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Management of public institutions in the digital economy

Summary

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Romania, as a member state of the European Union, has the obligation to align with European standards, especially in the field of digitalization of public administration. The study of the digitalization of public administration is essential to identify the areas where improvement is needed and to develop proposals for reaching European standards.

Digitalization can simplify and automate many administrative processes, reducing the time required to complete tasks and the associated costs, leading to a proper management of public resources and a more efficient delivery of public services. It can also make public administration more transparent by publishing public information and data online and facilitate citizens' access to information.

Increasing citizen satisfaction by improving the quality and accessibility of public services or even combating social exclusion by facilitating access to public services for disadvantaged people are another example of positive effects that digitalization brings to the governance process.

The study of the digitalization of public administration is essential to identify the opportunities and challenges associated with this process and to develop effective strategies to implement the necessary reforms.

The doctoral thesis, through the topic addressed, aimed to answer the questions related to the digitalization process of the Romanian public administration and the adaptability of the system to the new realities of digital tools, as well as the alignment with European performances.

Given that during the course of the research the problem of the pandemic arose, I considered this moment opportune to expand the research to the effects that forced digitalization had on the digitalization process already started in the public administration in Romania.

Through the use of empirical research, it was aimed to identify the impact that the introduction of digital tools has in public administration, especially following the COVID-19 pandemic.

The general objective of the paper: Analysis of the impact of the digitalization of the Romanian public administration on its efficiency, effectiveness, transparency and accessibility and the effects of the pandemic on the digitization process.

Secondary objectives:

- Evaluation of the correlation between the level of economic development of Romania and the degree of digitalization of the public administration.

- Evaluation of the impact of the COVID-19 pandemic on the degree of adoption of digital solutions in public administration.

- Identifying the needs of qualified human resources in the field of IT in the Romanian public administration.

- Formulation of proposals for improving Romania's digitalization performance.

General hypotheses:

H1: There is a significant positive correlation between the level of economic development of Romania and the degree of digitalization of public administration.

H2: The implementation of digital solutions in the Romanian public administration increases its efficiency and effectiveness.

H3: There is an interdependence relationship between the level of digital education of civil servants and the degree of use of online services offered by the public administration.

Specific hypotheses:

H4: The degree of adoption of digital solutions in public administration is positively influenced by the COVID-19 pandemic

H5: There is a lack of qualified human resources in the field of IT in the Romanian public administration.

Research methodology

Several scientific methods and techniques were used in the elaboration of the paper, the result being an empirical research, in which the conclusions were obtained through a comparative analysis of the degree of digitalization in relation to the economic development of Romania, Bulgaria, Poland and Finland, on a period between 2018 and 2022. The particularity of this analysis was determined by the emergence of the COVID-19 pandemic, which produced visible effects in the digitalization process.

By means of the text analysis, strategic, legislative documents and specialized literature were examined, in order to highlight the current framework of Romania's digitalization, in close relation with the European framework. Contextual analysis and data analysis were also used to study the management of the pandemic problem, from the period 2020-2022 and the general framework for remediation and recovery as a result of the effects of the pandemic.

Content analysis was used as a quantitative method, through which the communication and information actions taken regarding the spread of the SARS-CoV-2 virus were identified and objectively described, scoring the effects of these actions and indicating the measures adopted to improve the results.

The reasearch paper is structured in five chapters, the first three presenting conceptual notions about the digital economy and the digitalization process at the European level, but also in Romania and the fourth chapter being dedicated to a comparative analysis of digitalization in relation to the economic development of Romania, Bulgaria , Poland and Finland, calculated through the "GII", "DESI" and "EIS" indicators. The fifth chapter presents the conclusions obtained from the comparative analysis and offers a proposal for improving the results, by building a new model for the improvement of digital skills of the

civil servants in Romanian public administration, in order to increase the degree of digitization of Romania.

Measuring a state's level of digitalization

Measuring digitalization in a country involves assessing various aspects of the adoption of new digital technologies, infrastructure, connectivity and the digital economy. Although no measurement unit has yet been created to capture digitalization or the degree of digitalization, the closest form of measurement is a combination of indicators that paint a more comprehensive picture.

The most widely used tools to assess digitalization in a country are:

- Internet penetration - the percentage of the population with Internet access is a fundamental indicator of digitalization, which reflects the level of connectivity and the availability of digital services for citizens;

- Broadband coverage and speed - the availability of high-speed broadband infrastructure, together with its coverage in urban and rural areas, indicates the accessibility and quality of Internet connectivity;

- Mobile connectivity - measuring mobile phone penetration, including the number of mobile subscriptions and smartphone adoption rates, which provides information on mobile connectivity and the potential of mobile-based services;

- Digital skills and literacy - assessing the digital skills and literacy levels of the population helps to understand the readiness of individuals to participate in the digital economy, access digital services and use technology effectively;

- e-government services - assessing the availability and adoption of e-government services, such as online service delivery, digital identification systems and electronic payment options, indicates the extent to which the government has digitalized its processes and interacts with citizens online;

- digital economy and innovation - measuring indicators related to the digital economy, such as the size of the digital sector, investments in digital technologies and the number of startups and innovation centers, provide insights into the level of digital entrepreneurial activity and innovation in the respective state;

- e-commerce and online transactions - assessing the volume and growth of e-commerce transactions and online retail sales helps measure the extent to which digital platforms are used for commercial activities;

- ICT infrastructure - assessing the quality and coverage of information and communication technology (ICT) infrastructure, including the availability of data centers, fiber optic networks and

4G/5G connectivity, provides information on the backbone that supports digitalization efforts;

- digital inclusion - measuring indicators related to digital inclusion, such as the gender gap in internet access, the access of marginalized communities and the accessibility of digital services, helps to assess whether digitalization efforts are reaching all segments of the population equitably;

- open data ecosystem and innovation - assessment of the availability of open data, government support for data-driven innovation and collaboration between the public and private sectors in promoting digital innovation can indicate the level of openness and support for a thriving digital ecosystem.

The first chapter of the paper provides an introduction to the framework of the digital economy at European and national level. The chapter presents a general picture of digitalization, a general framework of the benefits brought by new technologies.

The European Commission's action plan on e-commerce provides rules to double the volume of e-commerce, facilitate card payments, replace traditional invoices with electronic ones, strengthen internet security in online purchases and adequate protection against cyber-attacks[1].

As a result of the development of the Digital Agenda for Europe 2020, which has as its main objective the development of the Digital Single Market, Romania, in its capacity as a member of the European Union, prepared in 2016 a document to ensure the transposition of the European objectives in the national context, following a series of specific objectives, adapted and aligned to the strategic vision, regarding the information and communication technology of Romania 2020[2].

The European champions in the field of digital public services are Finland, Estonia and Denmark. Greece, Hungary and Romania lag behind[3].

Romania has taken significant steps towards the digitalization of public administration, although there is no single strategy document that presents the entire initiative. However, several key government entities and policies are driving the digital transformation process:

Authority for Digitization of Romania (ADR): This agency leads digitization efforts in the public sector, focusing on areas such as interoperability, cybersecurity and cloud services

-The National Strategy regarding the Digital Agenda for Romania: This strategy, adopted in 2014, outlines broad objectives for digital development, including improving the provision of

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[1]Comisia Europeană, (2014), *Să înțelegem politicile Uniunii Europene: Agenda digitală pentru Europa*, Bruxelles, pag. 5, file:///C:/Users/ANDRA/Downloads/agenda%20digital%C4%83%20pentru%20europa-gp_eudor_WEB_NA7012031ROC_002.pdf

[2]Ministerul Comunicațiilor și Societății Informaționale, (2015). *Strategia Națională privind Agenda Digitală pentru România 2020,* https://www.ancom.ro/uploads/links_files/Strategia_nationala_privind_Agenda_Digitala_pentru_Romania_2020.pdf

[3]Comisia Europeană *Digital Public Services*, informație disponibilă la: https://ec.europa.eu/digital-single-market/en/digital-public-services-scoreboard , accesat la 30.05.2019

public services through digital channels.

- The EU strategy for the digital single market: Romania aligns its digitalization efforts with the European Union strategy, which promotes a more integrated digital market in the member states.

In 2019, the Romanian Government adopted a series of measures whose purpose was to simplify and reduce the efforts of citizens to access some documents, through the digitalization of the public administration. These measures were built on the basis of the 3000 proposals formulated by citizens on the public consultation platform "maisimlu.gov.ro"[4].

Most of the proposals related to the payment of fees and taxes online, reducing the number of copies on the identity card, renouncing the legalized copies requested by the public administration and recognizing the electronic signature.

The adopted measures aim at[5]:

- public institutions have the obligation to post on their own websites information and models of requests and forms necessary for the services provided, but also on www.edirect.e-guvernare.ro, in a format that allows online completion;
- public institutions must accept the digital copy of the Identity Card, through the e-mail address of the institution in question. The legalized copies requested in the provision of public services are replaced by the verification at the counter of the document's conformity;
- the issuance of identity cards, as well as the issuance and extension of the validity of identity documents for foreign citizens and the criminal record, will be exempt from the payment of extrajudicial stamp duty. Citizens will pay one tax, in one place;
- the transmission of the proof of payment of traffic fines also by electronic mail, respectively the elimination of this obligation when the payment is made by electronic means.

In the second chapter, aspects of the need for digitalization of governments, implicitly of public services and their quality, are discussed, with reference to the "smart city" concept.

The integration of the digital economy into administrative systems is a very important step in the technology revolution, in which our society is currently taking part. The digitalization of the

[4]Website Guvernul României: http://gov.ro/ro/stiri/masuri-pentru-simplificarea-procedurilor-i-reducerea-eforturilor-cetatenilor-de-procurare-a-unor-documente#null , accesat la 10.06.2019

[5]Website Guvernul României: http://gov.ro/ro/stiri/masuri-pentru-simplificarea-procedurilor-i-reducerea-eforturilor-cetatenilor-de-procurare-a-unor-documente#null , accesat la 10.06.2019

administration and the governance process implies a series of advantages that we cannot ignore, but these advantages are seconded by a series of disadvantageous possibilities and unforeseen situations, which slow down the digitalization process to a great extent.

eGovernment and digital public services is a very comprehensive, broad sphere of digitalization. The implications of this topic touch on the digital competences and skills of civil servants, but more importantly, the citizens who use digital services.

It is understood that the existence of well-maintained Web platforms does not imply that they are also used by citizens or the business community. New methods of administration need not only innovative solutions, but also "smart citizens"[6].

The digital gap is a phenomenon that emerged and developed as the Internet became more and more widely used. Gradually, the existing inequalities between social categories that use the Internet and those that do not have access to the Internet, or other digital tools, have become more and more noticeable[7].

The costs of connecting to the Internet network have decreased, it has become much more accessible in Romania, the connection speed being, as is well known, one of the fastest in Europe. However, the digital divide reaches considerable dimensions, with a large part of the population not using digital services of any kind. This category of the population can be called a disadvantaged social category, such as the elderly or the disabled, who need help or special platforms to access the Internet.

Not including digital technologies and tools in urban every day life constitutes a great obstacle in its development. Modern public services are already unthinkable without the imprint of digitalization[8].

However, the involvement of citizens is very important, as the decision to live in a smart city belongs to them. Most of the time the citizens are reluctant about how the rulers will solve their needs. For that, transparency is needed from the authorities.

The third chapter presents the stage of Romania's digitalization process, before and after the pandemic. Is presented the gap between Eastern European states, which is measured with the DESI index, starting from 2018, until 2022, referring to the onset of the pandemic and the measures adopted that led to the forced increase in Romania's degree of digitalization.

Nowadays, it is already known that the states of central and eastern Europe encounter a difficulty

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[6]Vrabie C., (2015), *Digital Governance in Romanian Municipalities,* în Forms and Determinants of Development of Civil Dialogue, Lublin, pag. 139

[7]Tufă, L., (2010), *Diviziunea digitală. Accesul şi utilizarea internetului în România, comparativ cu ţările uniunii europene,* pag. 1-3

[8]Pușcașu, B., (2016), *Mic Ghid pentru orașele care vor să devină (și mai) inteligente* în Sesiunea de comunicări științifice „Orașul inteligent", Ediția a treia, pag. 54

in economic alignment with the European Union. One theory regarding the existence of this gap claims that the delay of these states is due to the former communist regime established in states such as Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia and Romania.

According to "Digital Economy and Society Index Report (DESI). Digital Public Services" of the European Commission, Romania is at the bottom of the ranking in several analyzed categories. DESI is an index that summarizes relevant indicators on Europe's digital performance and tracks the progress of EU Member States in terms of digital competitiveness. DESI consists of 5 indicators:

- connectivity-fixed broadband, mobile broadband, fast and ultrafast broadband and prices;
- human capital - basic skills and Internet use, advanced skills and development;
- use of internet services - citizens' use of online content, communication and transactions;
- integration of digital technology - digitization of business and eCommerce;
- digital public services - eGovernment and eHealth.

Denmark, Sweden, Finland and the Netherlands have the most advanced digital economies in the EU, followed by Luxembourg, Estonia and Ireland. Romania, Greece, Bulgaria and Italy have the lowest index scores[9].

The European strategy and priorities for the 2019-2024 period focus on the idea of digital Europe, on shaping a digital future for European citizens. The directions of action in this regard are: artificial intelligence; European data strategy; industrial strategy for Europe; high performance computing; online platforms; cyber security; digital competences; connectivity.

The challenge of the digital skill'scale requires a long-term strategy and new partnerships between European, national, regional, public and private actors, including civil society[10]. Every citizen should have at least basic digital skills to live, work, learn and participate in modern society.

Digital transformation is designed to facilitate the development of new sources of alternative jobs, that will be more relevant to the emergence of a new normal and to learn new skills[11].

The COVID-19 pandemic has had a significant impact on the EU economy and EU society. It has significantly changed the role and perception of digitalization in economies and accelerated its pace. It also showed the decisive role that innovation and technology can play in this times.

As stated in the DESI 2021 reports, the pandemic has increased the use of online services, both

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[9]Comisia Europeană, *Digital Public Services*, informație disponibilă la: https://ec.europa.eu/digital-single-market/en/digital-public-services-scoreboard , pag. 2, accesat la 30.05.2019

[10] Comisia Europeana, *Shaping Europe's digital future*, Digital Skills & Jobs, available at: https://ec.europa.eu/digital-single-market/en/policies/digital-skills , accsessed: 09.11.2020

[11] Dutta, G. , Kumar, R. , Sindhwani, R. , & Singh, R. K. (2020). Digital transformation priorities of India's discrete manufacturing SMEs–a conceptual study in perspective of Industry 4.0. *Competitiveness Review: An International Business Journal* , 30(3), 289–314. https://doi.org/10.1108/CR-03-2019-0031

public and private, putting pressure on the capacity of digital connectivity networks. In this sense, Member States can request support through the Technical Assistance Instrument, for reforms to facilitate the digital transition in e-government, digital economy, digital infrastructure, e-health and digital skills[12].

The DESI 2021 reports are based on data from 2020 and present the state of the digital economy and society in the first year of the pandemic. DESI 2021 has been adjusted to reflect the two major policy initiatives that are set to impact digital transformation in the EU in the coming years: the Recovery and Resilience Facility (RRF) and the Digital Decade Compass. The DESI 2021 reports present the state of the digitalization process in Europe. The structure of DESI has been adjusted to reflect the four cardinal points of the digital compass and the related targets for 2030[13].

Is estimated that the pandemic has accelerated existing trends in global remote work, e-commerce and automation, as well as exacerbated labor mobility. These trends, however, have not affected citizens and businesses in the same way.

DESI 2022 results show that while most Member States are making progress in their digital transformation, business adoption of key digital technologies such as artificial intelligence and big data remains low, including among EU leaders. Insufficient levels of digital skills are hindering future growth prospects, deepening the digital gap and increasing the risks of digital exclusion as more and more services, including essential ones, are moved online. Efforts must be stepped up to ensure the full deployment of ubiquitous connectivity infrastructure (especially 5G), which is required for highly innovative services and applications[14].

Finland, Denmark, the Netherlands and Sweden continue to be the EU leaders. The other member states are moving forward and there is a general upward convergence trend in the EU. Among the lagging Member States, Italy, Poland and Greece have substantially improved their DESI scores over the past five years and implemented sustained investment with an increased political focus on digital, supported by European funding[15].

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[12] Comisia Europeană, *Digital Economy and Society Index (DESI) 2021*, Thematic chapters, pag. 9, file:///C:/Users/ANDRA/Downloads/0_DESI_2021_Thematic_chapters__Full_European_Analysis_dhhO6dGif25zTsq4LXZQCIrI_80563.pdf

[13] Comisia Europeană, *Digital Economy and Society Index (DESI) 2021*, Thematic chapters, pag. 10, file:///C:/Users/ANDRA/Downloads/0_DESI_2021_Thematic_chapters__Full_European_Analysis_dhhO6dGif25zTsq4LXZQCIrI_80563.pdf

[14]Comisia Europeană, *Digital Economy and Society Index (DESI) 2022,* Thematic chapters, pag. 8, file:///C:/Users/ANDRA/Downloads/0_DESI_Full_European_Analysis_2022_2_C01lJgPAatnNf0qL2LL103tHSw_88764.pdf

[15]Comisia Europeană, *Digital Economy and Society Index (DESI) 2022,* Thematic chapters, pag. 8, file:///C:/Users/ANDRA/Downloads/0_DESI_Full_European_Analysis_2022_2_C01lJgPAatnNf0qL2LL103tHSw_88764.pdf

In the fourth chapter, the empirical research is carried out, for which we selected three EU member states (Bulgaria, Poland and Finland) for which we compared the results obtained by them within three specific digitalization indicators (GII, EIS, DESI), related to GDP per inhabitant, for the period 2018-2022.

The results of the comparative analysis showed that Romania has a very low degree of digitalization, being in last place, next to Bulgaria. The strenght of digitalization in Romania is the infrastructure, and the human resource is its weakness.

We cannot analyze the degree of digitalization of a city without taking into account the existing infrastructure, the policies and budgets allocated to digitalization, the human resource trained and educated to use new technologies or implement them for the benefit of citizens. The digitalization indicator of a city thus appears as a complex composite of economic, political, administrative, social, educational variables, which tries to provide a complete picture of digitalization or rather, of the entire digitalization process, which is in a continuous transformation.

The degree of digitalization of a state can be established through composite indicators that measure the respective state's performance in various areas related to digitalization. These fields chosen by the researchers for calculating the indicator values differ from case to case, depending on the premises of the research.

Economic development, through the benefits it propagates in the political environment, in the regulatory environment, in the business environment, on human capital as well as on infrastructure, so in general in social life, ensures the progress of humanity. It is obvious that the five specified areas of social life also have a reversible influence on economic development, favoring the context of the functioning of the social-economic mechanism.

The value expression of economic development is given by the Gross Domestic Product (GDP). By definition, this is a macroeconomic indicator, which reflects the sum of the market value of all goods and services intended for final consumption, produced in all branches of the economy, in a country within a year. It can also be calculated at the level of a region.

By applying a rigorous methodology, based on econometrics, mathematical models will be developed to formalize the functional link between GDP per inhabitant, as an exogenous variable, with the domains mentioned for each instrument for measuring the selected digitalization indicator, including their structural components, as endogenous or dependent variables. The calculations will be performed using the Eviews computer program.

The identified models will be subjected to a comparative analysis for the four chosen countries, namely Romania, Bulgaria, Poland and Finland. If the first three countries similar in terms of traditions,

geography and history are comparable, especially from the point of view of the East-European gap that characterizes them, Finland presents particularities that separate it from the others primarily by the level of economic development, being in the top of the states highly digitalized and economically developed, an example of good practices, which would provide a complete picture of the top digitalized states. At Romanian level, the digitalization process is in full swing. It manifests itself in different stages from region to region, depending on the degree of urbanization, and is the subject of numerous national or global studies and reports, which have been listed and mentioned in this work.

Comparisons are made of the coefficients for determining the specific areas of each indicator by changing the gross domestic product per inhabitant, the regression coefficients, and general judgments are formulated regarding the econometric viability of the models.

The areas related to digitalization, to be compared in this chapter, have been selected as follows:

-after consulting the specialized literature, it was concluded that the most comprehensive studies dealing with the calculation of the digitalization level of states around the world are the Global Innovation Index (GII)[16], the European Innovation Scoreboard (EIS)[17] and the Digital Economy and Society Index (DESI)[18]. The choice of these composite indicators was based on the need to compare Romania's results in DESI, with other results of digitalization figures obtained from other databases or following different data collection processes, as well as a comparison of Romania's results with the performances of other states, to be able to determine what is the reason for the visible gaps in DESI. Each of these three composite indicators will be presented within the research methodology;

- the selection of the 3 states for the comparative analysis with Romania, was based on the ideea that Romania needs to be compared with states that are similar in socio-political context. Therefore, were considered EU memeber states that are similar in terms of geographical location, political regime, membership of the post-communist Eastern European group and economic development. The presence of Finland in this analysis is to highlight the position of Romania, Bulgaria and Poland at the bottom of the ranking, unlike the first one, which is among the highest positions. Finland does not meet the criteria chosen for the comparison, but its presence at the top of the rankings, totally opposite to Romania's position, offers a more realistic picture of the degree of digitalization;

- the time period selected, namely 2018-2022, is motivated by the fact that the digitalization field is relatively new and the databases are not complete. This is also true even for the chosen composite

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[16] World Intellectual Property, Global Innovation Index, informație disponibilă la adresa: https://www.wipo.int/global_innovation_index/en/# , accesat la 24.03.2023.

[17] European Innovation Scoreboard, informație disponibilă la adresa: https://ec.europa.eu/info/research-and-innovation/statistics/performance-indicators/european-innovation-scoreboard_ro accesat la 16.05.2022

[18] Comisia Europeană, *Digital Public Services*, informație disponibilă la: https://ec.europa.eu/digital-single-market/en/digital-public-services-scoreboard , pag. 2, accesat la 30.05.2019

indicators, where it can be seen that the information collected is insufficient or missing, indicating the novelty and growing importance of digitalization studies.

Therefore, the comparison of the results obtained by Romania, Bulgaria, Poland and Finland in the DESI, EIS and GII rankings, in the period 2018-2022, will show what our performances are at the European and global level, as well as what our weaknesses and strengths are in terms of digitalization.

Research methodology

The general framework of the research methodology of the correlation of fields related to digitalization with the level of economic development expressed by the gross domestic product per inhabitant is carried out, practically, by going through the following stages:

- the graphic representation of the dynamics of the indicators considered to form an interdependent system is being carried out, in the 2018-2022 reference period, in order to inform us about how the "cloud of points" is arranged over time.

- the mathematical form of the model is chosen based on the graphic representation,

- the estimators of the model are defined using the least squares method and their statistical significance is checked using the "t-Criterion",

- the indicators of econometric representation are calculated and the statistical viability of each model is assessed based on a set of statistical tests aimed at: the significance of the coefficient of determination and respectively of the correlation ratio with the help of the "Criterion F", the probability of the asymptotic distribution of the residual variable against the normed normal distribution using the "Jarque-Bera Criterion", the existence of the autocorrelation phenomenon of the residuals using the "Durbin-Watson Criterion" and, respectively, the phenomenon of homoscedasticity of the residuals using the "Whait Test".

- it also quantifies the "power" of the model for calculating predictable levels of the endogenous variables depending on the levels of the exogenous variable, the gross domestic product per inhabitant, taken into account when developing econometric models and possible to achieve, with the help of the "Coefficient of Theil's irregularity/inequality" as well as by the relative expression of the "Mean error estimate of the regression equation",

- forecast levels are estimated, as a point value and as a confidence interval guaranteed with a probability of at least 95%.

The exposed methodology is applicable and substantiated by econometrics based on the concepts that support it: the law of large numbers, the method of least squares, distribution laws of random variables, verification of statistical hypotheses, the central limit theorem, the theory of surveys and

statistical estimates.

It is also noted that this methodology applies with complete certainty when the volume of observations is large enough, the significance of the conclusions is stronger the more observations the model is based on. When this restriction is not fully respected, the results are only of limited informative value without statistical support.

In the final chapter of the paper is presented the current state of digitalization of the public administration in Romania and are discussed the importance of the digital infrastructure and the existing human resources that use this infrastructure.

Based on the results of the comparative analysis, was generated an image of the current state of digitalization in Romania, in public institutions. It is also highlighted the infrastructure and human resources elements to show the components we need to act on. Lastly it is proposed an adaptive strategy for digital transformation and a model training of civil servants.

The conducted study presents results and conclusions supported by a rigorous methodology based on statistics, mathematics and economic theory that convince us that the areas related to digitization are categorically under the influence of the level of economic development of each state.

The models developed in the form of linear regression equations are confirmed as viable sources acceptable as mathematical arguments of explicit relationships of interdependence between the systems of variables studied, based on observations from the years 2018 – 2022.

Against the general background of economic development, digitalization is carried out by applying coordinated administrative and political decisions taking into account the financial possibilities for financing the development of related fields, the permanent adequate education of the human resource as well as ensuring a technological superstructure necessary for implementation.

The digitalization of public administrations in the EU is an ongoing process, driven by EU policies and initiatives as well as national efforts. Collaboration, standardization and the exchange of experiences contribute to the promotion of digitalization within public administrations and to the improvement of the provision of public services throughout the European Union.

In the context of the conducted study, an econometrics-based methodology was used, as a set of procedures applied in the research process of quantitative correlations, between variables defined as economic phenomena and processes. The presented models have an abstract form outlined as a synthesis between economics, mathematical statistics and mathematical analysis but with precise analytical value.

Following the analysis of the comparison’s results of the three indicators, it appears that Romania

has very good results for the indicators that analyze the digital infrastructure, but presents poor results for the field of human capacity, i.e., for example, for the subfields of training, research, higher education, population involved in lifelong learning and above average ICT skills.

The lack of a well-defined strategic framework in the digitalization field is a weakness for Romania. Therefore, a digital strategy integrated into a single national strategic document could bring considerable improvements to this digital transformation process.

Such an initiative on the unification of digitalization strategies presents a number of advantages. For example, a coordinated approach: a unified strategy would ensure that all government agencies are working towards a common set of goals, avoiding duplication of effort and promoting a more cohesive digital government ecosystem. Another example is clear direction: a well-defined strategy would provide a road map for digitalization initiatives, prioritization of projects and efficient allocation of resources. Also, simplified processes and standardized digital infrastructure within public institutions could lead to significant efficiency gains, reducing administrative burdens and costs. Last but not least, a unified approach could create a simpler and more user-friendly experience for citizens interacting with public services online.

The implementation of a new training model for civil servants based on digital skills is an essential investment to boost the digitalization of public administration in Romania. There is a need for a model that offers a flexible approach and adapted to the specific needs of the public administration, contributing to the development of digital skills of civil servants and improving the quality of services offered to citizens.

Through the successful implementation of a new model of civil servant training, the public administration in Romania could benefit from a competent and prepared workforce to face the challenges of digitalization. In other words, a competent workforce could successfully use the existing infrastructure, and even more than that, could even help maintain and update it.

Upskilling is the process of updating or developing existing skills, while retraining reflects the process of learning completely new skills. Digital transformation is related to both processes, as some individuals have digital skills for personal use and know how to use them for professional purposes. However, day by day, with the digital evolution, the need to update digital skills also increases, so there is always room for improvement[19].

Embedding lifelong learning into an organization's strategic goals is crucial. It is imperative both

[19] Grigorescu, A., Pîrciog, C. S., Lincaru, C., *The 2030 scenarios for basic digital upskilling and reskilling in Romania, prezentat în cadrul Conferinței ICBE 2024*

for individuals, and especially for public institutions, to devote time to the training of employees[20], especially in the field of ICT, in the context of the forced digitalization that has taken place in recent years, as a result of the effects of the pandemic.

At the public administration level, the digital skills of civil servants leave room for improvement. The approach to the training and improvement of civil servants could be updated, according to the trends of accelerating the digitalization process. In this sense, a different approach to the civil servant training process is needed, applied as the case may be, depending on the digital skills required. A modern and current vision on the continuation of the digitalization process implies a modern model, in turn, for the continuous training of the cadres involved in the government process of the state.

Conclsions

Citizens' interaction with public administrations is visibly improved through the introduction of digital public services. They have the role of reducing the costs and delivery time of services, increasing the efficiency and transparency of services, as well as obtaining benefits on a larger scale, namely the success of the single market of the European Union, but also of a possible global market.

Digital knowledge and skills are becoming increasingly important and in demand. To complete the digital transformation process that has been started, we need civil servants capable of working with this digitalized system, capable of using the existing infrastructure and making improvements to it. That is why the modernization of the management of the civil service is necessary, and this process can be achieved by modernizing and transforming the model of training of the civil servant, so as to transform him into a digital civil servant.

The emergence of the "smart city" concept brings in new challenges for our society. In addition to the many advantages, such as increasing the quality of life, a smart city challenges current governance.

The human component, or the workforce in the smart city, faces new challenges: the emergence of artificial intelligence, the increasing demand for digital skills in the labor market and the technologization of all fields of activity, which produces changes in all aspects of everyday life. In these conditions, the human factor is affected by all these changes. On the one hand, the training and education of individuals must be adapted to digitalization, and on the other hand, the government must adapt its strategies and policies to enable these changes, safely for citizens and for the civil servants who perpetuate these changes through local administrations. Therefore, the human resource is very important in the development of smart cities and in the development of the means of protection of citizens, specific

[20] Grigorescu, A., Pîrciog, C. S., Lincaru, C., *The 2030 scenarios for basic digital upskilling and reskilling in Romania, prezentat în cadrul Conferinței ICBE 2024*

to these cities.

With all of the above in mind, one thing is certain: the way society is currently organized will change in the foreseeable future, and with it the economy will fundamentally change as well

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