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THE IMPACT OF DIGITALIZATION ON EDUCATIONAL AND ADMINISTRATIVE SYSTEMS

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Abstract: *Due to the global pandemic that changed the whole world for two years now, we are facing extraordinary challenges: fighting against the Covid 19 virus, and also embracing accelerated digitalization in our lives. We will refer of the impact on the field of education, so vital for any society, as it forms the next generation, and the field of administration, which must address to all the needs promptly and efficiently, using the existing resources and identifying new ones, thus contributing to an overall increase in the quality of services provided for the local community. These challenges overwhelms somehow the whole society, and are perceived both positive and negative. The whole administration is reorganizing, reorienting on digital skills in order to function as an enabler of active citizenship and a driver of digital. Education takes a completely different form, new, difficult to adapt for some, tolerated for others or highly appreciated by open-minded people. The impact of digitalization is reflected on human resources, capable of continuous training, adaptation and self-education.*

Key words: *innovation; digitization; interoperability; simplification; digital education; online learning*

1. INTRODUCTION

Innovation and Digitization are closely linked, but not all digitization processes lead to innovation and not all innovation processes are based on digitization. Before Covid-19, the experimentation of innovations began, the introduction of new competencies imposed by the change in digital technology in education and continuous training.

Innovations in technologies and learning methods have a huge potential to add value to education and training, but there is no certainty that they will lead to the desired results. Students' performance can be aggravated by using computers to the detriment of books. Such risks may be one reason why more advanced technologies seem to have been less widely adopted, but the depth of the positive effect for students, teachers, trainers and providers of education and training, understanding the risks of innovation is a challenge. There is a steady rapid growth of digital learning, "EdTech", which means that it can be difficult to know what is "good" and what is not. [5]

Advance purchase of infrastructure can generate costs until return on investment. The new online learning also changes the boundaries between formal and non-formal education and training and the massive increase in the possibility of individual learning. There is a need for a more systematic approach to identify the costs and pedagogical benefits of innovation and digital learning technologies and to determine effectiveness. Intermediation structures are needed that can help coordinate and organize the engagement of teachers and trainers with new technologies to maximize their benefits and act as knowledge management organizations that can refer to good practice. in turn, it significantly affects how e-learning could be used.

High quality digital resources provide unprecedented opportunities for the creation of learning content by education and training providers, together with employers and students. They can be easily adapted to obtain quality services.

The impact of innovations in training, teaching and learning is largely based on teachers, which is a challenge and an opportunity in relation to their traditional roles.

Technologies are changing the way teachers interact through digital platforms to coordinate education and training in the classroom and at work. However, many teachers and trainers have not been educated to innovate or do not believe that innovations will be well received in their schools / workplaces.

In the face of so many new needs, teachers need skills and mindsets to be innovative and, in the face of the magnitude of the changes facing education and training, there is now a greater need for effective initial training and continuous professional development. They need support to get an innovation directive. At the same time, the development of networks and communities of practice can enable teachers and trainers to share experiences and expertise in teaching, teaching and learning methods and digital tools.

One of the guiding principles of digital transformation in the public sector is based on transparency; it involves openness, communication and responsibility. The information society integrates the objectives of sustainable development, based on social justice and equal opportunities, ecological protection, freedom, cultural diversity and innovative development, restructuring of industry and the business environment.

The digitalization of the public administration facilitates the access of persons and institutions to the local public services, ensuring at the same time the transparency in fulfilling the specific attributions. Institutions are subject to change processes with increasing frequency and intensity. The complexity of the environment, the great dynamics of its components oblige them to permanently evaluate their situation in the context in which they carry out their activity, and to react or act in advance to the challenges they face. It is proposed to cross the digital barrier, which limits access to information by using restricted means of communication, thus addressing the services that fall into the highest priority level.The pressure is on to compete with nations, states, and cities. The pressure is to create new jobs and revenue. The pressure is to adopt a citizen-centric-mind set, the pressure is on to modernize and future- proof IT system. [1]

2. THE DIGITALIZATION ASPECTS

Work is the basis of learning to acquire practical skills and training using more technologies such as virtual and augmented reality and related to artificial intelligence. It is well-designed to meet wider environmental, social and economic challenges, as it has the potential to meet new skills needs and provide experiential and practical learning either in schools (eg laboratories, kitchens or on-site restaurants).) or in companies or other jobs, especially for apprentices.

It is difficult for schools to close during Covid-19, which is a key challenge - to what extent should education and training programs integrate digital learning into their curricula. The pandemic has shown that there are variations between sectors in the use of digital tools. While they can reduce the unit costs of learning and provide new ways to teach / learn and assess students, it is debatable how much they can replace practical real-life experiences.

Work-based learning, with the help of projects, helps to develop transversal skills, and digital platforms can unite people with different topics of interest. In general, digitalization offers an opportunity to rethink how education and training providers cooperate with companies that still have the greatest access to the latest technologies.

Romania's digital transformation, in line with the European one, is accelerated by the rapid progress of new technologies, such as artificial intelligence, robotics, cloud computing and block chain technologies. Every person needs to invest in their digital skills throughout their lives. Education can benefit from openness to concrete experiences and projects, new tools and study materials, as well as open educational resources (RED). Pupils and students can gain more independence through online collaboration. They can help reduce the gap in learning through access to and use of digital technologies for students from disadvantaged socio-economic backgrounds and those from disadvantaged backgrounds.

The personalization of the teaching techniques determines the increase of the students 'motivation by concentrating the teachers' efforts on each one of them. Progress

in integrating technology into education remains small. Most young people in Europe use the Internet for social activities. Mobile Internet access has increased significantly in recent years, but the use of technology for educational purposes has not kept pace with these developments. Not all primary and secondary schools have broadband connections and not all teachers have the skills and confidence to use digital tools in their teaching - learning - assessment.[2]

Learning outcomes can be improved, and efficiency is increased through innovation in education systems, understood as the adoption of new services, technologies, skills by organizations in the field of education. In order to achieve efficiency and sustainability, innovation must be supported by well-trained teachers and must be integrated into clear teaching objectives. It must be established how digital media can achieve education goals. Therefore, a key element of the overall vision for digital transformation in Europe is the improvement of education and skills.

In Romania, the digitalization of the education system has become an important topic since 2016, with the launch, by the Presidential Administration, of the country project "Educated Romania". In the period 2016-2018, the Presidential Administration held a wide-ranging public debate on education in Romania, starting with the expected future and challenges.

The 15 transformations expected for Romania by 2030, included in the mentioned public consultation, followed:

- permanent internet connection;
- the accentuated dynamics of the professions;
- decrease and aging of the population;
- increasing the diversity of families;
- advanced robotics;
- increasing the share of services in the economy;
- the deepening of social inequality;
- increasing the impact of climate change;
- development of virtual reality;
- increasing the incidence of diseases caused by stress.[16]

Although Romania has a wide range of internet connectivity, steps are still needed to ensure all resources and an integrated framework for access to quality education in the digital age. In addition to the development of the population's digital skills (digital literacy), the following are also challenged:

- Digital citizenship: ethical conduct, awareness of the impact of the use of digital technology on physical and psychological well-being, understanding of issues related to the marketing of personal information, the influence of digital advertising and perceived security/ trust of websites; Copyright;
- Using technology to facilitate accessibility;
- Utilization of digital skills in personal and professional development:
- Creativity and innovation in the use of technology.

The creation of digital content has become a necessity in the information society. Through all the initiatives taken at European level, the creation of digital content and the creation of databases are encouraged for a better dissemination of information, to allow users online access to resources, to encourage the creation process in electronic format, to promote and digital preservation of the archival collection in electronic format. On the other hand, public access to documents in electronic format is hampered by the institution; limited capacity to provide and use this category of documents. The absence of logistics equipment for the automatic processing of the information held does not allow the satisfaction of users information needs in real time.

Transforming the public sector demands an agile cloud platform, transforming the public sector demands scalable cloud platform. [9] We need to build the towns and cities of the future, uniting technology, processes, people. To give the performances of tomorrow’s demands. Only together we can go digital, innovative and competitive. Innovation must be prepared, it is a complex process, not simple at all. In order to be adopted, innovation must be understood first. It means changing culture, opening up to challenges by accepting the first steps as small as possible.

C. Bettinger states that a strong organization culture is that where values are rooted strong within, that is the key to a long term performance

and where the weaknesses are overcome. “The challenge is to manage the organization; culture so that you can tap the company; strengths to achieve superior performance and identify its weaknesses in time to overcome them before they cause serious damage”.[3] Organizational values are important components of the organizational culture and responsible for a successful management. [13].

The pandemic created not only a health crisis but also an economic crisis. Governments, local authorities, all have to respond to that crisis, they are the front line fighting it. The pandemic come as a wake up call and public and private sector were hard shaken. Time became a luxury. Public figures had no choice but to change the future tense to the present tense in their speeches. The pandemic made everyone become realist and more a problem solver than before. Things that were not anticipated to happen, just happen and projects, strategies, public politics suddenly shifted towards a new, unexpected reality. In this vein, public sector faced, like never before, profound changes and challenges and succeeded to find solutions to safely manage the dates, business challenges, connect citizens and employees in some formal way.

The multidimensional and unprecedented changes at all society layers, triggered by pandemic, enlightened the weaknesses and blind spots of administration as : what are the real time necessities, the stronger problems in the health system, social system, or the emergency situations response to those in need.

The balance between processes, human resources and technology can all be seen in the examples of good practices in the country or other countries and shows the power of innovation in time of critical crises. In order to achieve that, there is a stringed need to prioritize economic recovery and increasing competitiveness in order to raise the level of development through an open economy, an inclusive society, competitive private sector, sustainable and involved citizens, considering Entrepreneurship - Access to business education- Investments in: increasing funding for health, for health through digitization, access to innovative services and products, promoting quality of life. The pandemic has taught us that digital tools can and will ensure the continuity of processes in critical contexts, and one of the most relevant examples lies even in the neuralgic point of this period, the health system. Digitization provides the benefit for the health system with an impact on general management, the provision of medical services, the path of patients from diagnosis to treatment facilitating a solid and transparent record.

During the pandemic, we could all see that digitalization in health is more than telemedicine. The exchange of medical data for research and analysis is very important, but at the same time, personalized medicine and the use of digital solutions for the patient; brain and the optimization by automating flows at the medical unit are just a few examples.

A good governance- Digital transformation through coherent integrated infrastructure of public and private services, digital competences, promotion of key sectors for economic development and use of European funds, which offers the possibility to include the integrated digitization component in all projects funded by the National Resilience and Recovery Program (PNRR) such as health, education, justice, labor and social protection, environment, public procurement, civil society.

The future of the labor market - encouraging SMEs and public institutions to use new technologies, financial education Fiscal policy - a modern fiscal legislation, transparent and efficient predictability of public processes and services.

The public sector needs to be competitive and innovative, be coordinated by one competent authority responsible for coordinating and implementing digital transformation in the public sector, thus avoiding the individual efforts of public authorities and unconnected digitization islands. It is also necessary to develop the digital skills of public sector employees because the lack of digital skills of public sector staff nullifies the effect of investments in modern digital solutions. Digitization is possible only if it is accompanied by a real simplification of processes, procedures, legislation, opinions and so on, otherwise the digitization efforts will materialize in a shift of bureaucracy in the digital environment. As Benjamin Franklin said: “An investment in knowledge pays the best interest”.

Rethinking the existing infrastructure, a centralized administration, interoperability between public systems for the benefit of citizens, " digital highways", to really serve the goal of interconnecting large public systems for the benefit of citizens. Simplify the interaction between the administration and citizens using electronic identification by aligning with the European Union.

Internal Market Commissioner Thierry Breton said: “Many online platforms have come to play a central role in the lives of our citizens and businesses and even in society and in democracy in general. Through today proposals, we organize our digital space for the next decades. Through harmonized rules, ex ante obligations, better supervision, rapid law enforcement and dissuasive sanctions, we will ensure that everyone who provides and uses digital services in Europe enjoys security, trust, innovation and business opportunities”.[11]

Artificial intelligence is an instrument and not an end in itself. The performance and prosperity of an economy is linked to intrinsic human capital. The educational system was one of the most tried and tested systems in the Covid-19 pandemic, because here we are not just talking about adults who had to spend the night in a telework system, we are talking about children who, even if they enjoyed staying In front of the computer, they suddenly had to sit in front of the computer in a structured program, given that not all teachers were ready to face the challenges of an online educational system.

The public administration needs a new image, nowadays it consumes a lot of time for the citizens and does not offer quality. Digital technology has helped the public administration to take a step forward and be closer to the citizens it serves. The inter operationalization of public services must be done in an articulated way. Once identified by a digital state system, we transfer the necessary information between institutions, thus facilitating the tasks of the citizen. European Commissioner Thierry Breton has announced the initiation of a digital citizenship, a digital passport. The interaction with the forms you have to fill in becomes complicated. These forms must be tested on the actual users of that product, tested until they become intuitive and thus easy to use. The time, the speed with which the services respond to a need, refers to the infrastructure, to the technological capacity of the equipment, but also to the way in which the applications consume our time.

The private sector has experienced these things, gained these experiences, and learned from each other. Public administration has a lot to learn from the private sector because there are lessons that are hard to come by, lessons that can used in the future, if shared, thus providing positive benefits. Civil servants will have more time, the large volume of work will be taken over by applications, and thus the results they offer, the services they offer, will not be delayed. Human error through digitization will decrease considerably, and information will be much easier to control.

The interoperability of databases is an absolutely necessary first step to lay the foundations of a public sector that generates a positive experience for the citizen. Digital transformation is a permanent new vision in the public sector, desired to be transposed in all domains. The benefits of digital transformation, such as efficiency, transparency and simplicity, lead to much higher process productivity [10]. Public administration is changing and will change in the future. A public administration that could generate smiles, one single identifier for citizens, testing each process before becomes available, the speed that public administrations shares with the citizens is a necessary step forward. Gardner predicts the changing in the public IT landscape to improve resilience and agility, also predicts that by 2025 over 50% of public agencies will have digital applications.

The ability of employees to interact with citizens must ensure the organization; ability to interact on any channel with target subjects: informed employees, granular identification of needs and then formulation of strategies, technological capacity to adopt and develop and implement innovative services and products. As mentioned above, this implementation is difficult in the public sector mainly because it triggers changes on multiple levels: processes, hierarchies, people skills, culture, agility, and

ways of working. On the road to becoming innovative, at the micro level, the public sector needs first to start adopting and implementing innovation- from technology to improving new ways of working, and at the macro level, supporting innovation at national economy level.

Laying the bricks for tomorrow‘s cities both through the public and private view means developing and having the same principle, targeting the performance. The speed things happen around us must be adapted to the normality in which we live. The public mindset must be brought to the level of the private one, because the pressure and the competitive framework are different in the two systems.

3. THE VIRTUAL PUBLIC SYSTEM

Evaluation research and studies conducted in the context of the Covid-9 show the following aspects regarding the digital skills of pre-university students:

- teachers consider that, for 68% of students, the insufficient level of digital skills is a serious obstacle to online learning;
- students start using the internet around the age of 9; almost all students use the "smartphone" to access the Internet; about 40% of students say they do not use the internet for a specific purpose;
- more than a third of teachers consider that some students in the classes they have worked with online have not demonstrated sufficiently developed digital skills to enable them to use different tools and applications autonomously - especially in rural areas and at primary and pre-school levels ;
- almost half of pre-university students are of the opinion that the subject at school is no longer adapted to the current reality, and more than a third consider that the school curriculum does not respond to the students' study interests;
- parents of middle and high school students want IT / ICT classes for their children, and about 1 in 3 parents of middle school students believe that computer science should be taught as a matter of priority during face-to-face classes.[14]

Between digital transformation and green transformation there are cause-effect and interdependence. The common element of the two transformations is INNOVATION, respectively management and knowledge Throughout life, digital education is very important in a rapidly changing world, concerned with expanding digital skills.[4]

From the perspective of potential issues related to ethics, environmental sustainability, data protection and privacy, children's rights, discrimination, including gender and disability biases, ethnic and racial discrimination requires an understanding of the technology. Thus, formal education must be complemented by non-formal education in partnership with libraries, industry and research institutions.

The implementation of a strategy for the digitalization of education is not only related to the strategy itself, but also to the social capital enjoyed by public institutions in Romania, the allocated resources and many other external factors.[15]

To the question "What do you think was the biggest learning challenge for teachers when the courses were suspended face to face (March 2020)?" used in a consultation questionnaire the following aspects were found:

- maintaining students' passion for learning;
- personal and student time management;
- formative evaluation in the online environment;
- adapting the curriculum to online teaching. [13]

Most of the answers refer to the lack of endowments with technological and communication means, to the difficulties in using technology, to the absence of previous learning and practice experiences. Therefore, there is a need to rethink the whole educational process, and today's education is built on a set of mutually exclusive goals and are intended to overcome our efforts.

There are three major ideas and goals of education - academic, social and developmental growth. An Imaginative Education would dramatically change teaching and curricula, while providing the skills and understanding we all want our children to acquire.[1]

A public administration exist to serve the citizens, to care for their rights, needs, health. The pandemic hit the city infrastructure at all levels: education, economic, social, health level. The balance was disrupted because the pandemic's target was the people. People are not resources. Their lives circles the organizations they work for, the customers, they are the key for their employee success. Unhealthy citizens will generate no production, no industry. They are essentials, the core of the wheel. There is a critical link between public or private organizations and their workers- employees.

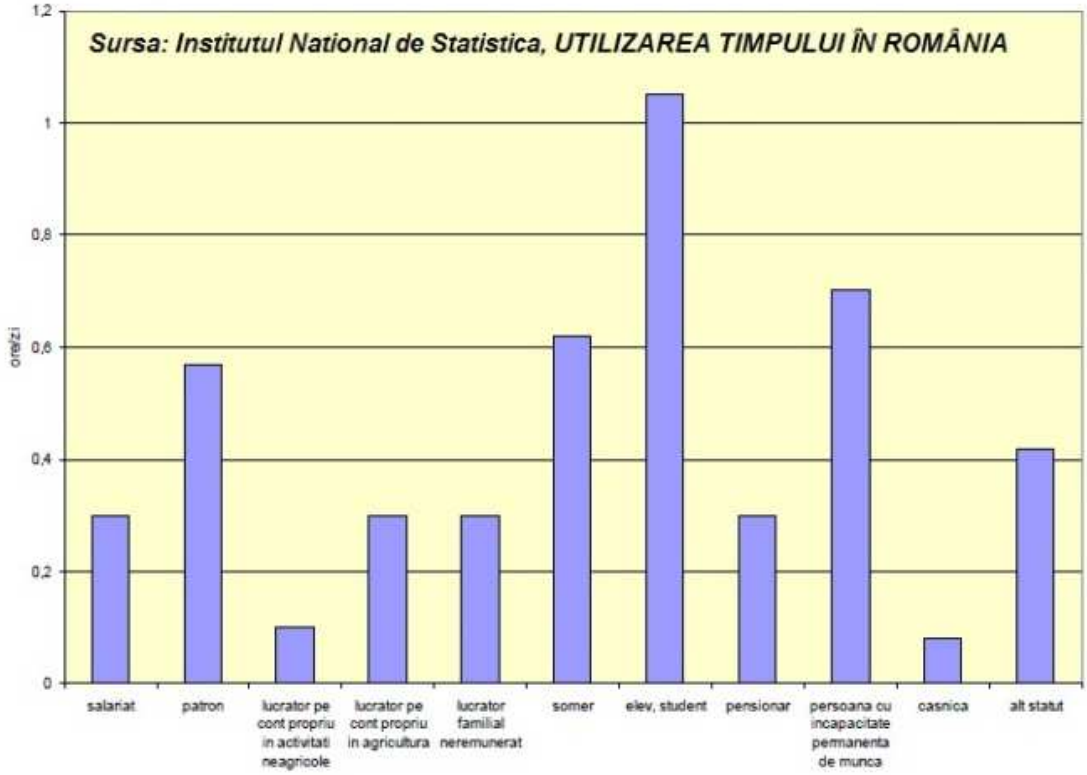

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Fig. 1. Time spent on PC

Regarding the use of the computer in our country, this graph shows the number of hours spent by each category of people in front of a monitor, namely it is found that pupils and students are those who spend the most time with technology, followed by people with permanent disabilities workers, the unemployed, employers, and last but not least employees. This shows us that the telework was performed only in conditions of extreme urgency, the rest taking place with the physical presence.

In this times of changes, it is interesting to see what are the strategies that they are using to contain their cost or sometimes reduce their cost. A recent study show that they use different strategies to respond to the crisis.[6]. Thus some of them are implementing cost saving technologies and solutions, some are freezing hiring, or spending freezing, delaying capital projects. The most commonly used strategy to contain the cost is implementing cost saving technologies and solutions. That addresses two challenges at the same time, one, they can contain the cost for technologies and solutions and secondly, how to keep providing services to citizens in the digital way which is required. Citizens access to obtain passport or any kinds of permits or any bureaucratic process is limited now. Thus, innovative technical solutions offers the way in time of crisis. Implementing technology during Covid-19, and post Covid-19, is a great way to manage interaction with citizens at a reasonable cost.

Also a recent study show that the mostly mentioned challenge in the public administration is that the technological platforms are outdated. “So public entities want to implement innovative solutions but they have all systems which are not only rigid and inflexible and difficult to add new serviced to it, but also cost a lot of money to maintain and run it. The modernization of technical infrastructure and applications must be made a priority if governments ever hope to deal with their technical debt. Technical debt is rampant throughout governments where their legacy technologies have been milked of every bit of their functionality over many years only to be a financial burden as they age. Legacy technologies are maintained, upgraded, and changed over time but eventually they need to be replaced.”[7]. Very often, the maintenance cost and the service cost, and just keeping the main system alive, takes the most part of the IT budget or given department. It creates a difficult problem because it does not allow to the public administration to innovate and implement new solutions. Another problem with the outdated technologies platforms is that they are very often not interconnected. It is very difficult that all system creates a workflow who go across different departments, authorities, ministries, or different agencies or to the Private sector, the Partner from the private sector. Also the lack of inter-regional cooperation vid to the existent system is a major challenge. The situation is not easy because, on the one hand, public sector wants to innovate but on the other hand the current system is pulling them back, and does not allow to innovate the way they wanted to. During the Pandemic, the priorities in the public administration has changed according to the Center of Digital Government.

Thus Cyber Security became on top of priorities [9], followed by budget and cost control, sometimes, during Covid-19, public administration decided to stop projects, investment into one area and decide to move one to other area of higher priority. To allow that sort of budgetary allocations quickly, the control of how the money flows is the main challenge, also in the future too we will see this reshuffle. Budget cost and control become the second largest priority for helping the broader budget followed by citizen engagement experience. Citizens could not leave home during the lockdown, or go to government office to run their normal processes, that needed to move to the digital platform. E-government was successfully used, also government started to implement M- government, mobile access to citizens to manage interaction with government, with the cities. The process accelerated, they want to keep the relationship, engagement with the citizens permanent. In order to reach the priorities like better cyber security, budget and cost control, or the engagement of the citizens, Cloud computing is the underlying technology which supports all govern movements and all government future digitalization as IT spending. Gardner predicts that by 2025, 95% of government IT spending will be spent on cloud service (software services, infrastructure as a service, data as a service and so on). [10]

During the pandemic, employees used digitalization more than ever. This diagram shows the comparative percentages in the world regarding the number of employees who worked from home. It is found that Romania is below the middle of the statistics, at 24%, Croatia having less than 20, the least, and Belgium 52%, the most.

In order to fulfill the above goals, public administration’s mission is to help people see data in a new way, discover insights, unlock endless possibilities, coming up with new innovation and citizens can immediately benefit from that. They do not need a lenghty and costly process, which take months or years to implement new projects.

4. CONCLUSIONS AND FINAL REMARKS

The paper presents the impact of digitization processes on the public system, especially in the field of education and administration and reflect the research on public system innovation with the accelerated introduction of technology. In the pandemic, government did not have the time to do that, they wanted to do immediately, they wanted to do in a few weeks, and cloud services allow to do that. Innovation is the key. Pandemic showed us that innovation and digital innovation

is even more important than it was before and it will no change in the following years. Digitization is possible only if it is accompanied by a real simplification of processes, procedures, legislation, opinions and so on, otherwise the digitization efforts will materialize in a shift of bureaucracy in the digital environment. As Benjamin Franklin said: "An investment in knowledge pays the best interest".

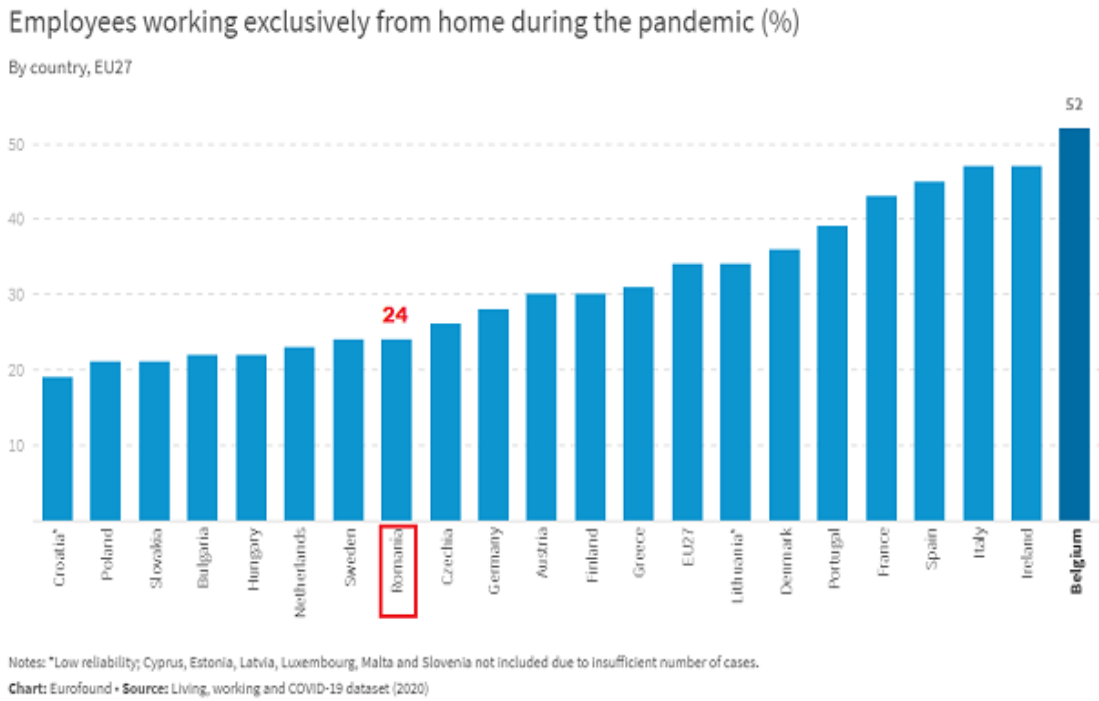

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Fig. 2. Digitization on the world

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Impactul digitalizării asupra sistemelor educaționale și administrative

Rezumat: *Din cauza pandemiei globale care a schimbat întreaga lume de doi ani încoace, ne confruntăm cu provocări extraordinare: lupta împotriva virusului Covid 19 și, de asemenea, îmbrățișarea digitalizării accelerate în viața noastră. Ne vom referi la impactul asupra domeniului educației, atât de vital pentru orice societate, întrucât formează următoarea generație, și al domeniului administrației, care trebuie să răspundă tuturor nevoilor prompt și eficient, folosind resursele existente și identificând altele noi, contribuind astfel la o creștere generală a calității serviciilor oferite comunității locale. Aceste provocări copleșesc cumva întreaga societate și sunt percepute atât pozitiv, cât și negativ. Întreaga administrație se reorganizează, se reorientează pe competențe digitale pentru a funcționa ca un facilitator al cetățeniei active și un motor al digitalului. Educația ia o cu totul altă formă, nouă, greu de adaptat pentru unii, tolerată pentru alții sau foarte apreciată de oamenii deschiși la minte. Impactul digitalizării se reflectă asupra resurselor umane, capabile de formare continuă, adaptare și autoeducare.*

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