The development of innovative business organizations in the digital economy has its own patterns and trends, the main of which are crucial for the successful business implementation of innovative forms of management.

Key words: e-commerce, information technology, digital economy, e-business, online store, e-commerce, information society

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TRAINING OF IT SPECIALISTS FOR THE DIGITAL SINGLE MARKET

Abstract. To implement all initiatives related to the development of the digital economy, adequate education and training is required for people who are at the same time creators and users of the e-services that feature it. The paper discusses the three areas where the EU can help overcoming the shortage of IT specialists in Europe and particularly in Bulgaria. It represents the main types of computer skills that are necessary for the business.

Key words: digital single market, digital skills, training of IT specialists, digital competencies.

Introduction. Internet and digital technologies globally change the world. Digitization of the economy is a world trend that has many challenges and risks.

The ICT sector represents nearly 5% of the EU economy and accounts for a quarter of the total costs of businesses. ICT investment are responsible for half of the rise in productivity in Europe.

Digitization is not only a choice but also a necessity for European businesses and economies as a whole. It brings plenty of opportunities, but also changes as well: some jobs will be replaced, new jobs will be created, and many jobs will be transformed. Thus, it is important the citizens to be prepared for this transition.
The idea behind the digital single market is to move from 28 national markets to one. It must provide free movement of people, services and capital, where people and businesses can easily access and perform online activities in a state of fair competition and a high level of protection for citizens and their personal data, regardless of their nationality and residence. The widespread use of digital technology does not only increase the access to information but also enhances job opportunities and modern and transparent eGovernment. A fully operational digital single market can contribute € 415 billion a year to the EU economy creating hundreds of thousands of jobs.

There is a shortage of 300,000 IT specialists in Europe, which number is expected to increase to 500,000 by year 2020. Another much more important fact is that at that time more than 90% of the jobs will require basic digital skills, while currently only 37% of the active labor force in Europe has such [1]. This is a major challenge, meaning that maximum effort must be put to prepare the needed staff, ready to meet the requirements and standards of the digital economy.

In Europe, information technology is an innovation driver and play a central role in the economic growth strategy. Today, 250 million Europeans use the Internet on a daily basis and the digital economy is growing 7 times faster than the real one.

**Digital Single Market Strategy and IT education and training**

Finalizing the idea of creating the digital single, consumer-orientated market will contribute to:

- increasing competitive growth;
- transforming the European industrial sector;
- creating new products and services for this growing market.

There are also some barriers to online access to goods and services:

- only 15% of people shop online from other EU countries;
- internet companies and start-ups can not take full advantage of online opportunities;
- only 7% of small businesses sell goods and services outside the EU;
- businesses and governments do not make optimal use of digital tools.

The Digital Single Market Strategy includes 16 initiatives ranging from copyright to cybersecurity. This strategy is based on:

- creating the necessary conditions and equal opportunities regarding the competition, for the rapid development of digital networks and innovative services;
- maximizing the growth potential of the digital economy.
To implement this strategy and all other initiatives related to the development of the digital economy, adequate education and training is required for people who are at the same time creators and users of the e-services that feature it.

Education, training and youth and sport policy play an important role in the knowledge-based economy as they support growth and employment by promoting the emergence of highly qualified and adaptable population. They also strengthen the social cohesion and active citizenship within the European Union (EU). Through education, training and youth and sports programs, the EU develops and strengthens the European dimension by promoting mobility and encouraging international cooperation. The EU supports and complements the actions of the Member States in accordance with the Treaty on the Functioning of the European Union [2].

The influence of the technology and digital change pace over the economies and societies is as follows:

- the need for better respond from schools to this new reality — it is no longer enough for young people to have short-term skills and knowledge;
- schools need to develop flexibility and ability to adapt to change, with new ways of learning in an increasingly mobile and digitized world;
- education systems need to modernize, to promote creativity, critical thinking and entrepreneurial attitudes.

There are three areas where the EU can help overcoming the challenges [3].

1. Development of better and more comprehensive schools, including:
   - support for all students and development of their competencies;
   - improving studying through the creation of new forms of cooperation, for example with local services, community organizations, businesses and universities, which would help young people prepare for future employment and further training;
   - improving access to and quality of early childhood education and care.

2. Assisting teachers and school leaders in achieving high quality teaching and learning, including:
   - make the teaching profession more attractive;
   - the teacher profession to require constant training;
   - assisting school leaders.

3. School education systems management to become more effective, fair and efficient:
• to invest properly and effectively in school resources;
• combining autonomy and quality assurance.

The education of young people in Europe is responsibility of the European Parliament and the European Commission, which are also committed to:
• enhance the cooperation between schools through the Erasmus+ and eTwinning programs;
• develop a digital capabilities self-assessment tool for schools,
• support improvements in science, technology, engineering and mathematics education STEM through co-operation between higher education, scientific research, businesses and schools.

European cooperation in education and training is among the main priorities for the period 2016-2020 and the implementation of the strategic framework for European cooperation in this field includes four specific objectives:
• turning lifelong learning and mobility a reality;
• improving the quality and effectiveness of education and training;
• promoting equality, social cohesion and active citizenship;
• expanding creativity and innovation, including entrepreneurship, at all levels of education and training.

The 2015 Joint Council Report of the European Commission sets out six priority areas for the period 2016-2020, identifying specific issues to be addressed within each area. In the context of this report, the most important priority area is Area 3. It covers:
1. Appropriate and high-quality performance-oriented skills and competences in terms of employability, innovation and active citizenship;
2. Comprehensive education, equality, fairness, non-discrimination and the promotion of civic competences;
3. Open and innovative education and training, including through full integration into the digital age.

The main aspects of cooperation include:
• integrating innovative and active pedagogical methods;
• developing digital technologies competences and promoting open and digital educational resources;
• promoting cooperation between educational institutions and local communities;
• increasing the interaction between education, research and innovations.

4. Strong support for teachers, trainers, school leaders and other staff in the education system.
5. Transparency and recognition of skills and qualifications to facilitate mobility for learning and work.


The information technology education is a priority in the European Union. EU countries are responsible for their own education and training system, but the Union supports them in defining common goals and exchanging good practices.

The European Commission is organizing a special European Digital Skills Awards. This initiative encourages people to develop digital skills for work, education and life in general. The projects are ranked by an independent jury on the final of the competition, organized in 4 categories:

- **Digital skills for all** — to create digital skills that enable all citizens to be active in the digital society.

- **Digital skills for the workforce** — to create digital skills for the digital economy, for example, to increase the skills and retraining of workers and employees.

- **More and better trained ICT professionals in Europe** — for ICT professionals in all industry sectors. In this category Bulgaria also has an excellent project among the finalists implemented by IT talents.

- **Digital competences in the field of education** — to transform the teaching and learning of digital skills as a lifelong learning perspective, including training of teachers.

The partnership between the Bulgarian Association of Information Technologies (BAIT), the eSkills for Jobs contractor for Bulgaria and the Employment Agency is among the best projects in Europe among 258 applications. The project "eSkills for Jobs Bulgaria" for training labor mediators is among the 16 finalists. It is among the 4 finalists in the "Digital Skills for the Workforce" category, competing with the projects of the Italian Ministry of Labor and Social Policy, the Italian Chamber of Commerce and Google; Europe’s Growth Engine — Google’s initiative in the 28 EU member states and Digi Pass — a Samsung project in Estonia.

In Bulgaria, the IT staff shortage amounts to 25-30 thousand specialists, for the lack of which, the Bulgarian government is taking measures in the next 10-15 years, one of them providing that around 2500 9th grade students across the country are trained in programming within the next 3 years. The courses will be on weekends and holidays and will be held in 5 professional high schools and 4 universities in the country. At the end of the 900 hours training, students will take an
exam in order to get a professional programmer qualification. 300 000 BGN will be given for the start of the project from the Ministry of Education.

"We are planning to extend the scope of the program next year and in the future we will be in an increasing need of software specialists – as stipulated by the software industry, being one with the highest added value and with the biggest share of young people remaining and working in Bulgaria", said Minister of Education Krasimir Valchev [1].

IT talent program is a bulgarian initiative in the training of IT specialists. This program provides completely free programming training, focused on the fundamental study of the basics of programming and algorithmization. The courses last 5 months and are very intense and practical. The lecturers are people from the industry with rich experience.

The groups are small — up to 26 people, giving the lecturer the opportunity to pay individual attention to each participant. Students receive constant feedback throughout the training. In the mentoring program participate leading specialists from different IT companies as well as proven professionals from other fields. After training completion to the students are aided for a successful career start in the leading companies in the country.

Education is not only an obligation for universities. The constant shortage of IT specialists forces software companies to take part in this process, one form or another. They have to prepare their own qualified employees to meet the demand of the software market. They focus their educational programs on practical training, tailored to the immediate needs of the business and its ability for direct participation in the learning process.

Training opportunities for IT specialists posess also specially created training centers. A typical example is the TechnoLogica Learning Center with over 20 years of tradition in training IT professionals. It is the first internationally certified private training center in Bulgaria. It offers a wide range of courses in key areas of information technology. The lecturers are certified by leading IT corporations and have pedagogical skills and great practical experience in applying the technologies underlying in the courses. They are also available for consultations after the end of the training and on-site assistance in applying what has been learned.

TechnoLogica has developed modular programs to acquire the necessary knowledge and skills for an IT position. Training is also offered for a variety of products and their applications according to cus-
tomer needs. The training center has 4 halls and 55 training places, equipped with modern computer and presentation equipment.

Business needs to take a more prominent part in the educational process, not only in the form of internship programs, but also in the lecture area — lectures, seminars, master classes, etc. This should become a two-way interrelation — universities invite business representatives to participate in the training and they on the other side respond by offering internships and practices, and also to engage in discussing curriculums and programs. Thus, IT practitioners, having already been working in the real sector, are returning to universities. Focused on the practice, they teach what business is expecting from future IT specialists, building on the theory, that is naturally a mandatory element.

On the other hand, the purpose of the universities is to create IT specialists who, with little effort, can adapt to any requirements, but not those, who have specific, rapidly acquired but narrowly profiled knowledge and are at risk to be jobless in the event of any change in technology. When a specialist has a solid background, he can upgrade and expand his skills in any environment, and changing the company will not be a problem for him. The purpose of business learning organizations is not to replace or displace higher education, but to supplement and upgrade it by focusing on the practical skills that are needed by the business.

At the same time there is a need for more strategic and unified cooperation among the IT companies themselves, who conduct educational initiatives to be able to prepare well-trained personnel for the entire IT industry, not only for the specific needs of the individual company.

For the success of the higher education, a preparation in schools is necessary along with strong penetration of computer science in the primary education of children. There are many skills that can be built and developed in early childhood. There is no need every student to become a programmer, but it is good to give him the opportunity to become acquainted with the world of computers, to provoke his creativity and if he has the desired and necessary abilities to give him a direction to follow, which however, is absent in primary and secondary schools and is extremely difficult to catch up in the university level.

In recent years, we have witnessed the massive penetration of information technology in all areas of the economy and the various professional fields. They became indispensable assistant to every one of us, not only in business activities, but also in many others (seek and receive information, booking tickets and hotels, trade, payments) that
only a few years ago were made not electronically but in traditional ways.

It is important to note that, if in their private lives people have a choice in terms of the knowledge they use, then in their professional activity the requirements for possessing information technology knowledge and skills have increased significantly. Usually, competencies are required for working with resources in the computer system such as programs, files and folders, in the environment of a particular operating system, searching for information, optimizing and organizing work on the Internet, effective use of e-mail, word processing for the purpose of creating, formatting and printing text documents, including table and graphic objects, working with spreadsheets — layout and management of tables, worksheets and books, using formulas and functions, visual presentation, analyzing and organizing data.

**Digital Competencies**

In IT education, it is necessary to distinguish between professionals and people using information technology in their everyday personal and professional activities. This in turn has to be reflected in the form and content of each of the offered trainings.

The main course on Digital Competence aims to give the fundamental skills to work with modern information technologies such as:

- How to find information on the web;
- How to select and store the most essential information;
- How to process documents needed for further work;
- How business correspondence is conducted;
- How to make electronic payments;
- How to prepare a company presentations;
- How to organize plans and tasks with the software assistance;
- How to monitor emerging changes in the business environment;
- How to monitor the development of technologies and the implementation of good practices;
- How to take the necessary steps to eliminate any problems.

The main tool for training people in digital competence in the European Union is the Human Resources Development Operational Program. It enables people with secondary or lower education to apply for Project Vouchers for Employees and increase their professional qualification.

The most important in this program is that it provides an opportunity for the employed persons in Bulgaria, who are on a labor contract in enterprises outside the state administration and have a secondary or lower level of education, to take part in vocational training courses in
professions and/or foreign language training or digital competence. The grant under the Operational Program "Human Resources Development" (HRD OP) amounts to 85% of the value of the voucher, with the remaining 15% being covered by the trainee.

Digital competence is consistent with national and European Framework for Lifelong Learning and the expected results at the end of the course are the students to have the knowledge and skills in the following areas:

- **Information processing**: Trainees can use different search engines to find information. Use some search filters (e.g., search only for photos, videos, maps). Compare different sources to assess the reliability of the information they find. Classify information methodically using files and folders so they can find it easier. They back up information and files they have saved.

- **Communication**: Students can use advanced communication tools (e.g., Voice over IP and File Sharing, Viber, etc.). Be able to use collaboration tools for e.g. shared documents/files that someone else created. Use some features of online services (such as public services, e-banking, online shopping). Transfer or share knowledge with other online users (for example, through social networking tools or online communities). Be aware of and use the rules of online communication ("netiquette").

- **Create content**: Be able to create digital content in different formats (such as text, tables, images, audio files). Use tools/editors to create a webpage or blog using templates. Be able to do basic formatting (for example, enter footnotes, charts, tables) regarding content created by them or another user. Know how to report and reuse copyrighted content. Have basic knowledge of programming.

- **Security**: Have security programs installed on the devices used to access the Internet (antivirus, firewall, etc.). Use and update these programs on a regular basis. Use different passwords to access equipment, devices, and digital services and change them periodically. Be able to identify sites, messages, phishing emails that could be used for fraud. To form their own online identity and track their digital profile. Understand the health risks associated with the use of digital technologies (e.g., ergonomics, risk of addiction, etc.). Understand the positive and negative impacts of technologies on the environment.

- **Problem Solving**: To be able to solve the most common problems that arise when using digital technologies. Use digital technologies to solve (non-technical) problems. Be able to choose a digital tool that meets their needs and whose performance can be evaluated. To solve technological problems by examining the settings and options of...
programs or tools. Regularly update their digital skills and improve their knowledge.

The main types of computer skills (Digital Competencies) can be represented in the following four areas:

- computer literacy / ICT literacy;
- internet literacy -World Wide Web;
- media literacy;
- information literacy.

Different companies have different requirements to the technical skills of their IT staff. All agree, however, that the success of the IT division depends not only on technical knowledge of IT professionals but also on whether they have the so-called soft skills. The most important of these are:

1. **Readiness to Solve Problems** — Does the employee have a problem-solving initiative or do not pay attention to them until he is instructed to deal with them?

2. **Negotiation and wisdom** — How does a collaborator feel in unusual situations — does he benefit from them or just try to survive the relevant period?

3. **Ability to Assess Perspectives** — Has the employee established normal relationships with collaborators and managers working in other departments, including those who are not able to assist to his raise in the hierarchy?

4. **Communication skills and awareness** — Is the associate familiar with both formal and non-formal programs in which the company participates?

5. **Sharing knowledge and frankness** — Does the associate acknowledge that there are some preconceptions so that it does not prevent him from making the right decisions?

6. **Skill for teamwork** — Does the assistant aspire to achieving the common goals, even if they are inconsistent with his / her personal plans?

**Conclusions**

It is therefore essential to increase digital competences among the general population at all stages of life. Effective initial education and training requires well-trained educators with modern, well-equipped educational institutions making best use of digital and other innovative tools.

Digital skills or ICT competences are sometimes a separate subject and sometimes taught across subjects; however, they are so far not part of all educational curricula and learning outcomes.
Digital skills are currently mostly learned outside formal education, through personal internet and computer use, in the workplace, in experiential learning or in other informal settings. Mechanisms to identify, assess, recognize and validate these skills are rare and fragmented across Europe and often not recognized across borders. This impairs the further acquisition of digital skills as well as the matching of job seekers’ and employers’ needs.

The digitization of the economy is transforming the European labour markets, changing the working conditions and boosting the demand for digital skills. The use of technologies in the workplace alters significantly the patterns and modes of work as well as the relationships between employers and employees.

References

7. http://cio.bg/5646_10_vazhni_meki_umeniya_za_it_profesionalistite&ref=more