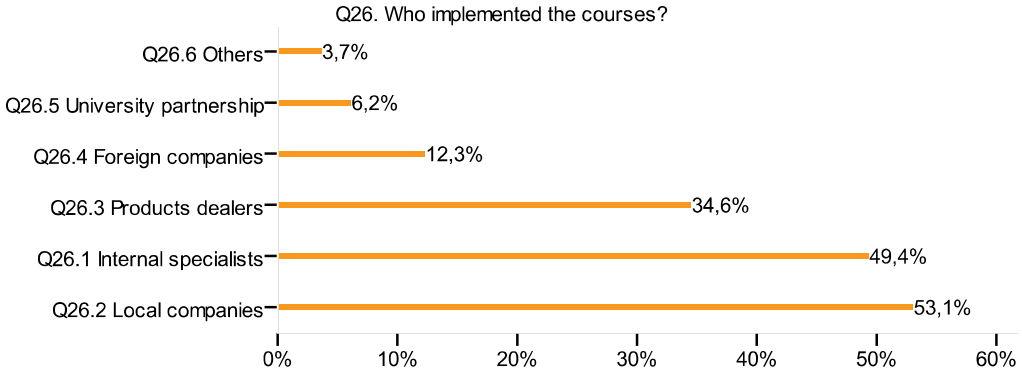


Another very important aspect regarding the human resource component refers to employee training as a resource of competitiveness and labour productivity. The percentage distribution shows that over half of the companies made at least one training course for their own employees, thus highlighting the role of continuous education in the technical sectors.

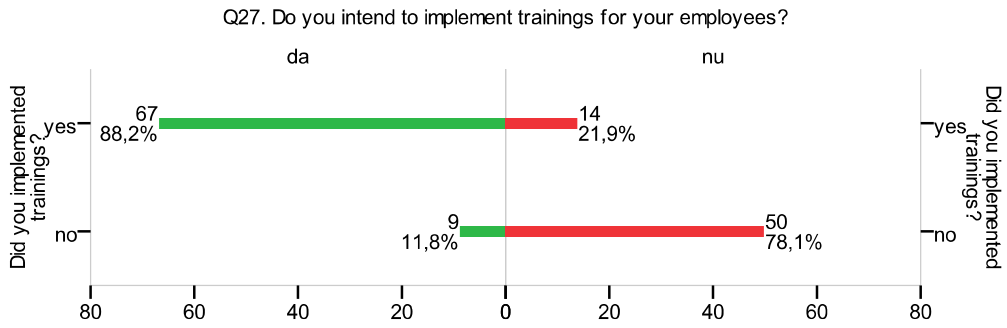
Of the total of 108 courses organized in the 81-company subsample, most of them focused on technical aspects of the activity, probably being designed for the productive section of the company, and the rest focused on the development of specific skills, usually management-oriented.



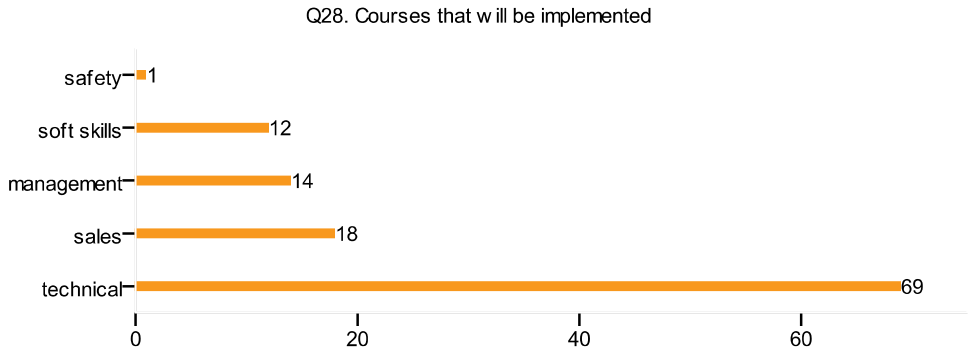
As regards the people involved in the training activity, in most cases, the courses were taught by domestic specialized companies (53.1%), followed by own specialists (49.4%) and product suppliers (34.6%), who own the technical know-how of the products they market. We should also mention the cooperation with specialized foreign companies and with universities.



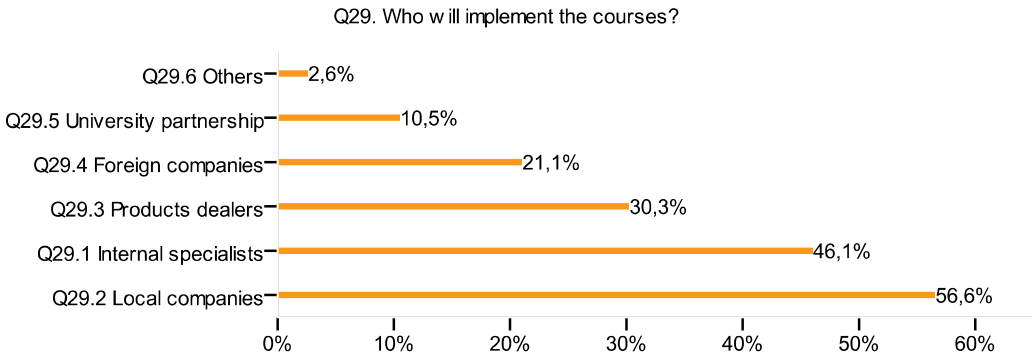
As concerns the availability for organizing courses in the future, the percentage of those willing to do this is dropping, reaching 54.3%. The in-depth statistical analysis revealed that most of the companies that organized courses for their own employees intend to do so in the future as well (88.2%). The other extreme contains 78.1% of the companies with no courses organized and no intention to do so in the future.



Of the total of 114 courses to be organized within the 76-company subsample, the following categories resulted. The distribution of the types of courses is maintained, the most frequent ones focusing firstly on the development of technical skills and secondly on that of managerial skills, the main importance being given to sales contributing to the growth of the sector.



As regards the people involved in the future training activity, the distribution shows a continuation of the previous hierarchy: in most cases, the courses were taught by domestic specialized companies (56.6%), followed by own specialists (46.1%) and product suppliers (30.3%), who own the technical know-how of the products they market. It is also worth mentioning the cooperation with specialized foreign companies and with universities, ranking last from the point of view of the frequency, but with a higher percentage share (10.5%).



III. REGIONAL COMPETITIVENESS

This section looks at the main indicators measuring the aspects connected with regional competitiveness, operationalized in the form of a number of relevant factors for this sector.

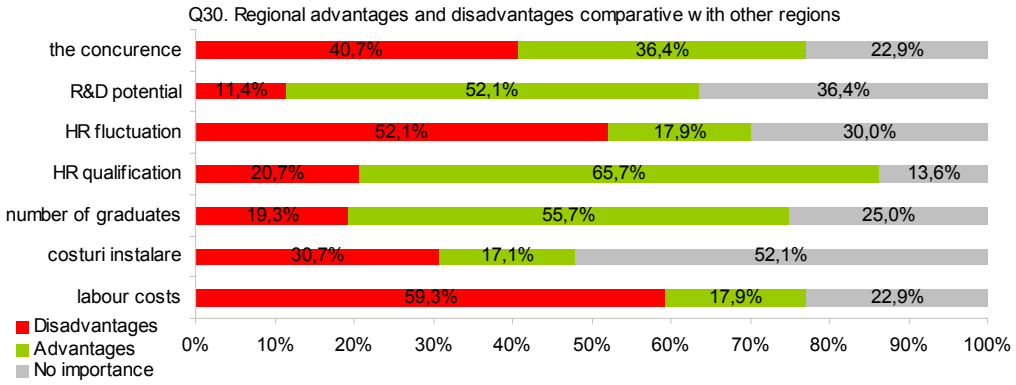
OVERALL FACTOR ANALYSIS

Within this section, we aimed to identify the aspects that individualize the West Region in relation with the IT&C sector. What follows is an overview of the main existing resources that were evaluated by the companies in three generic categories (disadvantage, advantage, and middle option – does not matter).

On the whole, we can see that the number of votes for advantages exceeds the ones for disadvantages.

Q30. Advantage and disadvantage perception in the West Region

	Disadvantages N° of cases	Advantages N° of cases
Q30.1 Labour cost	83	25
Q24.2 Installation costs	43	24
Q24.3 Number of graduates	27	78
Q24.4 Human resource qualification	29	92
Q24.5 Human resource fluctuation	73	25
Q24.6 Research & development potential	16	73
Q24.7 Competition	57	51
Total	**328**	**368**

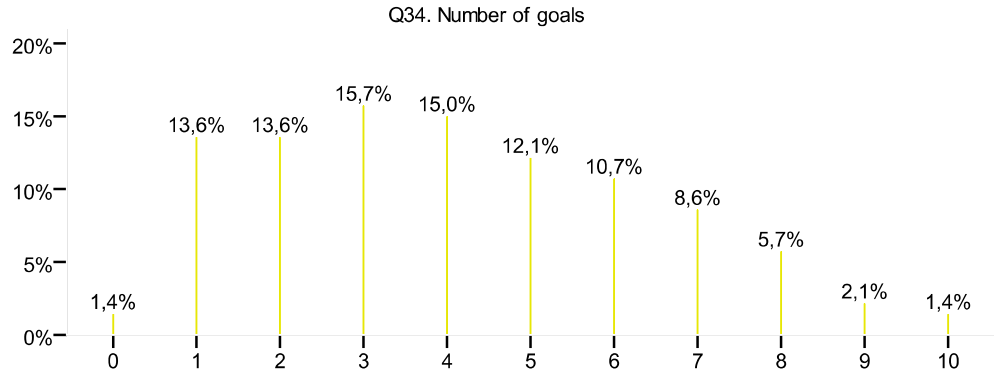


IV. THE STRATEGIC DIMENSION

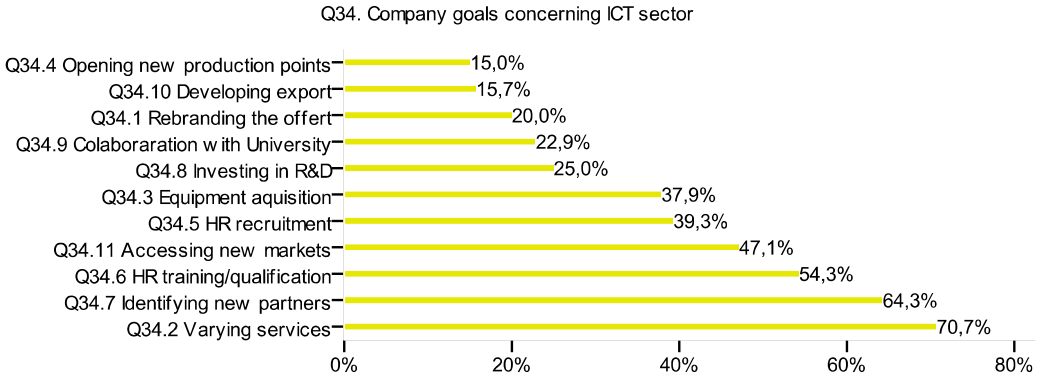
This section looks at the main indicators measuring aspects related to the company's development goals, the associative potential, and the supporting activities needed for development.

COMPANY GOALS

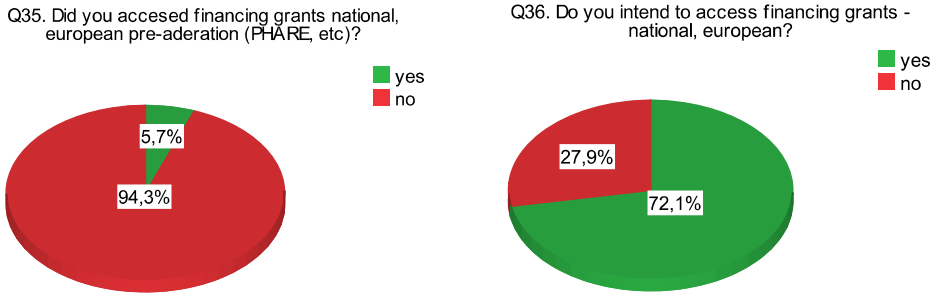
A first quantitative indicator showed an average value of 4 objectives formulated and the following statistical distribution.



Later, the synthesis of the development objectives undertaken showed a clear orientation firstly towards development (service diversification, identifying new partners) in the context of the existing competition, followed by professional training (54.3%) and accessing new markets (47.1%). It is worth mentioning the interest in research & development investments (25%) and in the cooperation with the university environment (22.9%).

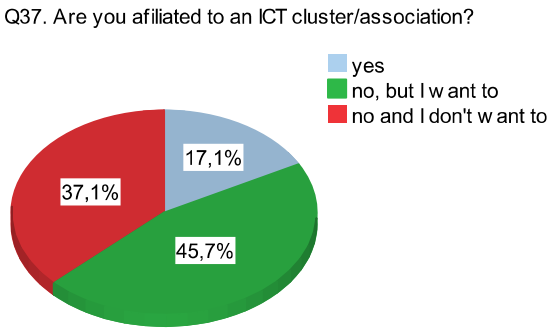


Also among company objectives, we tested the previous use by the companies of some non-refundable funding opportunities and the intention to use these in the future. The distribution clearly shows a very low utilization of the funding opportunities in the past (5.7%) and a clear willingness to use these sources in the future (72.1%). This is actually an important opportunity for the development of the sector competitiveness.

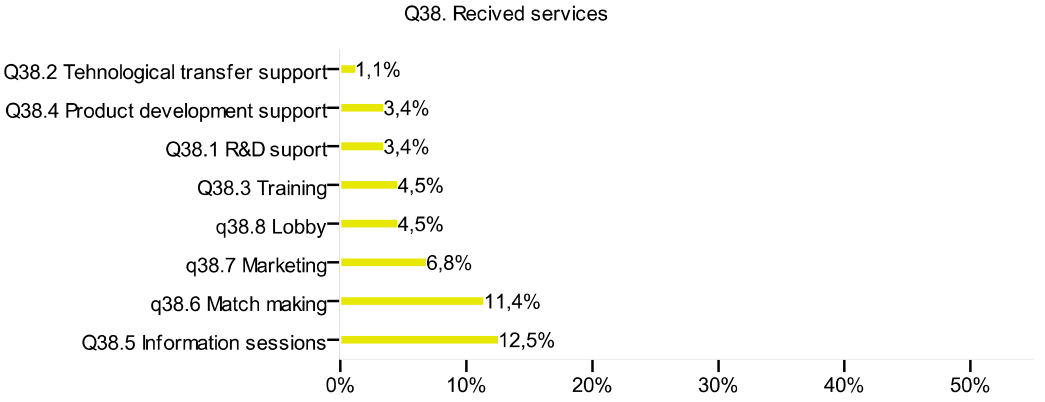


ASSOCIATIVE DYNAMICS ANALYSIS – A POLE IN THE IT&C SECTOR

The analysis of associative dynamics indicates that 17.1% of the companies belong to business/professional association in the IT&C sector. Also, 45.7% are not part of such a structure, but would like to be, followed by those that are not, and would not like to be, part of such a structure (37.1%).

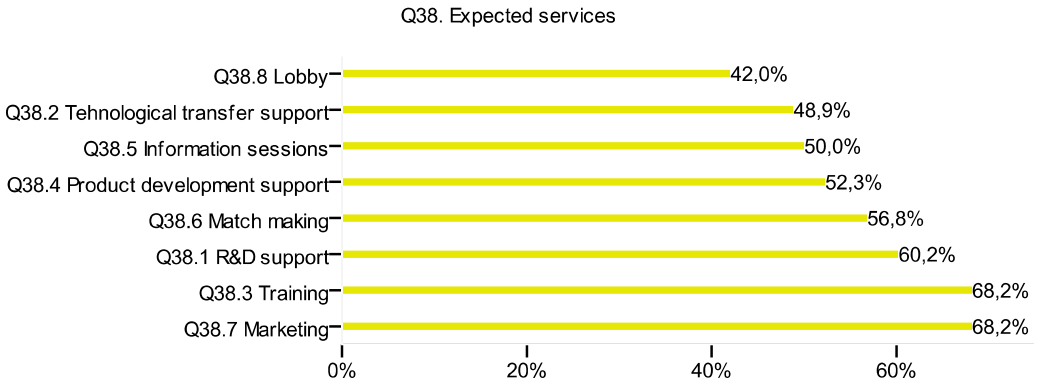


Let us now synthesize the services that the companies in our investigation have benefited from. Of the total of 88 companies that remained after eliminating the 37.1% (which are neither affiliated to any association, nor intend to be), we obtained the sub-sample in our analysis. On the whole, little experience can be found regarding the support actions the companies benefited from.

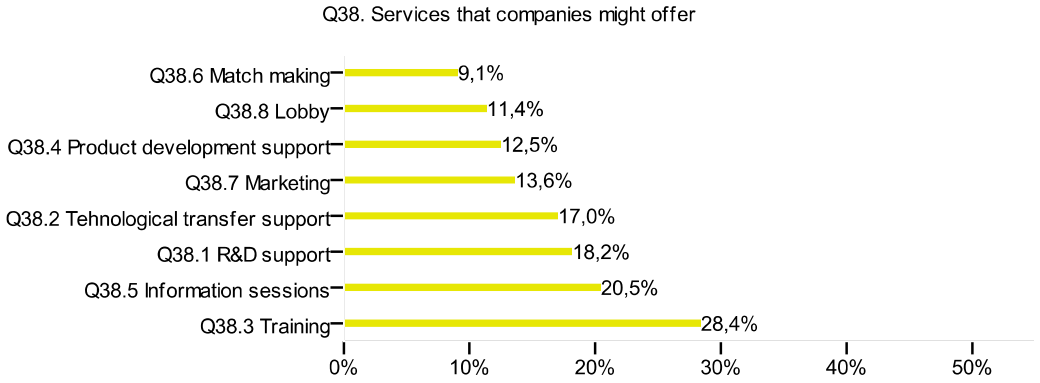


The analysis regarding the services they would like to benefit from showed a strong demand in this respect. The services were grouped as follows:

- first place: promotion/marketing and consultancy/training (68.2%);
- second place, very important, and showing a positive trend: research & development support (60.2%), next to fair promotion activities (56.8%);
- third place: product development (52.3%), information (50%), and technology transfer (48.9%) services;
- fourth place: the lobbying activity, aiming to support the IT&C sector.



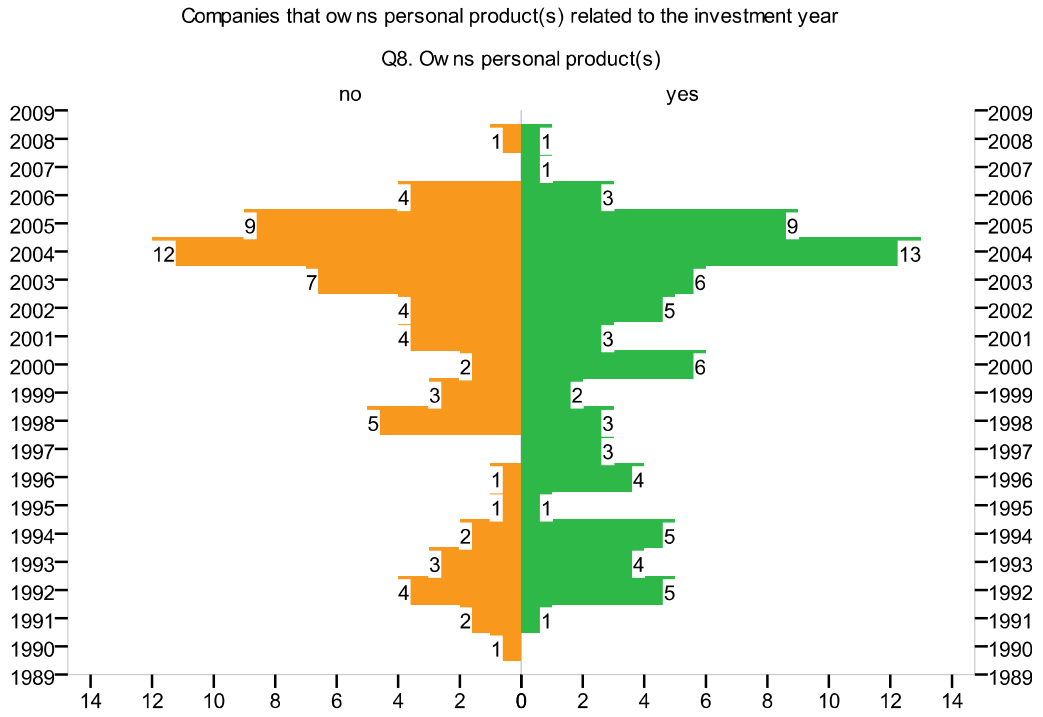
Belonging to a network/association/pole may require rendering some services. The analysis of the potential service offer showed that this is small compared with the existing demand. The service that could most frequently be offered is that of consultancy/training (28.4%), followed by information sessions (20.5%) and, very importantly, support for research and development (18.2%), as well as support for technology transfer (17%).



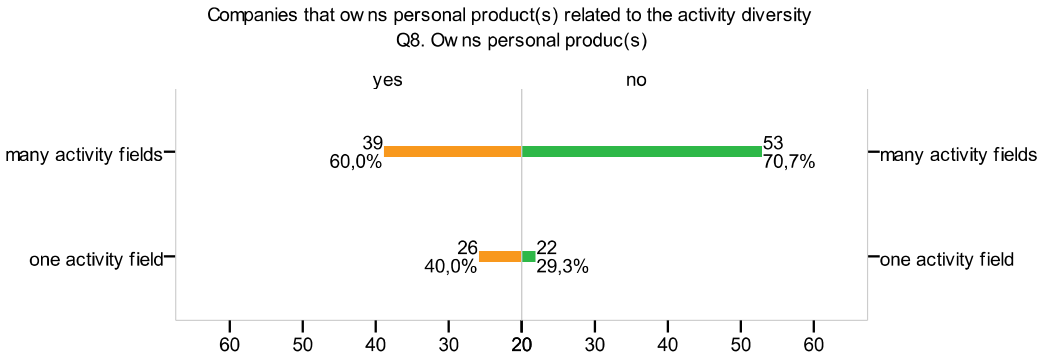
V. THE COMPARATIVE ANALYSIS OF COMPANIES WITH OWN PRODUCTS

In this chapter, we are going to compare the two categories of companies in the IT&C sector: those that have at least one own product and those that do not, the distribution of the two being rather balanced.

Below is a representation of the distribution of the number of companies (at comparative level) depending on the diversity of the activity, quantified under the form: operates in a single field – operates in several fields.

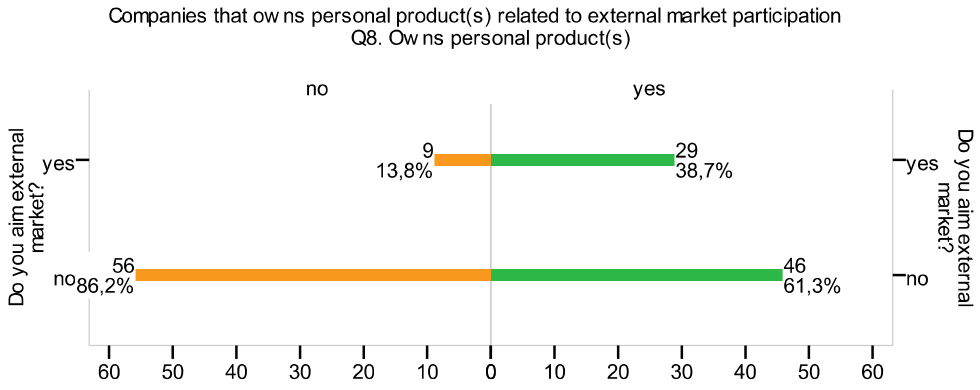


The frequency distribution shows, in this case, an obvious difference between the number of companies operating in several fields and those operating in just one field. Similarly, 53 companies operating in several fields have their own product(s).



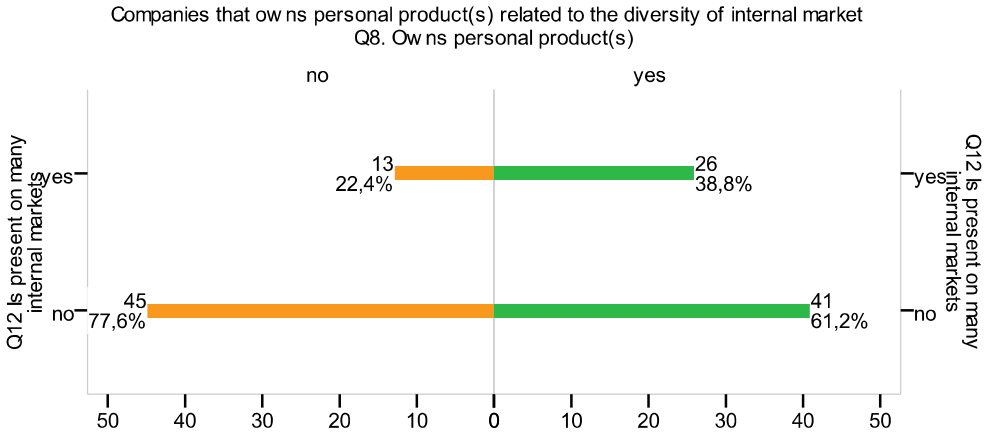
What follows is a representation of the distribution of the number of companies (at comparative level) from the point of view of their participation on the foreign market, this aspect being of high importance for the development of the sector.

The frequency distribution shows, in this case, an obvious difference between the number of companies operating on the foreign market and those that have not reached this market. Similarly, in the case of the companies operating on the foreign market, the share of companies with owns products are obviously greater, both in number and in percentage, namely 38.7%.



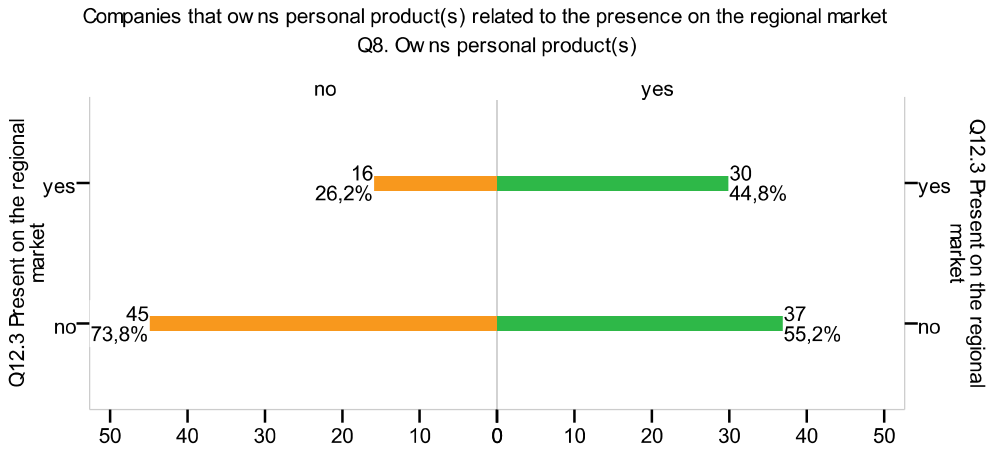
What follows is a representation of the distribution of the number of companies (at comparative level) from the point of view of the dynamics of their participation on the domestic market, quantified by the operation on several markets (local, county, regional, national), this aspect being of high importance for the development of the sector.

The frequency distribution shows, in this case, a clear difference between the number of companies operating on several domestic markets and those operating on a single domestic market, the latter being the most numerous. Also, in the case of the companies operating on several domestic markets, the share of companies with owns products are clearly greater, both in number and in percentage, namely 38.8%.

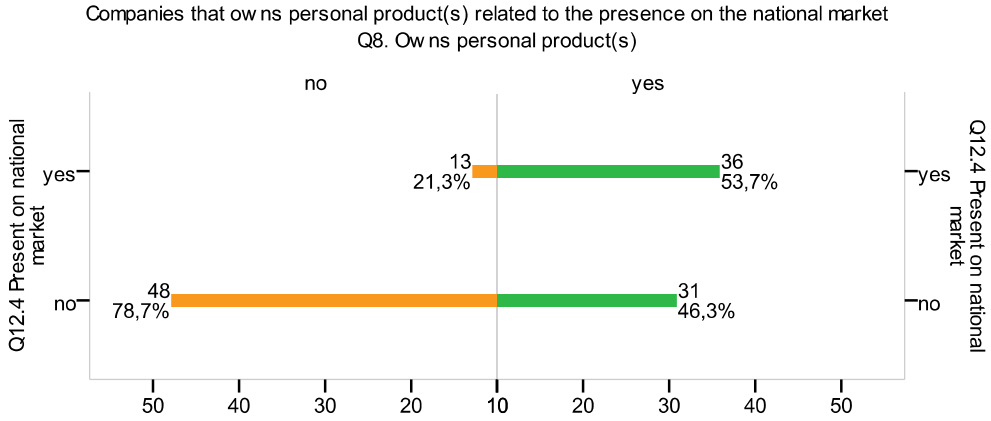


The analysis was then deepened to focus on the types of markets companies operate on, keeping the same comparative distribution into "has/does not have own product(s).

The frequency distribution shows, in this case, a difference (which is clear in the case of companies participating on the regional market) between the number of companies with own products (44.8%) and those that do not have own products (26.2%).

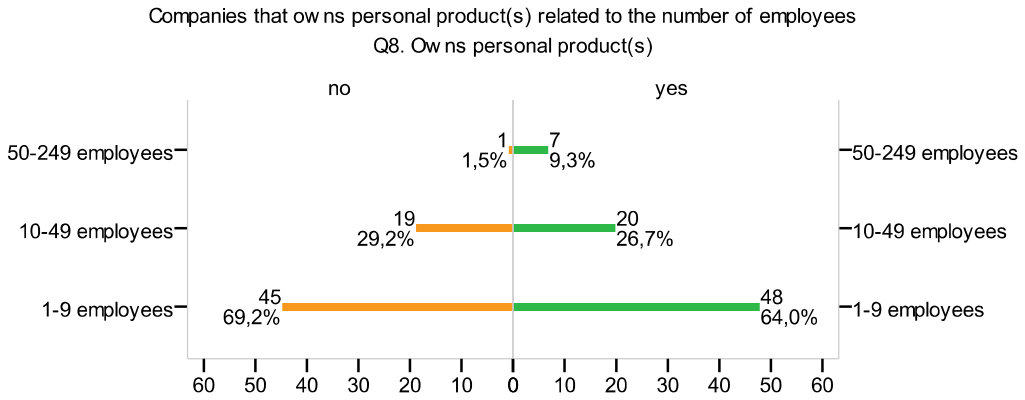


The same procedure was later repeated, the following being a representation of the number of companies (at comparative level) from the point of view of their participation on the national market. In this case as well, the distribution shows the prevalence of companies with own products among those participating on the national market (53.7%).

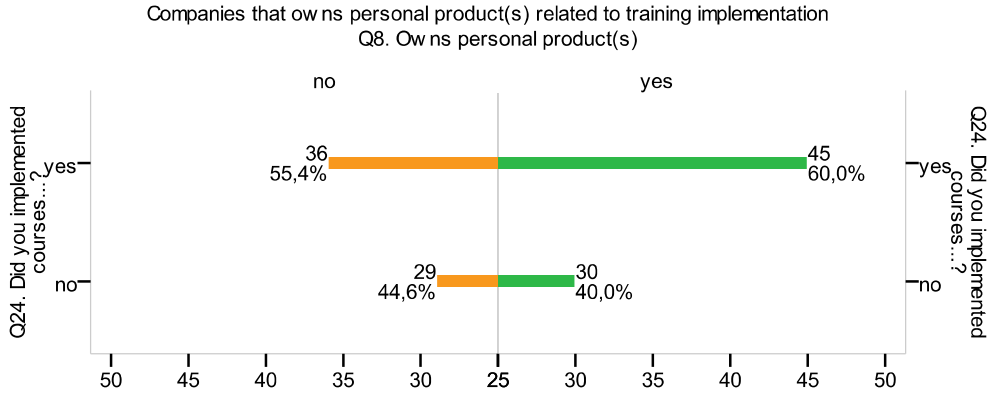


At the level of the management profile, the factors corresponding of this field were analysed, the following being a presentation of the distribution by number of employees, at comparative level among those that have own product(s) and those that do not have own product(s).

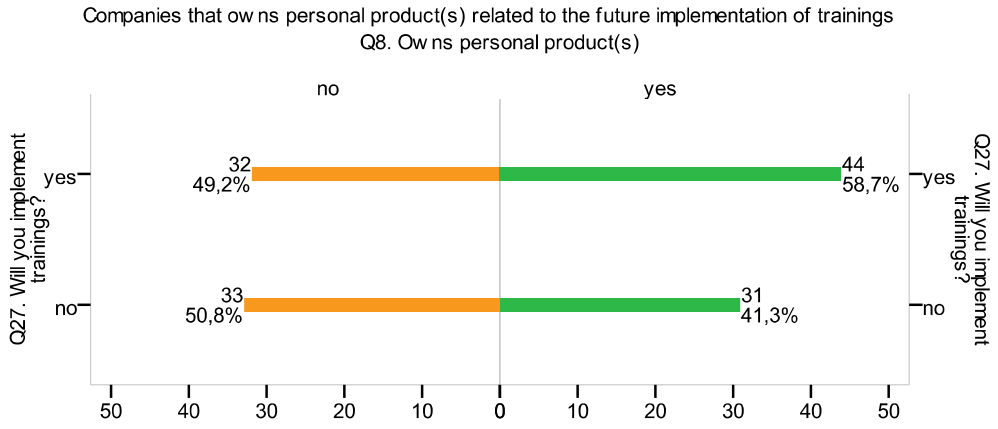
On the whole, we notice the existence of symmetry between the two categories of companies, except for companies with over 49 employees, where the number of those that have own product(s) is obviously higher (9.3%).



Also within the management profile, a comparative analysis was made of the distribution of companies that had organized courses for their employees and companies that had not. On the whole, we can see that, among those that did organize courses, most have their own products (60%).

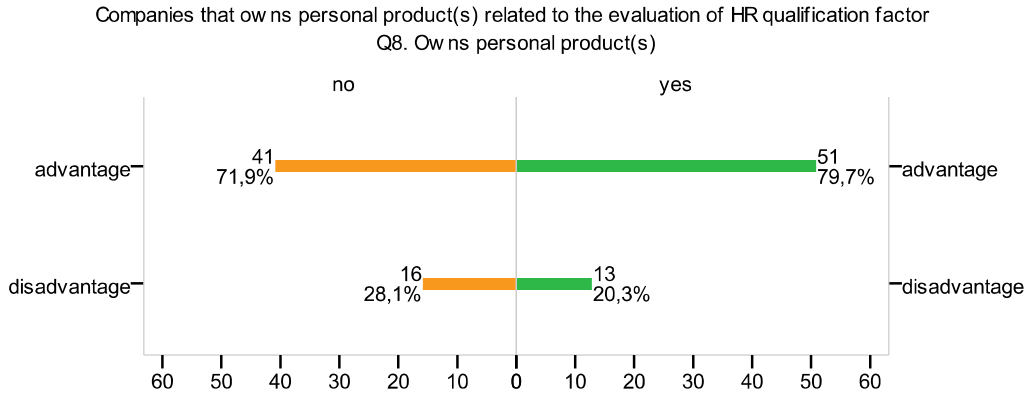


The same procedure, but from the point of view of the intention to organize courses for their employees, revealed that 58.7% of the companies have their own products.

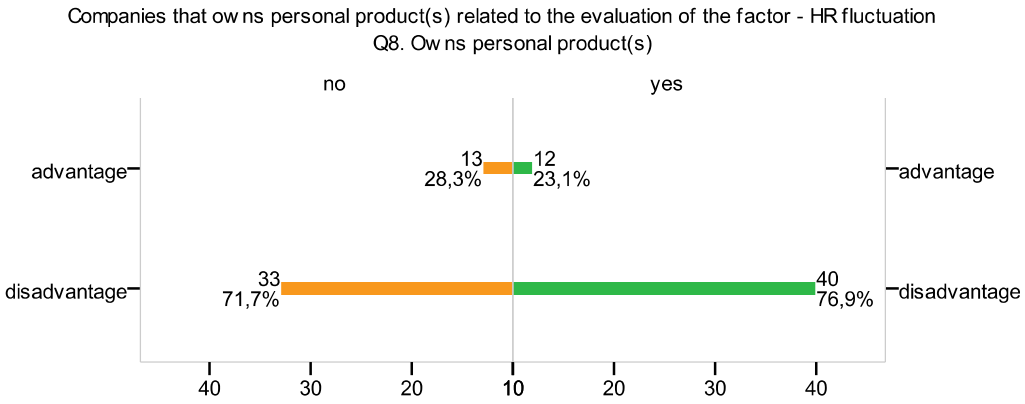


At the level of competitiveness, the factors were analysed that describe the sector's strengths and weaknesses at regional level.

The first factor analysed refers to the improvement of human resource skills, an area in which the companies have reported the issue of decreasing quality. On the whole, the factor of human resource skills remains an advantage, more obviously in the case of companies with own products (79.7%).

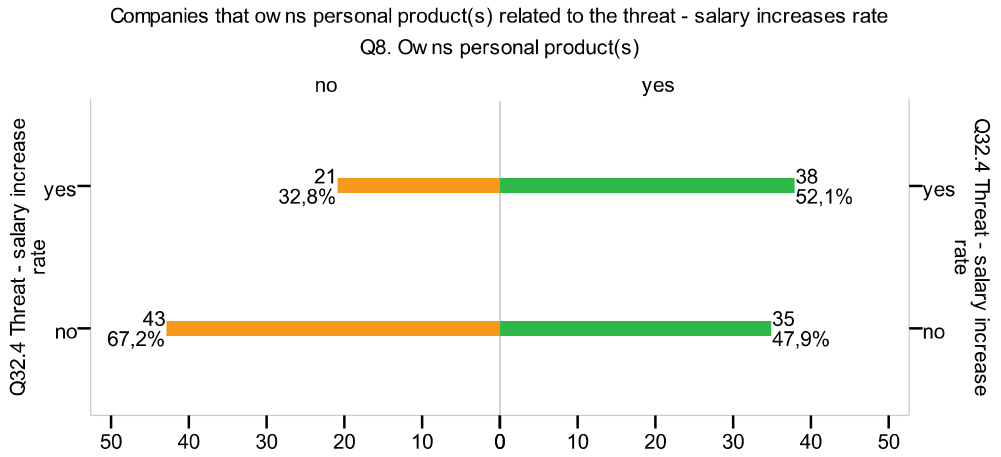


The second factor analysed refers to the improvement of human resource fluctuation, which has shown, on the whole, that it represents a disadvantage, affecting to a greater extent companies that have own products (76.9%).

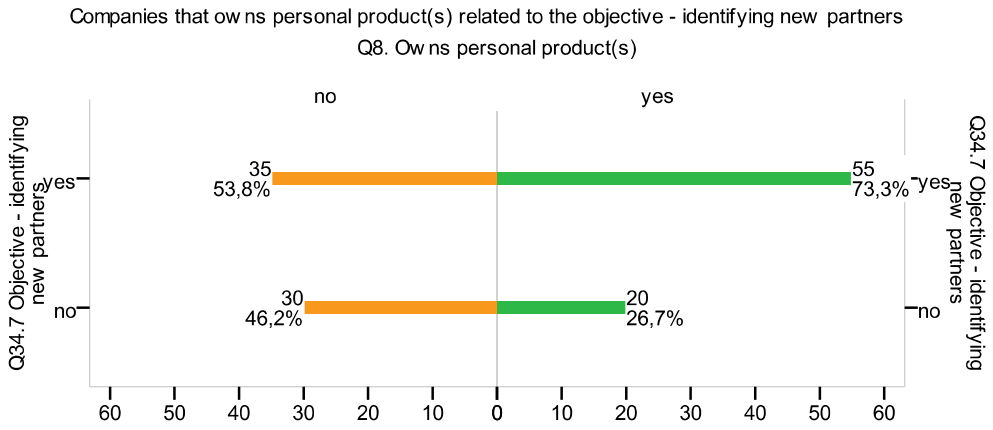


Another aspect refers to the increase of the potential threats in the region, from which we mention salary growth. Thus, the frequency distribution shows that 52.1% of the companies that have own products see a greater risk in this phenomenon than the other companies.

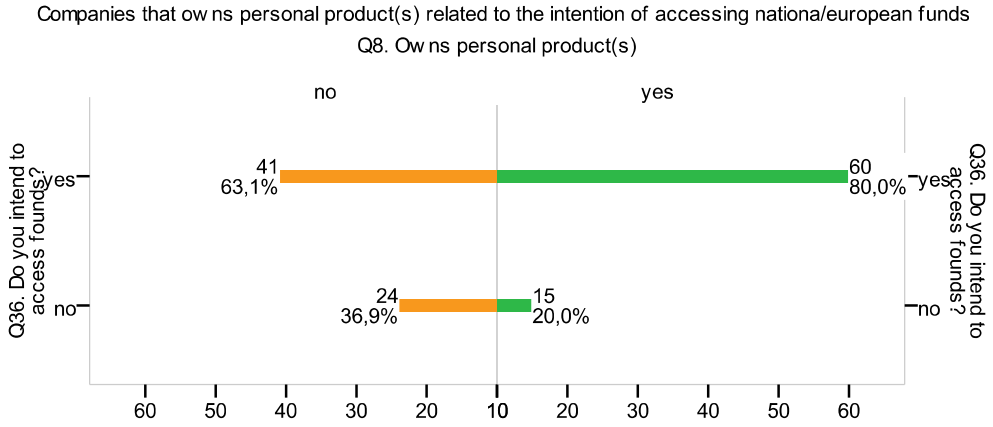
We can also see notice a share of 67.2% of companies that do not have own products and do not believe salary growth to be a risk.



Another aspect concerns the objectives undertaken by the companies, one of them referring to identifying new partners. Thus, the frequency distribution shows that 73.3% of the companies with own products have undertaken this objective to a higher extent than the rest of the companies.



Within the analysis, the intention to access national/European funding was taken into consideration; the frequency and percentage distribution shows, on the whole, strong willingness in this respect. Also, the most important share connected with accessing the funding is represented by the companies that have own products (80%).



Chapter 4. SWOT ANALYSIS OF THE WEST REGION IT&C SECTOR

Strengths	Weaknesses	Opportunities	Threats
Workforce	***Workforce***	***Workforce***	***Workforce***
• Romania ranks first in Europe from the point of view of skilled programmers • High skills of the workforce • University tradition in technical fields • Around 1,000 IT graduates per year • Internationally recognized IT studies • Developed language skills • Development of the sector in the proximity of university centres providing technical education • The obvious orientation of the companies towards training their own employees	• The demand for IT specialists exceeds the supply on the market • Some specializations are missing or are insufficiently covered • There is an imbalance between the market demands and the "production" of technical field graduates • The salaries in the sector have grown suddenly • The companies are "invaded" by students and/or beginners with exaggerated salary expectations ***Economy*** • The region, just like the whole Romania, is affected by the "digital division" • Less than half of the companies have access to	• Romania (and thus, the whole region) is developing its own IT&C skills • Retraining of non-technical field graduates for the IT&C sector • Increase in the number of students and alternative training opportunities ***Economy*** • The regional markets has one of the fastest growth rates in Europe • The consolidation of the status of nearshoring or offshoring location in the field of IT&C services • Proximity to European markets and cultures • Greater access to the global market through the development of e-commerce	• Part of the educated and skilled workforce is leaving the region and the country for higher salaries (the "brain drain" phenomenon) • High competition for skilled and talented staff • Increased staff fluctuation among the companies in the region, favoured by the head-hunting practices • Human resource crisis in the IT&C sector • Decreasing level of workforce qualification ***Economy*** • International economic recession • Exposure to the

Economy • Timiş County ranks first in Romania in the field of hardware production • The IT&C market is dynamic • The increase of the contribution of the IT&C sector to the GDP • Large direct foreign investment in the IT&C sector • The establishment of many important IT&C multinationals in the region • Multinational companies have transferred production activities to the region • The region's software development activities and exports rank second, after Bucharest • Timişoara is highly sought-after as a location	broadband Internet • Romanian companies are relatively small from the point of view of the number of employees • The GDP increase has led to an increase of the expenditures in the IT&C sector, rather than the IT&C industry having spurred economic growth • Insufficient use of the e-commerce and e-banking services in the business environment • Insufficient promotion and little marketing ***Institutional dynamics*** • The telecommunications infrastructure is still weakly developed, especially landline telephony • The absence, in the past years, of big public projects to boost the IT industry • Insufficient development of the national IT systems	IT&C products • Transition towards higher added-value software service segments • Penetration of niche markets for software products • Increased regional demand for IT&C services and solutions • Product/service orientation towards export, considering that a positive correlation has been identified between profit and the share of participation on the foreign market • Formation of clusters to support the sector ***Institutional dynamics*** • The formation of some natural clusters that could be organized institutionally • The presence of the Timişoara science and technology park can consolidate the already existing natural cluster • 45.7% of the companies are willing to join business/professional	globalize market • The lack of an efficient use of the high potential • Decreasing volume of direct foreign investment due to the increase of the salaries in the sector • A number of companies are already recruiting skilled and cheaper workforce from neighbouring countries, namely from the Republic of Moldova. • Competition by Asian countries, especially India and Pakistan • Projects made for clients in Romania and in the region have become 40-60% more expensive • Frequent Internet fraud • Software piracy and non-competitive practices ***Institutional dynamics***

for establishment • International recognition and prizes for own products at competitions • Increasing use of high-tech solutions in companies • The existence of many own products • Sustained development of IT&C sector companies ***Institutional dynamics*** • Government support (MCSI, ARIS) • There are IT research & development centres within universities, but also independent centres • There is a technology and science park in Timişoara • There are many associations in the IT&C sector • An initiative to form a pole of excellence in the IT&C sector in Timişoara • A technological transfer	• Insufficient development and resort to public applications such as e-government, e-learning, e-health, e-commerce, etc. • IT/GDP expenditures and expenditures per capita are low • Weak experience regarding support actions for IT companies ***Individuals*** • Low Internet penetration rate and PC-fitting rate, both at household and at corporate level • About one third of the households have access to a PC • Significant gap between the urban and rural environment as concerns the access to IT&C infrastructure • IT accessibility, the digital literacy-building, and the access to suitable digital content are still rather poor	associations • The possibility of accessing national and European funds for the development of the IT&C sector ***Individuals*** • The fees for telecommunications and Internet services are getting lower • The domestic market has considerable potential, with 22 million inhabitants (the second largest in Central Europe, after Poland)	• Instability at institutional level, with effects on the sector • The lack of dedicated support instruments at sector level • The lack of representation at regional level

centre in the region – Tehimpuls • ECDL testing centres ***Legislation*** • The complete liberalization of the telecommunications market • Exemption from income tax of the employees that create computer programs • Personal data and intellectual property security has improved after joining the EU	• The increase in commercial spam messages on the Internet • The population's spending power is still low ***Legislation*** • Low importance given to certification, standards, and quality control		

Chapter 5. Conclusions on the IT&C Sector

General conclusions

- At European level, the sector is of high importance and is sustained by a number of initiatives meant to support the sector (eEurope, i2010 Strategy)
- It is noteworthy the increase in the number of computer and Internet users
- The economic agents use more and more the computer and the Internet in their current activities
- The electronic services (e-government, e-business, e-commerce, e-learning, e-health, e-banking, e-tax, e-mail, e-procurement, e-statistics) have known a great development
- The mobile communication services have also grown explosively in the European states
- The increasing role played by the IT&C sector in Europe is determined by the existence of a few thousands science and technology parks, most of them operating in the IT/Media/Telecommunication fields
- A common practice within the multinational companies is to relocate the hardware towards new production units
- The sector has a great potential to develop clusters, the up-to-date figures showing the existence of over 1000 clusters Europe wide.

National level

- Romania is amongst the leading European IT markets having a high growth rate
- Romania was perceived by the foreign investors as the most attractive country in South-East Europe in 2007-2008
- The first typical computer of the 1st generation, called **MECIPT-1,** was created by the Polytechnic Institute of Timişoara
- The roots of the IT&C sector in Romania are related to the activities of the computation schools founded in 1950
- The costs for IT&C services have sloped on a downward trend since the liberalization of the telecommunications and the emergence on the market of the biggest European fixed and mobile telephony operators
- The telecommunications infrastructure still faces some challenges, major investments being necessary in this respect
- The qualified and uncostly labour force has generated substantial investments by well-known companies
- There are about 8,000 students with IT qualifications that graduate each year
- As for intellectual property some progress has been made
- Internet-related crime and software piracy still represent an unsolved issue
- As to the main statistical indicators of the sector, it can be noticed that the usage of the computer and Internet is higher in the urban environment; also, there has been an increase of the mobile communication networks users
- The first science and technology parks, as well as other associative and institutional forms have developed in the IT&C sector
- In every important university city of the country have developed natural clusters by the territorial aggregation of the IT&C firms and companies.

Regional level

- The development of the IT&C sector in the West Region is underway and has a high contribution to the regional macroeconomic indicators
- In the West Region, the services of the IT&C sector are used mainly by the automotive industry, whose companies are the main clients of the sector
- The IT&C sector in the region is characterized by a diverse range of products and services, most of them being customized to meet the clients' requirements
- The development of major IT&C projects is realized by the cooperation between the leading companies with Romanian capital from the region
- The investments in IT&C services have raised, even if in the West Region the hardware products are predominant (the West Region is the national leader in hardware production)
- The prevalence of short and mid-term contracts with clearly set deadlines offers the chance to the regional companies to attain the level of maturity that is needed to resist on a competing market
- The selling and identification of business opportunities in the IT&C sector focus on the technical specifications of the products
- The foreign companies already rival with the existing ones on the regional market.

Questionnaire level

In what follows, the main conclusions of the study by each analyzed dimension are shown synthetically.

The economic level

- Most of the companies (97,1%) are limited liability companies (SRL in Romanian) and have an exclusively Romanian capital (88,6%)
- Overall, the IT&C sector in the West Region covers all its components and detains a core of companies which are software-oriented
- 53,6% of the companies possess in-house products (an average of 2 products) in at least one field which contributes to the regional competitiveness within the sector
- During the analyzed period, 62,9% of companies operated in the same activity sector, 32,1% of companies further developed their services, while 5% changed their area of activity
- 84, 45% of all products and services are intended for domestic markets and only 17,55% for external markets, indicating a medium level of competitiveness
- The sector deals with a great level of competition
- The analysis of the evolution of the turnover over the 2004-2007 period reveled an obvious ascending trend both overall and for the average values obtained
- As for the profit, the same increasing tendency can be observed for the total value, as well as for the average values, even though there were companies that recorded losses
- Over the 2004-2007 period the number of sample companies had increased by 28,3%.

The management level

- The companies have a very diverse internal organizational structure
- The turnover of the companies with a more complex organizational structure and a greater number of employees is higher
- 42,9% of the companies contracted at least one service from a specialized company, which indicates a certain organizational flexibility
- According to the study's sample, the total number of employees working in the IT&C sector rises to 1962 with an average of 14 employees per company, a minimum of 2 employees and a maximum of 240 employees
- The distribution of companies by the number of employees indicates that the small and medium companies are the most numerous
- The highest percentage is detained by the employees with university degrees, which is the case for 130 companies from the entire sample size
- More than half of the total number of companies provided their employees with training courses emphasizing the role played by the continuous learning in the technical sector
- In terms of continuing the training activities, the companies that had already provided training committed to do so also in the future.

The regional competitiveness level

- The first three advantages of the IT&C sector in the region are the high qualification of the human resources, the great number of university graduates, and the research-development potential
- The main disadvantages of the sector in the region are the costly labour force, the fluctuation of the labour force, and the existing competition.

The strategic level

- The companies expressed on average four objectives, most of them being related to development on a competing market (diversification of services, identification of new business partners), followed by objectives linked to professional training (54,3%), and access to new markets (47,1%)
- The companies did not use the opportunities of receiving non-refundable funds in the past (only 5,7% did), but show an obvious interest in accessing such funds in the future (72,1%)
- 17,1% of the companies questioned belong to a business/professional association in the IT&C sector, while 45, 7% of them expressed an interest to become a member of such an association
- The IT&C companies benefitted from little support activities, which were reduced mainly to awareness and information sessions (11,4%)
- The analysis of what kind of services the companies from the sector require reveled a need for promotion/marketing services along with consultancy and training services (68,2%), support for research-development (60,2%), and promotion activities at international fairs (56,8%)
- The services that the companies from the IT&C sector can offer most frequently are those related to consultancy and training (28,4%).