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Digitalization and Innovation in Romania

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ABSTRACT

Due to the constant increase in the flow of data, machine learning systems, cost reduction and innovations are becoming a business reality, the order of the day, and digitization practices enable completely new business models. Thus, digitization can be considered a completely new factor of production, reversing the trend of the last years of decreasing profits, by optimizing processes. Intelligent automation systems improve human work and contribute to the continuous innovation process. Digital transformation is essential for micro, medium and multinational companies if they want to remain competitive. Companies must keep up with the development of digitalization, which does not only refer to meeting the needs of the market, but is one of the main pillars of successful operation. If this is missing, the company ends up in a foundation from which there may be no escape, no way out. The digital transformation affects different operational processes of a company, which, as far as possible, are placed on a digital basis. This transition means such a new strategic tool, which allows a revolution of innovation and the construction of a new business model.

KEYWORDS: *digital technology, public institution, companies, internet, future, legislation, new skills.*

INTRODUCTION

Emerging markets and traditional business models are beginning to become highly constrained by the need to adapt to the continuous changes and macro and micro economic dynamics of today. Digitization has become an absolute necessity for companies that want to increase revenue and remain competitive in today's environment.

Nowadays, as a result of declining profits, rapid changes in the market and increasingly high consumer expectations, companies are starting to consider different digital systems, which have proven to be highly effective in increasing the competitive sustainability of companies and of profit margins. In fact, Accenture research shows that digitization has the potential to increase average profitability by 38% by 2035 [1].

Modern technology is closely dependent and related to access to data. Due to the constant increase in the flow of data, machine learning systems, cost reduction and innovations are becoming a business reality, the order of the day, and digitization practices enable completely new business models. Thus, digitization can be considered a completely new factor of production, reversing the trend of the last years of decreasing profits, by optimizing processes. Intelligent automation systems improve human work and contribute to the continuous innovation process.

Short History

Digitization can be traced back to antiquity, when clay and wax tablets were replaced by papyrus, parchment and then paper in the current sense. This allowed the manual recording of information. With the advent of book printing, analog duplication began.

Later, with the invention of the mechanical typewriter, letters, symbols and numbers were put on paper with the help of an ink strip by pressing the keys. After that, the electric and electronic versions followed.

Geared computers played a very important role in starting the digitization, but János Neumann's computer science foundations were the real breakthrough, when the binary system appeared and laid the foundations of the later digital revolution.

The first and second generation of computers that used those so-called automatic codes appeared in the 60s, these were the first software. In addition to military tasks, they also helped in solving more complex problems in the technical and scientific world and were always written only for those specific machines.

To simplify programming, the assembly language was later created. Third generation computers required the creation of newer and more complex software (for example, FORTRAN,

ALGOL). Writing programs has become a real technological innovation since the 1970s, because more advanced programming languages and methods appeared, such as the PASCAL and C programming languages.

Digital technology began to develop rapidly from the 1990s. Not only computers became more and more innovative, but software was created that not only helped the work, but later the program partially performed the tasks that can be automated. Think of the DOS operating system and then the Windows text editor that replaced it, the Word program used today. But let's not forget that we have gone from saving data on magnetic tape to using cloud-based technology.

In the case of the so-called digital activity, you have to imagine a system in which certain instructions are even independently executed by the software, but the human is still part of these processes. A kind of manual presence, control is constantly necessary, exactly as we perform a calculation operation in an excel table.

We will reach the highest level of digitization when fully automated processes become possible. This means that the programs are able to execute the commands issued independently, even without human intervention. A perfect example of this is the autopilot car or robots endowed with "artificial intelligence". This type of evolution can bring changes in the future, which will raise various additional questions.

Digitization of Romania in the Context of the EU

Romania remains in last place in the EU in 2022 regarding the value of the economy and society index digital (DESI), shows data from the European Commission [2]. Another worrying aspect indicates that our country had the lowest DESI growth rate in the period 2015-2022, thus moving further away from the other EU countries [3]. The analysis of the evolution of the DESI index for Romania in recent years, compared to 2015, shows an increase of only 3.7 points compared to the 13.4 average increase of the EU countries. Alignment at European level regarding digitization is becoming more distant and only a fundamental reform could change the current situation. In the 2022 DESI report [4], Romania ranks last in the EU ranking, with a score of 30.6 points, compared to an EU average of 52.3 points.

The Digital Economy and Society Index (DESI) developed by the European Commission, based on Eurostat data, is a useful tool for measuring the level of digitization in EU member countries, as well as for tracking the progress made in recent years in this field. Romania occupied the last place in the European ranking also in 2022, the same place it was at the first publication of the DESI report in 2015. For a short period between 2018-2020 Romania surpassed Greece and Bulgaria in this ranking, but in 2021 our country returned to the last position of the EU ranking.

Another worrying aspect is the fact that Romania not only has the lowest DESI score, but also recorded the slowest growth in the period 2015-2022 of all EU countries. "This aspect shows that Romania, even if it has made progress regarding digitization, has moved further and further away from the European average, the other countries registering a much more dynamic progress during this period. Therefore, the convergence at the European level of digitization is becoming more and more distant, and a fundamental reform is needed to reverse this trend, which should include a system that accelerates the development and adoption of digital solutions both in the public sector and in the business environment, namely a large-scale inclusion of digital skills in the educational system at all levels", reports the Romanian Economic Monitor.

The Digital Economy and Society Index (DESI) tracks progress in EU Member States in terms of digital competitiveness in areas such as human capital, broadband connectivity, the integration of digital technologies by businesses and digital public services. According to data published by the European Commission at the end of July, Romania ranks 27th out of the 27 EU member states this year, in the 2022 edition of the Digital Economy and Society Index (DESI). EC representatives emphasized that in Romania the relative annual growth is lower than that of similar countries, which indicates that it is not convergent with the rest of the member states.

Romania ranks last in the EU ranking, with a score of 30.6 points, compared to an EU average of 52.3 points. Finland, Denmark, the Netherlands and Sweden continue to be in the top spots in the EU. However, even the leading states have a number of challenges in the digital sector. "Romania's relative annual growth is lower than that of similar countries, which indicates that it is not convergent with the rest of the member states. The country lagged behind in a number of indicators of the dimension of human capital, with a very low level of basic digital skills compared to the EU average, but maintains its leading positions in terms of the proportion of female ICT (Information and Communication Technology) specialists in workforce (2nd place) and in terms of the number of ICT graduates (4th place)". Specialists point out that a significant change in Romania's pace of training in terms of digital skills is essential for the EU to achieve the Digital Decade objective of basic digital skills and ICT specialists.

Romania has relatively good results in terms of connectivity, this being the dimension for which it gets the best score. The proportion of using fixed broadband coverage of at least 100 Mbps (57 %) and via very high-capacity fixed networks (87 %) exceeds the EU average. This is also important given the Digital Decade's goal of 100% coverage of all households by gigabit networks by 2030.

Regarding the DESI components, Romania is best in the Connectivity chapter, which mainly measures the existence and performance of digital infrastructure, such as household high-speed Internet access or 5G coverage rate at country level. In terms of connectivity, Romania ranks 15th in the EU, but 2022 is the first year in which Romania falls below the European average in terms of this indicator as well.

The other three components of the index, respectively Human Capital (which measures aspects such as the level of digital skills or the existence of a sufficient number of ICT specialists), the Integration of Digital Technologies (which refers to the use of various digital solutions at the level of companies in Romania) and Digital Public Services (which measures the spread of digital tools in the public sector, made available to citizens and businesses), shows a less favorable picture. Romania ranks last in the EU, regarding all three indicators. In terms of digital public services, we are at the current stage compared to the rest of the EU, because we have not had a national digital identity. We have PSCID (Centralized Software Platform for Digital Identification) in implementation. A law was also adopted in this regard and very good premises for its application.

Legislation

Starting on July 4, Law 9/2023 comes into force [5], a huge step towards the modernization and digitization of public administration in Romania. This law provides for a significant reduction of red tape in public institutions, including eliminating the need for the rail file, a symbol of red tape that has characterized the relationship between citizens and public institutions for decades.

Law 9/2023 provides that all public institutions in Romania have the obligation to receive documents from citizens, including identity documents, in electronic format. This change means that citizens are no longer required to physically go to an institution to submit documents, but can do so online, saving time and resources.

Public institutions are obliged to announce on their websites the email addresses through which documents can be sent in online format. This will facilitate access to public services and improve efficiency in public administration.

Digitization is a set of processes in which we use digital technologies to perform an operation. This innovative solution increases the efficiency of processes and is integrated into business and everyday life. Because it is about activities such as sending e.g. an e-mail, upload data to the cloud or an external carrier, make an online banking transaction, use the GPS and others. All this is possible through the combined work of hardware and software. However, digitization cannot take place without digitization.

A common and simple example: we can enter into a computer by scanning a written material or an image on paper or we can digitize from analog data storage carriers such as a film/video from a VHS tape or music from a disk. These data are thus converted from an analog signal into a digital signal, i.e. the numerical form. In this way, the information appears in the computer as binary numbers, different files. And these files are stored, processed or, when necessary, redirected in a very short period of time with great ease.

The great advantage of digitization is that the quality of these data will not deteriorate and they can be multiplied and edited easily and quickly. Digitization is always preceded by digitization, because we work with files created by the latter.

The Fields of Digitization

Digital transformation is essential for micro, medium and multinational companies if they want to remain competitive. Companies must keep up with the development of digitalization, which does not only refer to meeting the needs of the market, but is one of the main pillars of successful operation. If this is missing, the company ends up in a foundation from which there may be no escape, no way out.

The digital transformation affects different operational processes of a company, which, as far as possible, are placed on a digital basis. This transition means such a new strategic tool, which allows a revolution of innovation and the construction of a new business model.

Work processes can be automated by purchasing or developing IT infrastructure, various software and systems, and by using new technologies. However, it is not only manifested in a physical sense, but also represents an added value.

The result is a new organizational culture, where progress, the need for a new approach and development lead the company to success. The corporate structure is also transformed, and the introduction of new methods takes on a role in work processes.

It is a challenge for companies to be permanently up-to-date in the digital world. In order for this kind of transformation to be viable and functional, the organization must get rid of old habits, get out of its comfort zone and be receptive to technological progress.

The process should be introduced in collaboration with all employees. This allows them to adapt more easily to the new situation, it will not mean a stress factor and helps to develop a modern approach according to the present. In the corporate environment, full adaptation is possible through the development of skills and the digital education of colleagues. You have to learn new ways of working, processes and skills that are key to successfully accomplishing your tasks. Through this, their work becomes much more efficient.

Digitization offers companies a new vision. This vision focuses on the application of digital possibilities, technological processes and their impact in the creation of strategy. One of the key components of the strategy is the digital business model, which shows in a structured way the systematic steps that must be followed for a company to be successful. Sustainable and competitive functioning is almost impossible without digitization. Along the digitization, softwares have been created that serve a company 100%, such as e.g. Google applications, E-learning systems, etc.

DIGITIZATION AND INNOVATION

According to the study carried out by McKinsey [6], Romanian

employees worked, on average, 1795 hours in 2017, 12.7% more than employees of the 5 largest European economies and had a productivity of only €29 / hour, compared to 53 € / hour, average of the 5 strongest economies in the EU. Moreover, between 50-54% of the workplace activities carried out by Romanian employees, approximately 4.4 million jobs – could be digitized or automated, which would lead to a significant increase in the productivity and profitability of Romanian companies until 2030.

Widespread implementation of digital solutions could lead to an increase in national GDP by up to 10% over this time frame, the study suggests. However, any change will be faced with challenges and drawbacks, both of which will be considered in this section. Table 1 highlights the perceived benefits and disadvantages of the digitization process in global and Romanian companies. The following conclusions from McKinsey, SAP Center, Gartner and Valoria 4 are highlighted:

Table 1. Perceived benefits and disadvantages of business digitization

Benefits	Disadvantages
67% of companies that have implemented the digitalization of their activity in the relationship with customers confirm an increase in their satisfaction.	Lack of talent: Not enough employees are able to keep up with the implementation of new technologies or understand them.
64% of companies say their employees are more engaged thanks to digital transformation. In Romania, 35% of companies report that digitization has already had a major impact on their activity.	Fear of the unknown: Some executives are far too anchored in the old organizational culture and are quite reluctant to adopt new technologies.
46% of Romanian companies say that digitization brought them a decrease in costs and a simplification of their activity.	A large number of digitization technologies are still "technologies of the future" and await mass adoption.
34% of Romanian companies say that digitization has allowed them to better measure performance indicators, while improving their operational efficiency.	In Romania, the implementation costs are seen as too high, and the domestic business models are not strong enough to support radical changes.

Source: [6].

Studies support the idea that an increase in productivity and profitability of companies would be replacing old business models with digital solutions. The basic implementation already allows companies to migrate their data and work from analog to digital, speed up procedures and processes that involve working with a significant amount of information, automate paper operations through software systems that process data faster, better and timely.

Digital systems bring a major advantage in implementing KPIs (key performance indicators) and measuring post-operational performance, they can detect operational errors and waste of resources.

According to the latest research by eNet - Telekom, based on the European Commission's report from 2018, the digital competence of Central and Eastern Europe is still at a competitive disadvantage compared to the average of the European Union. But he is not even in the worst situation. Half of the population has medium or superior digital knowledge, while the other half has little or no knowledge of using computer technology. Although different digital devices are widespread, only 44% of the surveyed population exploits this potential.

Those who regularly use the Internet [4], use the possibilities offered by the world wide web on a large scale and a large part of them conduct most of their business online. This speeds up administration and makes everyday life easier. For what activities is the internet used?

- Navigation 96%
- Email 86%
- Searching for information 85%
- Visiting social networking sites 75%
- Visiting news sites 72%.

Most of those questioned use the Internet to browse, correspond, obtain information, visit social networking sites and read various news sites. Also, of course, let's not forget that performing various transactions, such as paying bills, bank transfer, online purchases also plays a major role in the online world.

Despite the fact that digitization is gaining more and more ground, digital illiteracy affects almost a quarter of the population. There are several steps, the reasons for which include:

Reason 1: Inadequate internet coverage in some places, lack of signal.

Reason 2: Lack of technological knowledge of the older generation.

Reason 3: Lack of knowledge and use of the software.

Moreover, digital illiteracy means the lack of adequate use of hardware and software to achieve a certain goal. In other words, the person does not have the skills to operate digital devices, the Internet, applications and programs in such a way that these things allow him to do useful work without problems.

This can be remedied through digital education and the development of skills at school and at work. This will help prepare you to use digital transformation and create marketable human resources. The development of adequate technical and technological infrastructure also contributes to all these things, that is, access to high-speed Internet for everyone and at a reasonable price.

Thanks to digitization and digital transformation, there is the possibility of working from home in certain functions, which is very popular and widespread among employees. This is also proven by research conducted among small and medium-sized enterprises in Europe, the Middle East and Africa. The research was conducted by Epson, which is the most famous technology company in the world. The research found that 47% of employees work permanently in the home office, 30% work 1-2 days a week from home and 15% work 3-4 days a week from home. Working from home offers the possibility to have shorter working days, because you don't have to waste time traveling to the workplace. At the same time, a comfortable balance between professional and private life can be achieved. Most of the surveyed employers undoubtedly agreed that working from home has a positive effect on both productivity and employee retention. However, many still do not apply for this type of work. This is also due to the lack of appropriate technological equipment, which would provide the solution for this type of work.

The world is still at the beginning in the field of home office, as the corporate culture is not yet prepared for this and there is not enough flexibility in this direction. But we can already experience role models, e.g. in the IT sector, communications and marketing, etc.

THE IMPORTANCE AND APPLICABILITY OF DIGITIZATION

The spread of the Internet and with it digitization has raised information, as a resource, to a higher level. We live in an era where obtaining information as quickly as possible has become a vital necessity in everyday life, but especially in the business sector. After all, we are talking about a major resource without a doubt, which has a huge impact on how a company operates. The entire organization is connected through the IT system network.

Information means knowledge that removes doubts and provides a kind of security from the point of view of the company's operation. It is based on data, which when interpreted becomes relevant information for a certain company. The company not only obtains and uses the information but also generates and supplies it to partners, government and control bodies or employees. For proper use, it needs inherent value, quality and that it reaches the person in question at the right time.

You can use the information in several areas of the company's processes, starting with processing and through hierarchical steps ending with decision-making. Based on your knowledge, you have the opportunity to efficiently carry out the different work processes, based on which the employees of a specific position know exactly what their task is. Correctly processed data helps in clear communication between employees, conflict management and problem solving.

The Advantages of Digitization

Each of us has noticed how much faster it is to write an e-mail, to order a lunch online with a few clicks than to cook at home. All this is due to digitalization, which is already a natural part of everyday life and offers the same positive benefits in business life as well, through the following: more cursive and faster communication and contact with colleagues, also with partners Remote; work processes become more transparent and are easier to follow with the different applications; data transparency improves and becomes accessible from anywhere and anytime; files and information can be easily shared on a variety of platforms with colleagues, with partners both in the country and abroad; increases work efficiency and performance; the administration time is reduced, which allows transactions to be completed quickly; reduces operating expenses thus generating a much higher income; optimizes and integrates the operational processes of the company; navigation becomes even simpler and easier with the digital map (eg Google Maps, GPS); the current status of the transport or parcel shipments in logistics can be tracked exactly; copying and saving files and documents is a quick and simple task compared to copying and saving traditional paper files. Performing tasks becomes more comfortable and faster.

With the development of digitalization, new opportunities are opening up in the world of work. Despite the fact that many believe that automated processes and mechanized work are taking over people's jobs, there is still no high level of unemployment due to this.

Digital transformation protects people from burn-out and exhaustion, makes room for unleashing creativity and creates prosperity. For example, we can complete monotonous and time-consuming tasks much faster and more efficiently, gaining more time to do more important things that create value.

Digitization does not eliminate, but transforms certain jobs, by acquiring new skills and digital qualifications. With the rapid development of technology, we can expect the emergence of new professions and jobs that do not exist yet. Soft skills, i.e. social or interpersonal skills (communication, responsibility, empathy, attitude, etc.) that significantly influence successful work are becoming more and more important.

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