

SMARTER COMPETENCES IN A DIGITAL WORLD

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Abstract: *According to the Digital Agenda 2020, the European Union is achieving various activities and projects such as DIGCOMP, New Skills Agenda for Europe. At the European level, in all sectors of the economic and social life, there are vacant jobs due to the lack of persons holding digital competences. As estimated by the European Commission, in 2020, almost 756,000 jobs in the ICT sector will not be occupied due to the lack of persons with digital competences. Thus, the digital transformation represents a great opportunity for job creation. The paper presents an analysis concerning the digital skills in information, communication, problem-solving, content-creation of the EU population. The paper concludes with the need to develop the digital competences in all the EU Member States, and especially in Romania by smart education.*

Keywords: *digital competence, e-skills, smart education*

BACKGROUND

For the time being, we are witnessing continuous changes at economic, social, technological, cultural, political-legislative level as well as increasing global interactions and interdependencies. Whenever debating about the main sources of change, we have to take into consideration the following issues:

- The evolution in the field of technologies: expansion of the internet network; use of increasingly sophisticated technologies in a customized manner; complex production equipment; occurrence of high-performance methods for information gathering, storage, transmission and use, which allows a significant reduction of costs, increasing the quality of the products and services; use of robots and artificial intelligence in the production process;
- Economic factors: market globalization, economic crises, significant differentiation of the market segments, free movement of (human, financial) capital at the global level;
- Socio-cultural factors: demographic situation, polarization of society, changes in the system of values and aspirations, the corruption level inside the country;
- Political-legislative factors: state attitude towards entrepreneurship, attempts to nationalize the organizations, political instability, inefficient legislative basis;
- Ecological factors: climate change, negative influence on the ecosystem.

The European Union, as a global actor is facing several challenges in times of dynamic development of the strategic and geopolitical context: competitiveness of countries outside the borders of the EU, demographic changes, constraints of public finances, economic and social stability, uncertainty about the future stability of the banking sector climate changes, rapid and exponential pace of information technology, high level of migration, threats of terrorism, security, including cyber security.

One modality to address the economic recovery and to achieve inclusive and sustainable long-term growth should concentrate on co-creation together with citizens, businesses, on active citizen participation in decision making, on involving the final users of public services, of academia, public organizations and social entrepreneurs in co-designing and co-implementing social innovations.

Concerning the young generation we should be more pro-active in job creation, providing customized education and social engagement of young people. According to Horizon 2020 (EC, 2017):

- "By 2020, public administrations and public institutions in the European Union should be open, efficient and inclusive, providing borderless, personalized, user-friendly, end-to-end digital public services to all citizens and businesses in the EU.
- Innovative approaches are used to design and deliver better services in line with the needs and demands of citizens and businesses.
- Public administrations use the opportunities offered by the new digital environment to facilitate their interactions with stakeholders".
- Consequently, the public administration should foster to be creative, innovative in providing the best solutions in light to overcome the above challenges, should address the current needs of various stakeholders.
- At the same time, the public administration has to adapt and to turn into account the opportunities provided by new technologies, as well as to develop new services, it should focus on openness, transparency and citizen participation.

The public administration has an important role in boosting innovation in the economy and at the same time, it should trigger innovation itself in the public organizations in order to increase productivity, to improve efficiency, to enhance the creation of public value and thus to meet the society challenges.

Worldwide, the public sector innovation has become an important issue for governments, as they are trying to solve community problems. "Innovation although not new can be seen as one of the many 'magic' concepts that policy makers continuously use to demonstrate that governments are in an almost permanent struggle to show that they are willing and capable – through reforms – to be responsive to the changing needs of society" (Pollitt, Hupe, 2011).

Innovation represents a concept inspiring academics, managers and staff as it provides the challenge of radical change. Progress means constant innovation, so innovation represents a continuous process, and the public organizations should be open to new ideas and processes and thus should involve in networks, share knowledge and cooperate with various social partners. "In view to collaborate with various networks of partners, beneficiaries, customers, the public organizations can turn into account various instruments such as crowd sourcing, field officers, open-source databases, online community platforms, citizen centric services, digital platforms, new health care systems, intelligent transport systems etc.

Learning from best practices is worldwide acknowledged as triggering a positive impact. The examples of good practices could represent a source of inspiration for the public sector organizations in view to draw up their strategies for innovation” (Săvulescu, 2015). New forms of innovation in the public sector could include open government, business model innovation, social innovation community, ICT for training. According to Bekkers et al. (2013) four developments emerge:

- “How to meet new societal challenges, like global warming, (youth) employment, growing elderly population? Responsiveness of governments.
- How to deal with needs that really matter to citizens and companies? Efficacy and legitimacy of governments.
- How to deal with the budgetary crisis of government? Austerity and efficiency.
- How to make use of the self-organizing power in society? How to use this power of individuals and communities?”

When approaching innovation as a process we should focus on “learning, trial and error, experimenting, on qualitative discontinuity with the past (radical, transformative change), on co-evolution between different environments, interaction between various stakeholders” (Bekkers et al., 2013). Innovation, under its various forms – technological, social, etc. represents the result of the organizational culture, being directly determined by the intellectual or social capital of an organization. Innovation acquires features of complexity, sometimes being considered as ‘an adaptive complex system’.

DRIVERS AND BARRIERS FOR PUBLIC SECTOR INNOVATION

According to the field literature (Bekkers et al., 2013), innovation in the public sector takes place in a specific environment, distinguishing several actors who are collaborating in the area of disseminating relevant resources aimed at developing and applying new ideas, new modalities of organization or new modalities of operation.

In this context, the characteristics of environment could be considered successful factors or barriers for innovation. “The pressure to innovate and search for new combinations aimed at making efficient the public organizations is also provided by the rationality of public administration, which generates competition between the public values” (Moore, 1995).

It is moreover asserted that the inter-organizational networks could represent successful factors for innovation. In the field literature, the discussion is about ‘collaborating innovation networks’ (Gloor, 2005; Sörensen, Torfing, 2011). Collaboration within these networks could facilitate the exchange and dissemination of resources, thus stimulating innovation.

At the same time, leadership is important as it ensures an organizational culture of trust, respect and good communication. Relevant studies and analyses highlight the importance of leaders for innovation in the public sector and also for change management (Hartley, 2005; Bason, 2010; Osborne, 2011; Kuipers et al., 2013).

Also information and communication technology and social media represent important sources for innovation, through infrastructure and potential of innovation, thus triggering the accomplishment of several types of innovation.

It may be asserted that information and communication technology and social media represent successful factors for innovation, recognizing the vital importance of information and the modality of communication in public service provision.

According to the field literature, key barriers to innovation relate to the lack of methods and tools used. In this context it is important to mention the lack of tools, methods, experience and competences for developing innovation processes from problem identification to implementation; scarce knowledge about the type, nature and effectiveness of public policies; inefficient use of evidence and benchmarking as successful factors of innovation; unavailability or inaccessibility of information systems for the identification of potential local, national or international partners in innovation projects; difficulties in the establishment of criteria for the launch, implementation and evaluation of new solutions, governance structures or systems.

Also other relevant barriers refer to the lack of collaboration. In this respect it is worth to mention: significant lack of citizen participation during the innovation stages (design, implementation, evaluation); lack of systematic approach for citizen participation in the co-creation of public value; lack of policies and criteria for the establishment, management, evaluation of partnerships aimed at the implementation of innovative projects; powerful technical, administrative and political boundaries between different sectors and administration levels; cultural differences and difficulties in combining different objectives in public-private innovation partnerships.

INNOVATION PERFORMANCE IN THE EU MEMBER STATES

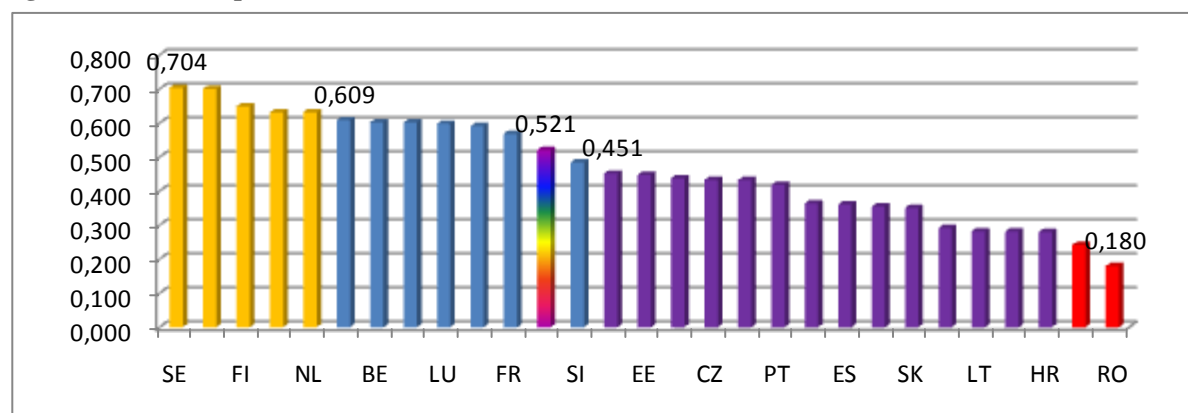
The European Innovation Scoreboard 2016 provides the evaluation of the innovation performance in the EU Member States, based on 25 indicators. It reveals the strengths and weaknesses of each country taking into consideration important innovation drivers, such as research systems, public and private investment, the economic effects of innovation. Based on the statistic data of the Innovation Union Scoreboard 2016, Figure 1 reveals the innovation performance in the European Union Member States.

Table 1 Innovation performance in the EU in 2015

Country	IP	Country	IP	Country	IP
Romania	0.180	Portugal	0.419	Belgium	0.602
Bulgaria	0.242	Italy	0.432	United Kingdom	0.602
Croatia	0.280	Czech Republic	0.434	Ireland	0.609
Latvia	0.281	Malta	0.437	Netherlands	0.631
Lithuania	0.282	Estonia	0.448	Germany	0.632
Poland	0.292	Cyprus	0.451	Finland	0.649
Slovakia	0.350	Slovenia	0.485	Denmark	0.700
Hungary	0.355	France	0.568	Sweden	0.704
Spain	0.361	Austria	0.591		
Greece	0.364	Luxembourg	0.598	EU28	0.521

Source: Authors - based on the data of Innovation Union Scoreboard 2016, European Commission

Figure 1 Innovation performance in the EU in 2015



Source: Authors - based on the data of Innovation Union Scoreboard 2016, European Commission

Four categories of states have been identified:

- “Innovation leaders – innovation performance is above that the average of the EU by 20%. Sweden, Denmark, Finland, Germany, Netherlands.
- Strong innovators – innovation performance is between 90% and 120% of the EU average. Austria, Belgium, France, Ireland, Luxembourg, Slovenia, and the UK.
- Moderate Innovators – innovation performance is between 50% and 90% of the EU average. Croatia, Cyprus, Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Slovakia, and Spain.
- Modest innovators – innovation performance is below the average of the EU by 50%. Bulgaria, Romania” (European Commission, Innovation Union Scoreboard 2016).

We are going to analyse the innovation performance in the EU Member States from the viewpoint of the following dimensions: human resources, research systems, funding resources. Considering the dimension related to Human Resources, Figure 2 presents a relevant situation. Sweden (0.831) is the leader of this ranking, being closely followed bySlovenia (0.829), Ireland (0.816), UK (0.786) and Finland (0.783), thus acknowledging that a high share of the labour force has the skills for developing a knowledge-based society.

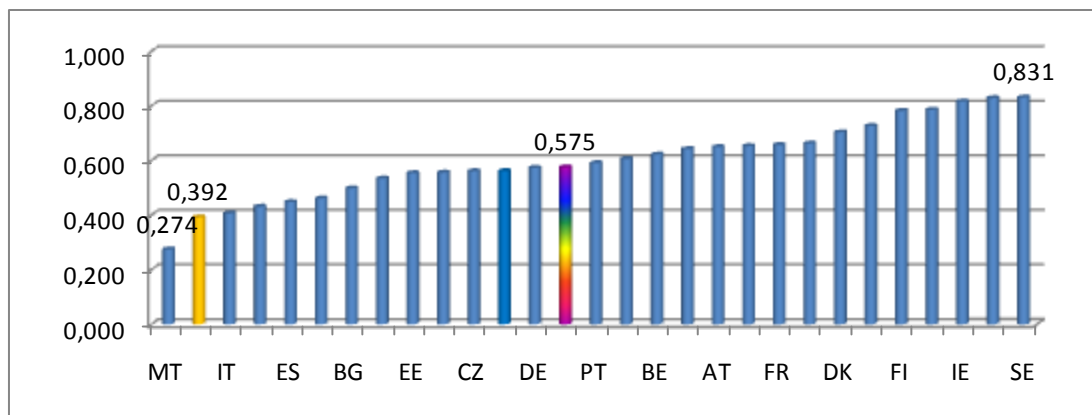
Table 2 Innovation performance in the EU – Human Resources

Country	Human resources	Country	Human resources	Country	Human resources
Malta	0.274	Czech Republic	0.561	Cyprus	0.662
Romania	0.392	Greece	0.562	Denmark	0.703
Italy	0.407	Germany	0.573	Lithuania	0.726
Luxembourg	0.431	Portugal	0.591	Finland	0.783
Spain	0.448	Croatia	0.606	United Kingdom	0.786
Hungary	0.462	Belgium	0.622	Ireland	0.816
Bulgaria	0.498	Slovakia	0.642	Slovenia	0.829
Latvia	0.534	Austria	0.650	Sweden	0.831

Estonia	0.554	Netherlands	0.653		
Poland	0.556	France	0.657	EU28	0.575

Source: Authors - based on the data of Innovation Union Scoreboard 2016, European Commission

Figure 2 Innovation performance in the EU – Human Resources



Source: Authors - based on the data of Innovation Union Scoreboard 2016, European Commission

At the other extreme we find Malta (0.274), Romania (0.392) and Italy (0.407), countries that should do efforts in view to improve the human resource skills, vital for a competitive economy. The differences in human resource performance have become smaller over time, thus we witness the convergence in innovation performance for this dimension. From the viewpoint of the dimension related to Research Systems, Sweden(0.814), UK (0.795), Netherlands (0.774), Luxembourg (0.771), Belgium (0.768) and Denmark (0.765) are top performers. It is acknowledged that the research systems in the above countries are open to cooperation with partners at international and European level, the researchers and specialists are disseminating information and knowledge by networking and the quality of research is very high.

At the same time, we remark that the differences between countries are quite large for this indicator (Figure 3).

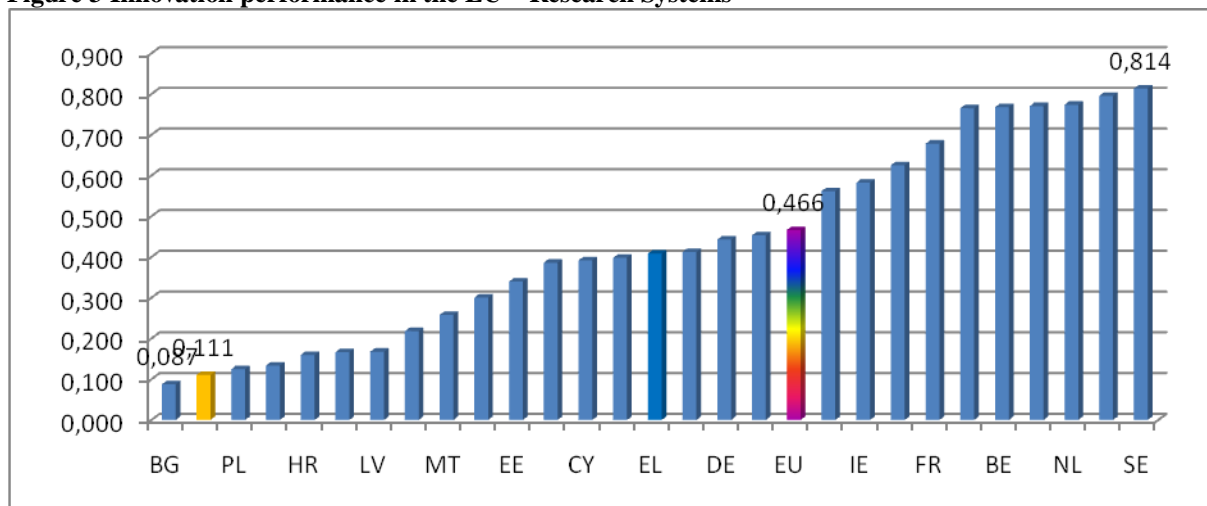
Table 3 Innovation performance in the EU – Research Systems

Country	Research systems	Country	Research systems	Country	Research systems
Bulgaria	0.087	Estonia	0.340	Finland	0.625
Romania	0.111	Slovenia	0.386	France	0.678
Poland	0.125	Cyprus	0.392	Denmark	0.765
Lithuania	0.134	Italy	0.398	Belgium	0.768
Croatia	0.160	Greece	0.408	Luxembourg	0.771
Slovakia	0.166	Spain	0.413	Netherlands	0.774
Latvia	0.168	Germany	0.443	United Kingdom	0.795
Hungary	0.218	Portugal	0.453	Sweden	0.814

Malta	0.258	Austria	0.561		
Czech Republic	0.300	Ireland	0.582	EU28	0.466

Source: Authors - based on the data of Innovation Union Scoreboard 2016, European Commission

Figure 3 Innovation performance in the EU – Research Systems



Source: Authors - based on the data of Innovation Union Scoreboard 2016, European Commission

Concerning the dimension related to Funding, Finland (0.765) is the incontestable leader, being followed by Estonia (0.727), Sweden (0.710), Netherlands(0.663) and Denmark (0.654). In these countries, the public sector is developing powerful activities of research, development and innovation. This indicator is based on a large extent on the expenditures in the field of research, development and innovation in the public sector.

The differences concerning innovation performance from the viewpoint of this dimension are relative high, thus demonstrating the fact that the EU Member States are not developed in a similar way, and for some countries, the global innovation performance could be improved by developing this dimension (Figure 4).

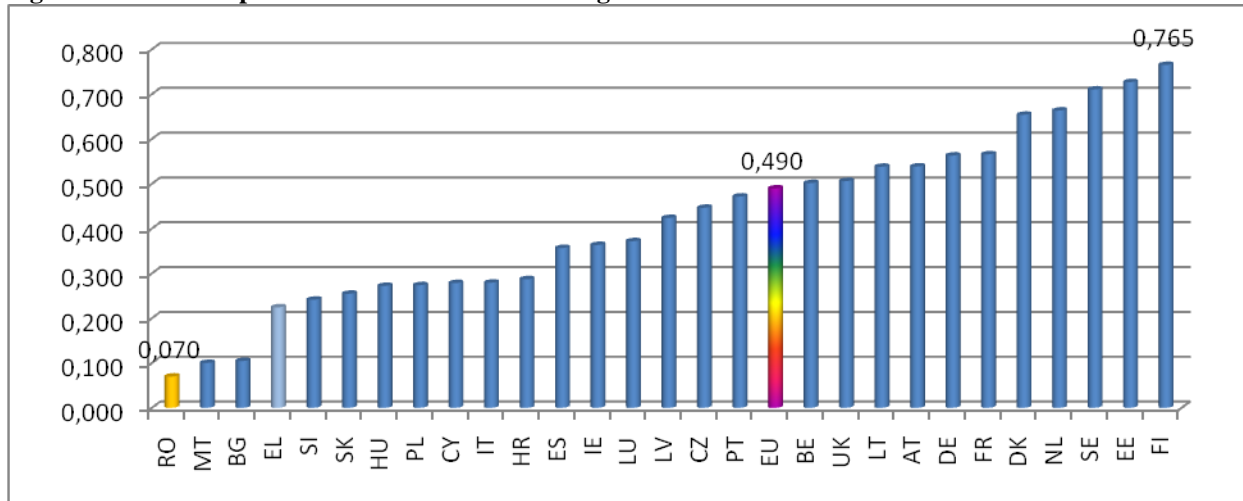
Table 4 Innovation performance in the EU–Funding

Country	Funding	Country	Funding	Country	Funding
Romania	0.070	Croatia	0.287	Austria	0.538
Malta	0.100	Spain	0.357	Germany	0.563
Bulgaria	0.104	Ireland	0.363	France	0.566
Greece	0.224	Luxembourg	0.372	Denmark	0.654
Slovenia	0.241	Latvia	0.424	Netherlands	0.663
Slovakia	0.255	Czech Republic	0.446	Sweden	0.710
Hungary	0.272	Portugal	0.471	Estonia	0.727
Poland	0.274	Belgium	0.502	Finland	0.765

Cyprus	0.278	United Kingdom	0.506		
Italy	0.279	Lithuania	0.538	EU28	0.490

Source: Authors - based on the data of Innovation Union Scoreboard 2016, European Commission

Figure 4 Innovation performance in the EU–Funding



Source: Authors - based on the data of Innovation Union Scoreboard 2016, European Commission

According to the Innovation Union Scoreboard 2016, Romania is a modest innovator. Innovation performance increased until 2010, after which it has been declining. Innovation performance in 2015 was at a significantly lower level than in 2008. The development of Romania's relative performance to the EU has closely followed the development of the innovation index. Over time, the relative performance has worsened from almost 50% in 2008 to 34.4% in 2015.

Concluding, the Nordic countries have remarkable innovation performance. Concerning the dimension related to human resources, Sweden, Slovenia, Ireland and UK are recording the best performance. Sweden, UK, Netherlands are incontestable leaders taking into consideration their efficient research systems, while Finland, Estonia, Sweden, Netherlands and Denmark are recording best performance in funding their activities of research, development and innovation.

CONCLUSION

This paper attempts to reveal that there is a powerful trend among the EU Member States which shows the correlation between high quality public services and innovation performance. Really, on the one hand, innovation represents an important enabler for public sector modernization and on the other hand, smart public administrations represent a key asset to trigger Europe's innovation potential.

The EU innovation performance has been increasing at an average annual rate of 0.7% between 2008 and 2015, but growth has not been equally strong across all dimensions and indicators.

Growth has been strong in Open, excellent and attractive research systems (2.9%), triggered by high growth in International scientific co-publications (6.5%). The EU innovation system is becoming more networked both between Member States and at the global scale.

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