

Evolution of the IT Industry and its Development Potential

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Abstract

The IT & C industry is currently the industry's fastest growing sector, doubling its turnover over the past six to seven years, to 6% of GDP at the end of 2017. The present study is based on secondary research related to the evolution of the IT & C industry in Romania in the last decade, plus a market research based on interviewing some of the players in the IT & C market, what challenges they face in Romania, their development plans and the advantages that Romania offers compared to other countries. The main challenge facing IT & C companies in Romania now, according to the research results, is that of the skilled labor force. IT & C companies have also resorted to in-house staffing solutions to develop further. Thus another result of the research was that hiring is done from college or even from the gray area of the labor force. Despite the fact that the supply of specialized personnel is below the growing demand, IT & C companies appreciate the Romanian staff, especially the young people. They have a very good knowledge of foreign languages, especially English, far above the level of young people in the neighboring countries. This, coupled with very good math skills, as well as creativity and readiness to learn and work, makes them extremely valuable for those companies. The study is limited to making an X-ray of the current situation and needs to be extended to the measures necessary for our country to maintain this advantageous position as a leader in the European Union in terms of the number of IT & C employees per capita.

Keywords: IT&C industry, Romania, IT&C personnel skills, IT&C growth in Romania.

JEL classification: M15, M54, F23, J24.

1. Introduction

In the context of the global economy, our country, Romania, has a rhythm of growth and development superior to other countries. World economic growth is slow and shows a relatively modest overall pace compared to the pre-crisis period. Taking as an indicator the global GDP, we observe even an annual tendency of a slight decrease in the pace of development. In 2016 the growth was only 3,04% compared to 2015 when the growth was 3,17% or compared to 2014 when it was 3,38% (CHIRITOIU, 2017).

In this global situation, the Romanian economy reached the highest level of growth after 2008, an increase of 4,8% in 2016, which was well above the EU one (1,95%). Romania's economic growth rate surpassed not only the member countries with advanced economies, but also the ones in Bulgaria, Hungary or Poland (CHIRITOIU, 2017). This growth was also supported by government measures to boost consumer spending by raising public wage earnings, raising pensions, and last but not least, by lowering the value added tax since January 1, 2017 to 19%. These measures, as well as the permanent digitization of the economy, proved to be beneficial, with growth in 2017 being even higher than in 2016. In 2017 the Romanian GDP grew by more than 7%. With this GDP growth, Romania was the fastest growing country in the European Union. Based on a strong Eurozone economy exports performed also very well. The expectation for 2018 is a ca. 5% GDP growth, which is at a more sustainable level, determined by limited possibilities for new fiscal stimuli and an expected monetary policy tightening. With this economical development, Romania will keep a top position among European economies (PAUN, 2018).

Our country has an “organic” economic development, demonstrated by general macroeconomic indicators. The IMF (International Monetary Fund) estimated an economic

growth of over 3% for the period 2017-2019. According to the National Institute of Statistics, the IT & C sector recorded an increase in productivity from 40% in the year 2015 to 45% in 2016 (CHIRITOIU, 2017). This data proves the potential of our country to maintain and develop the IT & C sector.

In the present study we carried out a secondary analysis on the evolution of the IT & C sector in Romania and with the help of a questionnaire we analyzed the opportunities and challenges facing the companies in this sector. This analysis aims at performing an X-ray of this sector and to highlight the first possible measures to ensure a favorable position of Romania in this field.

The digitization and the development of the IT&C sector has an accelerated pace throughout the European Union. The following graph presents the evolution of the number of employees in IT&C at European level, where the lack of skilled labor is not different from that in Romania.

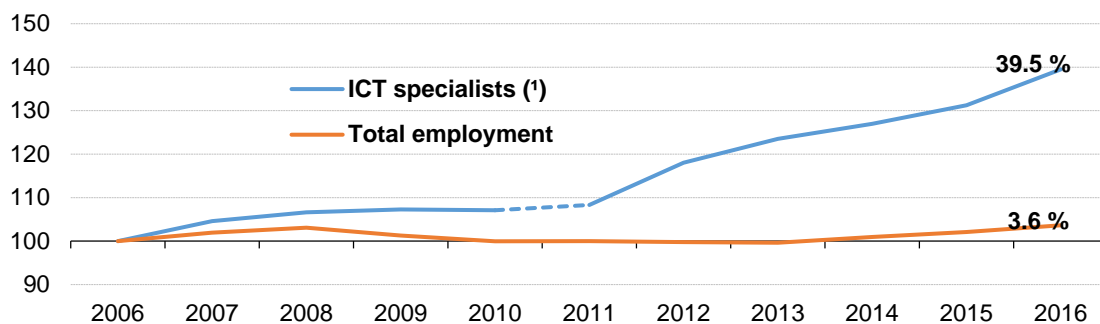


Figure 1. Persons employed as ICT specialists and total employment, EU-28, 2006-2016

Source: Eurostat (online data codes: isoc_sks_itspt and lfsa_egan)

According to market estimates, the Romanian IT&C industry employs over 100,000 people. Taking into account the upward curve of growth in this industry, only in the next few years the need for professionals will grow to 300,000. There are over 7,000 IT graduates annually from the Romanian schools, but the need for the local market, especially for software programmers, is double. The lack of qualified IT staff is an important topic of discussion throughout the European Union. The European Commission estimates that Europe may face a deficit of up to 825,000 IT professionals by 2020 (RADESCU, 2017).

Because of the talented human capital, Romania is seen as a vibrant entrepreneurial hub focused on tech and innovation. Romania has five polytechnic universities, 59 domain specific universities and 174 private colleges. A large number of talented and intelligent students tend to pick high-tech industries studies. Approximately 5,000 of the 30,000 engineers graduating every year in Romania are trained in high-tech. Another important advantage is the cost of living in Romania, especially in Bucharest. This costs are on average 50% lower than in other important western cities like Vienna, London, Berlin or Paris. The living cost in Bucharest, the most expensive city in Romania, is also at least 12% lower than other capitals from CEE countries, like Prague, Warsaw or Budapest (VRINCEANU, 2017).

The long list of important advantages and their unique combination, placed Romania on the radar of many investors. Based on the improved economic conditions and a high degree of monetary stability, significant transactions and a wealth of opportunities becomes real. An additional advantage is Romania's favourable geographical position, directly at the intersection of major European trade corridors. Therefore, Romania has been recognised as an excellent investment destination for companies who wish to establish themselves on the local market and to build stronger ties with Asian and Middle Eastern partners (STRATULAT, M.; ALBULESCU, E, 2018).

2. Secondary analysis of the evolution of the IT & C sector in Romania

The Romanian economy has shown a sustained growth in recent years, and among all sectors of the economy, the IT & C sector is considered to be the one with the most dynamic growth. This sector is also called "the success story of Romania" (ANGERER, 2016). According to data provided by the National Institute of Statistics, the input of the IT & C sector to Romania's GDP was 6,7% in 2015. Comparing this result with other countries in the region, members of the European Union, Romania was at the top of the rankings according to the 2015 Eurostat data (ANGERER, 2016).

The pace of development of the IT & C industry is a very fast one, with an average annual growth of approximately 15% (AUDOIN, 2017). This led to an increase in demand for skilled labor, more than the supply. This industry is very dynamic both in its pace of development and in adapting very quickly to customers' needs.

If in the past one of Romania's main competitors in the field of outsourcing was India, we have seen recently an increase in competition from Latin America, for example: Nicaragua, Panama and Brazil. These "kings" of outsourcing are seen as a safe future source for Business Process Outsourcing corporations (GEORGESCU, 2015).

The IT&C industry also enjoys the advantage that Romania is ranked second in the European Union regarding the average maximum connection speed and sixth in terms of broadband adoption of 4 Mbps in Q1 2017 (COCIRLA, 2018). According to forecasts by Computerworld, once companies show more interest in implementing new technologies, the IT sector budgets will grow by approximately 15% on average. These new technologies refer to: security technologies, cloud computing, business analytics, application development, upgrades and replacement, mobile / wireless devices and mobile device management systems (GEORGESCU, 2015). Another important aspect that has influenced the positive evolution of the IT&C sector in Romania is represented by the tax benefits specific to this sector (GRIGORAS, et al., 2017). In Romania, the level of taxes is low compared to other European countries. These measures to support the business environment are planned by the Romanian Government also for the future (COSTESCU, 2016). Although global taxes for this sector are small, the IT & C sector, being considered an important vector of economic development, has also enjoyed specific tax exemptions in Romania.

Another advantage that attracted foreign investments to the IT&C industry was the low wages compared to other, more advanced economies. This situation was present after 1989 also in other areas of the Romanian economy. For some industries, this advantage turned out to be a short-lived one, and the best example is the textile industry. After a relatively short period of time, the "loan system" did not present itself as an advantage for attracting investors to our country. Labor costs in Romania have increased, and foreign companies have been targeting other low-wage, labor-intensive countries. The major difference between the two sectors is the required skill level of the personnel. Romania enjoys a long tradition of research, development and innovation in the technical field. The technical schools in our country enjoyed appreciation and obtained outstanding results from its highly-qualified graduates abroad. This represented an important advantage, which convinced foreign investors to come to Romania. Initially there were collaborations of foreign companies with teams of experts from our country (AUDOIN, 2017). As a result of the good results of these collaborations, demand has increased and foreign companies have started to invest in Romania. Romanian IT & C specialists are professionally very well trained and also have the advantage of knowing at least one foreign language, usually English, at a higher level than in other countries in Central and Eastern Europe.

The success of this industry depends largely on creativity and innovation (ANDRIESCU, 2018). So the training of young people needs to be adapted to the requirements of the market in order not to lose the favorable position that our country has at the moment. In the study of

the labor market of the IT&C industry in the European Union, Mrs. Burciu also highlights the fact of the professional reconversion of Romanians who go to work abroad to the Romanian IT&C industry (BURCIU, 2017). Support Centers for the most important international brands are present in Romania and offer services to international clients, no matter where these corporations are located. The IT&C sector overcomes agriculture as a share of GDP, even though it has a much lower number of employees than this (GORODCOV, 2018). The IT & C sector has proved to be not only a growth vector, but also an image for our country. It grew in the AT Kearney rankings for 2016 (Global Services Location index rankings) by five spots compared to 2014, now ranking 13th (ANGERER, 2016).

The tech sector is expected to grow by 9% per year until 2025, sustained by one of the highest broadband internet speeds in the world (behind only Singapore, Hong Kong, South Korea and Iceland) (PASCA, 2018).

The IT&C industry, which is made up of the communications sector on one hand, a privatized, developed, expanded, and last but not least, modernized sector over the last 15 years, and a strong IT sector. The IT sector includes IT services, software and hardware development, Business Process Outsourcing (BPO), the video game development sector where many start-ups are also being set up, etc.

However, there are a number of issues that need to be addressed, such as:

1. Market demand mainly refers to skilled labor at low cost when intellectual property is owned by foreign beneficiaries;
2. the IT sector is largely a support industry without effective demand from the national market;
3. the demand for labor exceeds the offer especially in Bucharest;
4. Many Romanian IT companies have good ideas but do not have the necessary means to ensure the visibility necessary for their promotion;
5. employers expect employees to have a level of flexibility and adaptability, with the willingness to work according to pre-established rules from the first day of work;
6. Infrastructure and especially real estate development in other cities do not keep pace with the existing demand for faster development of other IT&C centers in the country (GEORGESCU, 2015).

The evolution of the domestic software and IT services market is negative, compared to a 14% increase in the Romanian software and IT services industry for 2017, the SITSI® software (Software and Industry Services) research shows a drop in domestic comparative consumption to 2016. As a result of the drastic slowdown in public investment in software solutions and IT services, the local industry relies primarily on private investment and demand. The government's decrease in demand for IT infrastructure is determined by the implementation problems of already existing projects that were designed to automate and implement effective inter-institutional programs, especially those that target social interaction. Unlocking investment plans for the local and central government, education, healthcare or the defense sector could attract a considerable amount of EU funding. This could potentially revive the local IT industry (COTOVELEA, 2018).

The exports of the IT industry are much higher than of the national sales and they are growing by 25% per year. The exports represent almost 77% of the software industry's total revenue. Romanian developers have a culture driven by innovation and a strong commitment to delivering excellent services across industries. Because of this they are gaining more and more recognition in the UK, Scandinavia and the US (PASCA, 2018).

Internet of Things appears to be one of the next opportunities for the IT industry, and there are major trends in the marketplace that transform technology development, because it can develop applications that take advantage of data and analysis from connected devices and sensors (OLARU, 2018).

Developing the IT&C sector is also an opportunity for the development of some areas in the country that do not have an economic growth at the same level as others, especially Bucharest. Such a region is the northeastern part of our country where IT specialists are trained in university centers such as Iasi and where the necessary infrastructure is being developed and necessary conditions are being created to attract foreign investments. An additional initiative of the Northeast region is to set up the Euronest Innovative Cluster of IT&C Hub in order to position the North East Region as a competitive European provider of IT&C services and technologies and as a priority European destination for projects of large international companies (MACOVEIU, 2016).

3. Primary analysis - questioning companies in the IT market

The questionnaire used in the primary research conducted in the IT sector in general and in the gaming sub-sector, in particular, included besides general questions about the turnover and the number of employees over the last ten years, questions regarding the main challenges and opportunities offered by Romania currently.

When asked about the choice of Romania as a destination of investment, the companies listed the following arguments:

1. Qualified human resource with serious IT knowledge;
2. the level of very high general professional training;
3. a very good cost/quality ratio regarding the workforce;
4. high-speed internet;
5. Romania's membership in the European Union and NATO;
6. the tax incentives granted by the state to the IT&C sector;
7. extremely good foreign language skills;
8. the geographical position of Romania (near the company headquarters and/or the main client).

Four of the main arguments listed by the companies that answered the questionnaire are staff related. The advantages that the state has provided through tax incentives related to employee income taxation for the IT sector has resulted in lower personnel costs and the possibility of providing motivating salaries for employees. This led to the well-trained young people in Romania and the creation of a successful story in our country.

The main development directions planned by companies refer in particular to:

1. diversifying the product portfolio;
2. Diversification of operating platforms;
3. developing the technology used;
4. Training and specialization of personnel.

All planned development plans relate mainly to increasing the quality of the products and services offered to customers and indirectly to increasing their added value. This trend is also evidenced by the permanent and organic growth of the turnover of companies surveyed over the last ten years. This increase in turnover is not comparable to the evolution of the number

of employees over the past ten years. The number of employees has varied over the last five years, generally showing a significant increase over 2007. The plans of the companies in this sector are a slight increase in the number of employees in the medium term and that they are willing to continue to invest and develop in our country, but that they need a skilled workforce. In the short, medium and long term, the lack of skilled labor becomes a very important obstacle, which blocks the chances of attracting and especially of maintaining the investments in this sector. In the 2015 Global Shared Services Survey, 10% of Shared Service Centers worldwide are located in Central and Eastern Europe, compared to 17% in APAC and 16% in Latin America (GHINET, 2015).

Thus, the question related to the main challenges in the Romanian IT & C sector, the companies mainly referred to finding, attracting and maintaining a qualified workforce. Other challenges mentioned by companies globally refer to the permanent changes in this sector and the need for adaptability and flexibility of companies in order to be able to maintain and develop in this market.

Among the global challenges mentioned by companies are:

1. A strong increase in competition for attracting users by using advertisements;
2. the difficulty of accessing certain Asian markets, especially China;
3. Opening customers to free/shareware solutions that erode the profits of licensed technologies;
4. the emergence of startups and disruptive players / competitors.

Turning to the challenges of the IT & C market in our country, they refer to the workforce, as I said earlier, and are mainly the following:

1. competition for the same workforce, especially in Bucharest (but also in the other big cities in Romania), both among the large corporations in the IT sector, as well as with the financial-banking and industry corporations that have service centers IT;
2. the recruitment of qualified staff, which entails large expenses both financially and allocated time;
3. maintaining the qualified personnel in the company in the medium and long term;
4. increase labor mobility and Z-generation typology for which you need to create new types of development programs; managers must adopt a certain leadership style (open, participatory, coaching type); must identify certain types of benefits that provide them with mobility and flexibility;
5. maintaining a high level of involvement and loyalty of staff;
6. an education system that can not cover the need for IT industry specialists;
7. lack of specialization in formal education adapted to the needs and requirements of companies in the field;
8. an education system that can not cover the need for IT industry specialists.

Labor market competition in the IT & C sector is on the rise and this requires employers to adapt to the demands of the workforce and to offer attractive benefits packages on top of the actual wage.

Thus, employees, irrespective of the generation they belong to, are expecting from the employer:

- a. a flexible work schedule
- b. development opportunities

- c. a pleasant work environment, a good team
- d. a good and direct communication with the manager
- e. wage compensation
- f. job stability (COTOVANU, 2018).

In the Romanian IT & C sector, over 78% of employees belong to the Millennials generation (between the ages of 24 and 34). These employees are hard to maintain in a company if they are not satisfied and are willing to leave the company after three or four years, although, in this sector we have the highest average salary in our country, 1.400 € per month (CHIRILEASA, 2018).

The number of female employees in this sector is constantly increasing, and the majority of the employees are graduates of the polytechnic universities in the country, especially of the Polytechnic of Bucharest (CIRMACIU, 2016).

The lack of qualified workforce is an even bigger problem for Romanian small and medium-sized firms, which can not provide employees with all the incentives that large corporations offer. In some cases, employers face employees that are over-skilled in some areas but lack the basic general knowledge. This leads to their lower adaptability and productivity in small companies (DRAGAN, 2018).

The problem of the lack of skilled labor faced by the IT&C sector can be solved in the medium term through close co-operation between educational institutions and private companies. By creating joint programs, it is possible to ensure the specialization of the personnel according to the needs and the requirements of those companies. Also, through a close collaboration, the curricula and the necessary training time of the future staff can be established.

Adoption of projects must be done in different forms and given different levels of importance, so that project management is well adapted to the needs. "Organizations can be centered on a single project that is the focus of their activities, or they can host a set of projects through a matrix structure, where the organizational chart is organized by project managers who manage independent or competing projects in programs and portfolios" (RADU, 2015).

In the beginning, the easiest is to organize short courses to respond to some urgent and punctual problems faced by companies at the moment. This implies the willingness of collaboration both from educational institutions and state institutions, as well as from private companies.

Unfortunately, the companies state that in most cases the curriculum is not tailored to the needs and demands of the market. Because the workforce is an important element for the IT & C sector this proves to be one of the main challenges. The next question addressed to the IT companies was related to the advantages of the Romanian employees.

From the responses received, I point the following:

1. good general training in the field of exact sciences (mathematics, physics, etc.);
2. solid knowledge of IT;
3. good language skills, especially English;
4. creativity and flexibility;
5. Good results in stress and crisis situations.

Knowledge of foreign languages is highly appreciated by international companies as they enable employees to communicate directly with clients from other countries and/or the headquarters of their companies and/or their counterparts from other countries.

The spreading of the English language in Romania is considered to be due both to intensive foreign language studies in schools, but also to the fact that movies and TV shows are subtitled in Romania and not doubled, as is the case in many other countries. Also the menu for computers, tablets and many mobile phones is in English. The last question addressed to

companies refers to the dual training education system and the assessment of the chances of this training model of solving the problems with the workforce.

The companies appreciated on a scale from 1 (insignificant) to 10 (extraordinarily useful) with an average mark of 8.6 this solution to be very useful. Thus, one of the possible solutions accepted by the companies is to organize specialized training and dual courses in order to create the premises for a durable and sustainable development of the IT&C sector in Romania.

4. Conclusions and discussions

Some of the important trends resulting from the secondary analysis and the questioning of some important players in this market, refer to maintaining the significant growth trend of the number of companies outsourcing certain functions from Western Europe to Romania. Also multifunctional service centers and fewer uni-functional centers are developing, as they used to before. In recent years, outsourcing centers have evolved and are much better structured, with clear elements of collaboration with headquarters, but also between the various corporate departments.

Thus, in a many cases, employees from Romania are detached abroad and vice versa. By increasing wage levels in our country, the workforce is only an asset if it proves to be better prepared and more productive than in other countries from Latin America or Asia, where there are high numbers of young people, and where the salaries are lower than in Romania.

Universities in the United States have raised the issue of adapting education programs, as published in the Harvard Business Review article in April 2016, which states that "hybrid" jobs require "hybrid" education (AOUN, 2016). So, our university programs must be tailored to the needs of the market. A new and important strategy for the tertiary education has been implemented in Romania since 2015. The goal of this strategy is to improve participation in schools, to prepare better study programs and to adapt or to develop for students new skills that are needed by the economy and are able to support and help the development of the IT & C industry (NICULAE, 2018).

Romania enjoys a special advantage, and thus, through the creation of dual-training programs, our economy can enjoy as soon as possible its rewards and thus solve a large part of the IT & C workforce problem. The advantage I am referring to is the Romanian school tradition of learning a lot of math, but also the outstanding ability of our students to process the effectively the information they receive. The extraordinary results obtained by Romanian students at the Olympics and Mathematics and Computer Science competitions place Romania on the third place in the world, after Russia and China, as a number of medals, and of course ranked first in Europe (MOGHIOR, 2018).

As early as 2014, the Romanian Government amended the Education Law by the Emergency Ordinance (OUG 94/2014). This order gives private companies the opportunity to get involved in organizing the educational process, namely in determining the duration, the content of the training programs and, last but not least, the ways of certifying the professional training.

Thus, private companies can determine, according to their own needs, the skills to be assimilated by potential future employees. This form of vocational training can also be one that will allow for the retraining of the labor force in order to decrease the unemployment rate, as well as an increase in labor productivity.

This dual system of education involves providing theoretical training by educational institutions during one, two days of training per week, and by the private companies organizing the practical training (3-4 days a week).

This form of education represents an important support for private companies, the costs of the theoretical training being borne by the Romanian authorities. In addition, students that have completed the compulsory ten-grade education can enter the labor market and, at the same

time, have the opportunity to continue their vocational training, obtaining a higher level of qualification.

Many young people who engage in the training period have difficulties to explain to the employer that they have to miss work to go to school, or to prepare for an exam, or to explain to teachers why they missed classes or have been late.

The dual education system enables young people to prepare themselves exactly as the labor market requires and thus can advance their careers much faster, compared to students who are devoid of practical experience.

A solution for the financing of the training programs and the specialization of the workforce in these sectors could be funded through European Union programs. This solves the problem of financing and can be structured for longer or shorter courses that all interested persons can participate to.

These programs can be accessed, for example, by universities in collaboration with interested private companies. Such a program funded by the European Union and managed by the Ministry of European Funds is the Competitiveness Operational Program 2014-2020.

Other programs available for the advancement of professional qualification projects are: Human Capital Operational Program Priority Axis 6 - Education and Competencies, Objectives Specific; Regional Operational Program 2014-2020 - Priority Axis 10: Improving Educational Infrastructure - Specific Objective, 10.3 Increasing the relevance of university education in relation to the labor market and competitive economic sectors; Human Capital Operational Program - Priority Axis 6 - Education and Competencies - Specific Objective 6.13 Investment Priority: Improving the usefulness of education and training systems for the labor market, facilitating the transition from education to work and strengthening the education and training systems and their quality, including mechanisms for anticipating skills, adapting curricula and creating and developing work-based learning systems, including dual learning and apprenticeship systems; and so on

Besides providing a well-trained workforce, it is also necessary to implement other general measures to maintain the pace of long-term development of the IT&C sector. Some examples of necessary measures would be: the development of several other cities as IT&C centers other than traditional ones such as: Bucharest, Cluj, Iasi, Craiova, Timisoara; creation of high-value IT&C services and research and development centers versus simple outsourcing centers; expanding collaborations between authorities, educational institutions and IT&C businesses; encouraging entrepreneurship in the field in a clear and systematic way; providing private companies with access to specializations and courses, including foreign languages, for their employees and, last but not least, organizing a public-private IT partnership for children and young people.

This study is limited to making a general analysis of the current situation in the IT&C sector in Romania, pointing out some advantages and challenges facing the companies in this sector at the present time. In addition, we highlighted the option of organizing dual system specializations and the acceptance of this option by the companies in this sector.

In the next stage it is necessary to study and define the necessary and accepted measures by the private companies, institutions and authorities for ensuring and maintaining the extraordinary position of our country, the leader in the European Union in terms of the number of IT&C employees per capita, in the long run.

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