

A Statistical Analysis of the Labor Demand of the ICT Sector in the R. of Macedonia

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Abstract

The dynamics of the development of information technology dictates the fast rate of economic development, as part of the overall development process, not only to companies, but also society in general. Sustainable economic development is a benefit to the development of information society, but as an instigator of the process. ICT indirectly affects an increase in the gross domestic product of national economies and provides an incentive for macroeconomic policy makers to seek ways to establish equilibrium in the labor market in this sector as a priority in their programs, which would increase market potentials for engaging the active population. It is actually one of the specific objectives of the national strategy to reduce poverty and social exclusion in the Republic of Macedonia in the period from 2010 to 2020.

From that point of view, this paper will analyze the labor market and identify the factors causing imbalance in terms of labor supply and demand in the sector of information and communications. The main aim of the analysis will be to compare the structure of the offer with the structure of labor demand for the ICT sector, in terms of market demand and competition. Thus, on the basis of the basic indicators of the labor market, a comparative analysis with other sectors in the R. of Macedonia will be carried out, which will lead to certain conclusions regarding the flexibility of the labor market in the ICT sector.

Keywords

ICT sector, labor market, indicators, flexibility.

Introduction

The ICT sector can be defined as part of the economy providing products and services in the field of information, communication and technology. The definition makes a distinction between the ICT industry and other sectors. However, the ICT sector is very broadly defined and, obviously, products not directly related to ICT are produced in this sector.

In such a broad definition of ICT, a number of activities can be included, such as (Van Druen L, Junne, Klabbers, & Hansen, 2002):

- Communications-mobile communications, cable companies, satellite services, providers of Internet services;
- Computers-software development and software services, hardware manufacturing and development services;
- Content-publishing, Internet content providers, e-commerce etc.

Basically, ICT allow users to store, organize, transfer and manipulate any type of information that can be written in the digital form. In order for an explosive development of the ICT sector, there should be a number of changes, often grouped

under the term of the “new economy” or “network economy”, contributing to it. These changes include (Turlea, Nepelski, De Prato, & Desruelle, 2011):

- the digitalization of economic processes, which simultaneously influence the generation of new organizational forms,
- the acceleration of economic growth, which is often expressed in short repetitive waves of innovation, and a continuous reduction in the product development cycle,
- the increased connectivity of regional economies, resulting in even greater economic exchange activities between cities, regions and countries.

Today, the ICT sector is not analyzed as a sector by itself, but rather as a sector being an important source of economic innovation, whose growth generates growth and development in other areas.

The two most important features through which the importance of ICT in the economy can be perceived are:

- in the short run, new technologies lead to a reduction in the relative prices of products,
- when a new technology has been applied within an economy, then it can be used by all manufacturers. It provides an opportunity for the development of new products and new ways of organizing business, thereby increasing the pace of growth and the total factor productivity.

The increasing importance of ICT becomes visible through a dramatic decrease in the price of ICT products, allowing their greater prevalence in many segments of the economy.

The application of ICT involves innovative ways of practicing business, new ways of management, new methods of monitoring and control etc., which in turn leads to lower costs and increased productivity. It also refers to the public sector.

Only companies willing to commit organizational change can fully take advantage of benefits offered by a new technology. The implementation of new business models and new ways of organizing, as well as new ways of combining labor and capital, are crucial for the implementation of ICT. It is also very important that we should say that the implementation of ICT requires the knowledge and skills founded by those who use the same technology.

A need for labor in the ICT sector

According to recent research, a continual expansion of new uses of ICT will increase demand for greater skills of the employees in the ICT sector (Stimpson, & Tielens, 2010) in the next ten years. These trends lead to the creation of new jobs, so it is not surprising that the world’s most sought-after professions are those belonging to the field of ICT. Such jobs are created as a result of the so-called digital economy that is now the main driver for the growth of national economies.

Key ICT skills can also be acquired through both educational institutions and training graduates from other disciplines. It is estimated that about a quarter of employees in the ICT sector lack formal education in the field of information and communication sciences.

Demographic changes, increased levels of migration, changing labor demand and the major technological change in the ICT sector contribute to the shortening of the working life, especially with employees in the ICT sector, and lead to intense competitiveness between labor and specific knowledge and skills (Ducatel, & Burgelman, 2010). In any case, there is a generally accepted view that well-qualified employees in the ICT sector are faced with shorter working life. Therefore, it is very important to build an appropriate strategy for the continuous supply of well-qualified ICT workers. As measures of this strategy could be stimulating for more students to choose areas of ICT, ways to engage other related specialists in the ICT sector should be promoted through additional retraining, attracting well-qualified foreign specialists etc. South Korea can be cited as an example of such good strategies for providing the highly-qualified workforce in the field of ICT. According to Microsoft’s latest report, South Korea has the same number of engineers as the United States, although its population is six times as small. It is predicted that by 2020, 90% of the world’s scientists and engineers will have been living in Asia.

The knowledge and skills employees should have in the ICT sector include various components, such as formal education, work experience, creativity, analytical thinking and understanding etc. When it the migration of workers from this sector is concerned, there are two aspects. On the one hand, when training costs are high, when the learning of the work is a long process, then too high a rate of mobility may imply that employers do not get the maximum from their employees. When training costs are lower, skills and knowl-

edge are easily transferable, and it takes less time for staff to engage in work processes, then a high rate of mobility will contribute to an increase in the dynamics of the sector.

From a quantitative aspect, a company's workforce or the workforce of a sector within an economy or between different countries is the net result between the inflow and the outflow of workers, for which reason it is a relatively unstable category. This is called the labor market migration, thinking of changes in workers' socio-economic status and working conditions. Every employee in a company, having his or her knowledge and skills, creates the basis for the operation of the company. When an employee leaves the company, a part of that base of knowledge and skills is lost; on the other hand, however, new knowledge and skills will come with newly-hired workers.

An analysis of labor demand in the ICT sector

The ICT sector is an area of knowledge incorporated in almost all industries. Information and communication technology is built into all products and services, contributing to the creation of a new added value and increasing the productivity and profits of businesses. The ICT sector is the basis for the development of not only all economic activities, but also a foundation for the growth of competitiveness. On the other hand, typical activities of the sector of information and communications, such as the manufacture of computers or software, are exposed to ups and downs due to the great competition governing the global market, where fierce battles to conquer new markets are fought.

The knowledge and skills acquired in educational institutions as well as experiences in enterprises are the main generator of new products, technologies and ideas essential to the achievement of economic development, and thus social welfare. Therefore, the harmonization of economic growth and development and human resources policies with short- and long-term needs of the economy, the community and the individual play the key role. Maintaining competitiveness is only possible if such knowledge and skills are present in educational outcomes, occupational standards and qualifications provided by educational programs.

All indicators point at a great potential of this sector through the following mechanisms: the spreading of knowledge and ICT skills in other

activities, the growth of the key sub-sectors with sustainable dynamics, an increased presence of the Macedonian business entities in the environment and so on.

The importance of the information and communications sector is indicated by the fact that it is one of the five sectors with the highest share in the total value added, calculated according to the cost of the factors of production in 2013, which is 7.7%, being preceded by the following sectors: manufacturing (24.6%) and wholesale and retail (23.5%), construction (10.8%) and transportation and storage (8.2%). In comparison with 2010, there is a decline in the sector in terms of its participation in the total added value, when it was the third sector. Although it is ranked lower than the construction sector in terms of added value, if the number of employees is compared (in the construction sector, it is three times as high as in the sector of Information and Communications), it can be concluded that it is at almost the same level. Today, there are 1446 active businesses in the sector of information and communications, out of 71 290. Unlike 2008, when the rate of the newly-created against the active business entities in this sector was 16.8, in 2010 it was 21.3%, the rate of newly-established enterprises in 2012, in terms of active businesses, amounted to 9.97%, thus ranking this sector amongst the nine sectors with the highest rate of newly-established businesses, which shows the reduced growth of this sector; hence a decreased demand for labor. The bit is the data for the rate of the surviving business entities formed in 2011, which survived 2012, which equals 75.3%, which is quite high, although the 2009/2010 survival rate was higher (82.4%). Today, on the other hand, only 2% of the total number of the employed population in the R. of Macedonia (690 962) are employed in this sector.

In order to perceive labor demand, important data for fulfilled and free employment in the information and communications sector are compared to other sectors in the Republic of Macedonia in 2014. The findings are shown in Figure 1 and Figure 2:

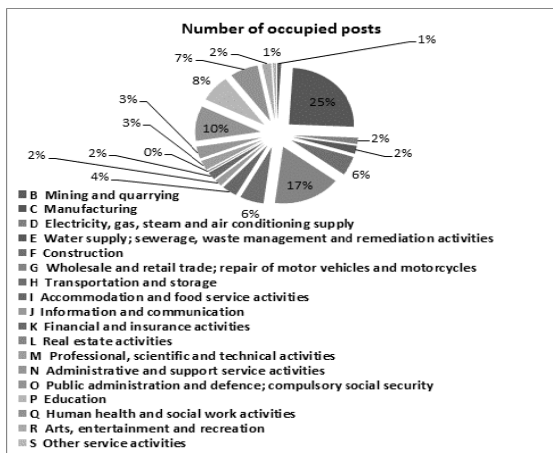


Figure 1 The number of the occupied posts
 Source: The authors, according to the State Statistical Office of Macedonia, 2015

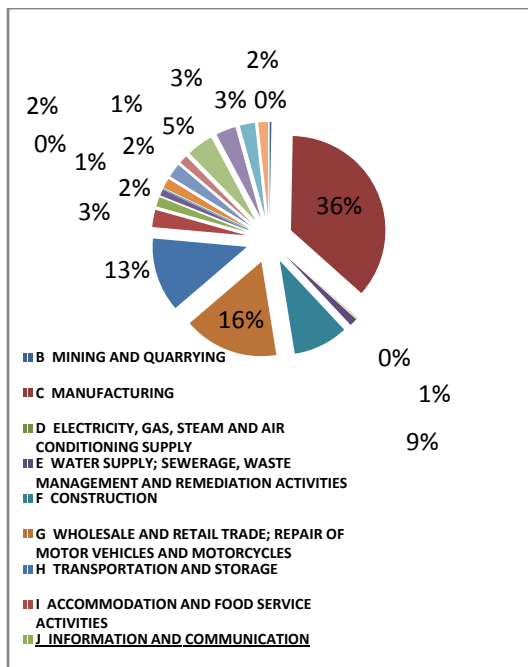


Figure 2 The number of job vacancies
 Source: The authors, according to the State Statistical Office of Macedonia, 2015

From the previous figures, it can be concluded that out of the total number of the jobs filled (386.909), the number of the jobs filled in this sector is 8446, whereas there are 59 free jobs, i.e. the rate of free labor is 0.69. The average of the jobs filled in all the (18) sectors is 21,494.94, which means the number of the jobs filled in the sector is 27% of the average in all the sectors. According to these data, it can be concluded that this sector is one of the eight sectors with the lowest number of free jobs, which means demand for labor in this sector is high.

As far as the necessary qualifications in the sector of information and communications are concerned, it is necessary that we bear in mind the number of employees in enterprises. The classification of businesses in the sector of information and communication technology is presented in the following figure:

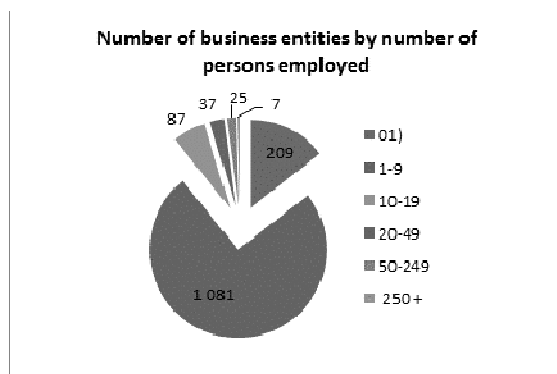


Figure 3 The number of the business entities by the number of persons employed
 Source: The authors, according to the State Statistical Office of Macedonia, 2015

The conducted qualitative analysis of a large number of businesses in this sector in the R. of Macedonia provides us with the evidence that larger businesses have proportionally specialized jobs, whereas small and medium-sized ones are significantly more complex, because employees perform more business activities, for which reason broader competencies are also expected there. Figure 3 allows us to perceive that businesses in this sector counting 1-9 employees are prevalent, with only 7 enterprises with more than 250 employees. Hence the need for employees' broader competencies. In this context, given the fact that in 2011 a new classification of occupations was adopted, there is no compliance of occupations in the ICT sector with the profiles that are required by businesses. It is necessarily required that a matrix of profiles and competencies for individual profiles should be created and an opportunity for conducting a comparative analysis of the labor market data at the regional, the national and the international levels should be provided.

The working conditions of the labor market in the ICT sector

Motivation for education, with a part being modeled on the basis of information on the working conditions for those occupations that are generated from the information and communications sector. When working conditions are spoken

about, the level of the salary, the prevailing conditions of contractual obligations, the usual working hours, the safety measures of employment and so on are considered. The following figures show the net salary per individual sectors and the net salary in the sub-sectors within the information and communications sector in the R. of Macedonia:

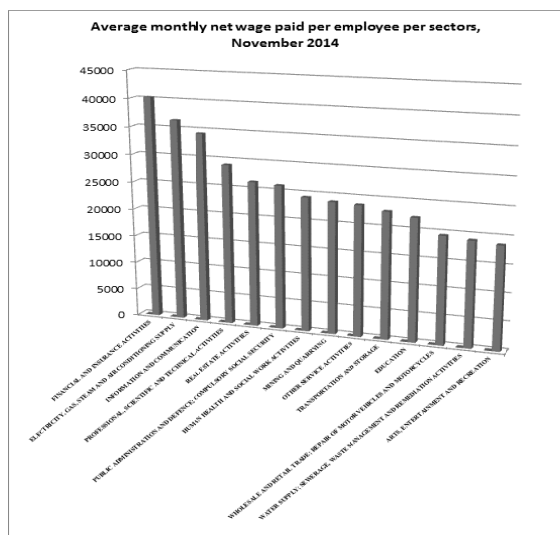


Figure 4 The average monthly net wage paid per employee per sectors

Source: The authors, according to the State Statistical Office of Macedonia, 2015

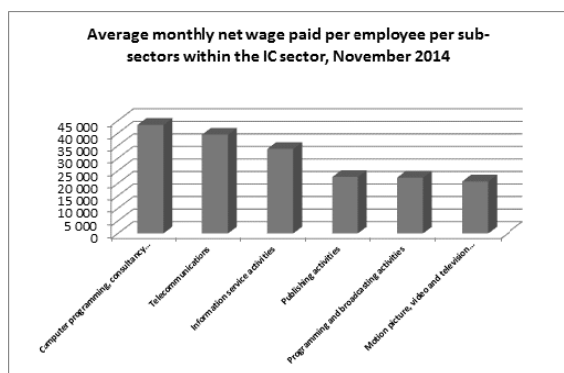


Figure 5 The average monthly net wage paid per employee per sub-sectors within the ICT sector

Source: The authors, according to the State Statistical Office of Macedonia, 2015

According to the previous figures, the net salary in this sector ranks the third, after the financial sector and the sector for supplying electricity, gas, steam and air conditioning. On the other hand, compared with the average salary in the R. of Macedonia in this period, which amounted to 21,588 denars, the average salary in the sector is 34,319 denars. This fact indicates that 58.97% of the average net salary in this sector is bigger than the

average salary in the R. of Macedonia. Given the big salary, it is clear that young people will be encouraged to enroll in educational programs in this sector, especially in the telecommunications sub-sectors and computer programming, consultancy and related activities, as well as information services.

Also, an analysis of the net pay for the first half of 2012 is carried out, Figure 6 reveals that the ICT sector immediately follows the sectors of finance and the supply of electricity, gas, steam and air conditioning. It shows that such a tendency in the payment of the net pay is not just a single condition, but rather a tendency lasting for a longer period of time.

Given the employee’s salary as the biggest motivating factor, young people should be expected to show a bigger interest in the future development of ICT skills and the knowledge of the area. It may also be a sufficient reason for retraining a number of employees in other sectors and their migration to the ICT sector.

As regards job security, it is necessary to take into account the ownership structure of the companies in the sector of information and communications, which is shown in the following figure:

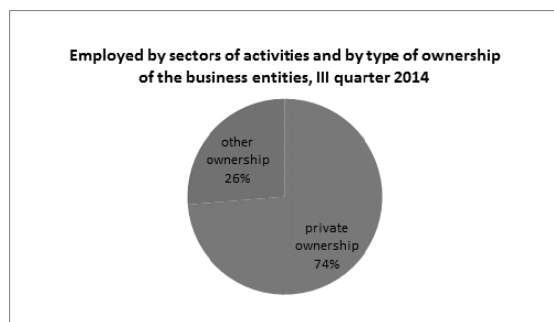


Figure 6 The employed by sectors of activities and by the type of the ownership of the business entities

Source: The authors, according to the State Statistical Office of Macedonia, 2015

Out of the total number of the employees in this sector, 74% are employed in private business entities, and 26% of them in the businesses in another ownership (of the state, social, collective etc.). Employees can be said to have relative security through contracts of indefinite duration. There is no real security of the labor market any longer, especially when the ownership structure is like the one shown in the previous figure.

Conclusion

Because of high unemployment in the R. of Macedonia, a need for following changes that have been made in the structure of the labor force and for conducting an analysis of the labor market in individual sectors has arisen.

Any business entity wanting to achieve a competitive advantage and above-average profits, which is also the major goal of any business entity, should require that ICT be introduced in its own future operations. There are users' continuously emerging needs and needs for developing new applications that, apart from offering a development perspective, also facilitate the work of those using them. Because of the benefits offered by this technology, it is continuously being developed and improved, and from that point of view, the information and communications sector has the key position in the overall structure of business entities in the R. of Macedonia.

According to the State Statistical Office, the majority of students of Informatics find work in three months upon graduation, and only after one year, they start thinking about moving out and finding other employment. Conversely, 1,330 graduate students are registered as unemployed with the Employment Agency; according to the competent authorities, however, they work for foreign companies from home. Demand for this staff has increased and for a new foreign investment, and the state is doing its best to meet the need, which, on the other hand, does not imply losing qualified staff in domestic companies.

The business sector in the country is affected by an outflow of ICT staff. This trend is seen as negative. For a long time, Macedonia has been faced with a shortage of staff, and the trend practically generates a shortage of required staff.

Taking into account the inequality in the proportion of employment in individual regions of the R. of Macedonia, data on the regional labor markets related to the sector are required, which prevents enterprises in this sector from being conducted a more detailed analysis of, as well as the basic indicators of regional labor markets. Because of that, the spatial concentration of businesses in the sector of information and communications is impossible to perceive, and it is not possible to perceive income distribution across the regions, either. These data will be a good basis for the mobilization of young staff in the R. of Macedonia given the fact that it depends on salaries in this sector, which are at a high level, unlike those in other sectors. At the same time, the danger of

the eviction of the finest professionals in this sector will also be reduced, which is due to the deficiency of these profiles in the EU (especially in the field of computer programming, as a sub-sector in the information and communications sector, where the EU is estimated to have a shortage of 700,000 IT specialists by 2015). Also, the State Statistical Office has no data on the supply of labor from the subsectors by regions, which prevents a further analysis of the alignment of labor supply and demand in this sector. It affects the capability of human resource planning and the prediction of actual future needs of the labor market and of planning qualifications with a view of their rationalization, directed towards meeting the needs of the economy. **SM**

References

- Ducatel, K., & Burgelman, J. K. (2010). *ICTs and employment in Europe: Outlooks in 2010*. White paper: European commission.
- Stimpson, A., & Tielens, M. (2010). *Mobility on the labour market: some key issues*. White paper.
- The Economist. (2015). *Labour market*. Retrieved February 6, 2015, from The Economist: <http://www.economist.com/topics/labour-market>
- Turlea, G., Nepelski, D., De Prato, G., Stancik, J., & Desruelle, P. (2011). *The 2011 Report on R&D in ICT in the European union*. European Commission.
- Van Druten, L., Junne, G., Kladders, V., & Hansen, M. (2002). *A report on the Dutch ICT labour market with a specific focus on the Amsterdam Metropolitan area*. Retrieved February 15, 2015, from The Network University: <http://www.netuni.nl/hamburg/amsterdam.pdf>
- Република Македонија - Државен завод за статистика (Republic of Macedonia - State Statistical Office). (2015). *Пазар на труд*. Retrieved February 3, 2015, from Република Македонија-Државен завод за статистика: <http://www.stat.gov.mk/OblastOpsto.aspx?id=14>

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