Implementation of digital reforms in public administration through efficient management of intelligent systems

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Abstract
The main objective of this scientific initiative is to identify an efficient system for achieving public administration digitization reforms by using the best strategic management practices. The main goal is to achieve our central objective of having a smart city and public policies aimed at increasing the quality of life of the citizen, we need a re-planning of the way things are done through electronic reforms at the administrative level, decision-making decentralization and implementing financial autonomy when it comes to implementing vital community projects. On the occasion of the research, a series of working models were identified, in the form of action plans for the preparation of an action plan for the development of the critical technological infrastructure on the three coordinates: time, money, and quality. The novelty of this initiative envisages the construction of general work plans, as well as the integration of smart roadmap systems, in the monitoring of digitization reforms with clear and precise deadlines and alert systems for each reference stage of the achievement of specific objectives. All in all, the success of the development strategy, the implementation of digital reforms, and public administration through efficient management of intelligent systems, can be achieved by promoting and implementing master plan in-laws in direct correlation with resource planning systems such as enterprise resource planning platforms – ERP. Capitalizing on such an approach having the direct role of effectively managing the vital information related to the digitization reforms in the public administration, which will oblige policies class, regardless of political color, to collaborate when it comes to the national strategic interest for the sustainable development of society, for increasing the quality of life of citizens.

Keywords: smart city and public policies, quality of life of the citizen, development of the critical technological infrastructure, enterprise resource planning platforms – ERP, sustainable development of society.

1. Introduction

Evaluating and selecting the development mechanism of the organization through projects in a "correct" way can be a formidable problem in itself. However, it is possible to classify development systems by projects, organizing them according to the results obtained.

These techniques are designed to increase the value of the human resources of an organization (or project team), making people feel better about themselves, educating them, and giving them new interpersonal and supervisory skills.

"As the project evolves, "human engineering" techniques will be coordinated; these include team building, restructuring values, organizational rules or communication channels, and programs aimed at changing the managerial style or individual and group behavior patterns. At the extreme edge of the project development system, the approach focuses especially on outcomes such as productivity, timeliness, and cost efficiency" [1].

Every project manager knows that selecting the right management methodology is crucial, seven of the most popular models which we can use to reform public administration are:

a) Agile. It is a type of process in which requests and solutions evolve through the collaborative effort of customers' autonomous and multifunctional teams.

b) Scrum. It is based on the development, delivery, and support of complex products through collaboration, responsibility, and iterative progress.
c) Kanban. It is another popular Agile framework that, similar to Scrum, focuses on early team launches, through collaboration and self-management.
d) Lean. This methodology promotes maximizing customer value while reducing waste and using fewer resources.
e) Waterfall. One of the cascade methodologies has a linear, sequential design approach in which progress flows down in a direction like a waterfall.
f) Six Sigma. It is the management methodology that aims to improve quality by reducing the number of errors in a process, identifying what does not work, and then eliminating it from the process.
g) PMI/PMBOK. Through PMI, comes PMBOK, which is not a methodology, but a guide that presents a set of standards that characterize project management.

As technology advances and projects become more complex, the work of the project manager becomes more difficult.

"Changes in environmental regulations, government policies, customer objectives, organizational policies, and more, keep the project manager constantly making decisions that affect the crucial considerations of the "Big Three" project: time, budget, and quality. regeneration of the project's human resources and the efficiency of the project team" [2].

2. Implementation of digital reforms in public administration

This is the technical side of decentralization on the way to an advanced democratization process and seeks to redistribute authority, responsibility and financial resources for providing public services among different levels of government.

Its aim is to introduce more participatory forms of governance, giving citizens or their representatives more influence in formulating and implementing policies and plans to develop the quality of life of citizens.

The importance of digitization in the process of decentralization of state authority: Osborne and Gaebler in "Reinventing Government" discuss the many advantages of flattening the traditional organizational hierarchy. Generally, these indiviuals are at the bottom of the organizational hierarchy [3].

In many hierarchical organizations enhance the ability of an organization to respond to future challenges [4].

3. The evolution of the digitization process of the public administration in Romania in comparison with the reference model of Estonia

The main electronic public services available today in Romania are of three types:

1. Integrated electronic services which are already working or in process of integration into the national electronic system of portals like: ghiseul.ro, e-guvernare.ro, e-

licitatie.ro, cert.ro, icipro.ro, used most of the time for payment of taxes, procurement, cibersecurity or website aggregators.
2. Independent electronic services used by ministries or agencies, subordinated to the central government, for fiscal administration or relationship with ministries with internet or extranet access.
3. Independent electronic services used by local public administrations like central mayors and local county councils for the most part.

On the other hand, the reference model Estonia is one of the most digitally advanced governments in the world. One of the core principles that has enabled Estonia to be rather agile in developing IT systems, has been the principle of distributed architecture like X roads, meaning that every ministry and every agency is responsible for developing their own systems – and the IT development projects are not centrally coordinated, there is no one big central system that is supposed to do everything.

A few examples of how digital tools have enabled serving people and businesses more efficiently are:

1. E-Cabinet (Government IT system for meetings.)
2. Digital signature (To improve processes speed.)
3. E-Services (e-Business Register, e-School, e-Court, e-Police, e-Residency, Electronic ID Card, i-Voting, m-Parking, e-health, and so on.)

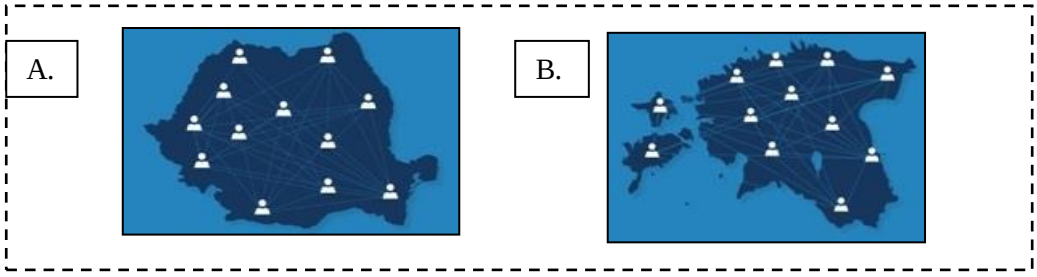

Fig. 1. Comparative analysis: (A) Romania; (B) Estonia.
Source: Internet pictures.

Moreover, it is very important to upgrade the national electronic system "www.e-guvernare.ro" and cloud infrastructure project for public Institutions in Romania "www.icipro.ro" as well as the speed of implementation of e-reforms as key elements for systemic transformation. In the process of a thorough analysis, the purpose and option of choosing income as a general mission is obvious, although, without a doubt, increasing income is a significant objective. Being much more important, we determine how to generate income, this information also coming from the particularities of the environment in which the company operates [5].

The insertion at governmental level of the vision to produce performance and profit, being vital through a real and continuous evaluation of human resources and e-reforms of public policies In public administration, the main objectives from the perspective of digitization have in mind a series of objectives, challenges and solutions as follows:

Objectives:

- Improving administrative capacity in terms of quality management, timeliness and service evaluation as a key element in improving the efficiency of public services in order to increase the quality of life for citizens.
- The Internet of things through Smart City.

Challenges:

- Decentralization of public services.
- Improving service quality.
- Redefining strategic objectives: people, technological infrastructure, storage spaces, data security, information transparency, artificial intelligence management, etc.

Solutions:

- Decentralization of public services and reconfiguration of technological infrastructure into independent units, coordinated by an intelligent system based on the best examples of good practice.
- Establishing clear, specific, measurable, achievable and relevant objectives in a well-defined time, like a roadmap for redesigning public administration.
- Implementing a management system for evaluating the performance of human resources and improving public policies through a promotion of specialists in public administration.
- Creating self-control and regulation mechanisms so as not to deviate from the proposed objectives transposed into a long-term master plan predictable, regardless of political color.

4. Functional analysis of digitalization at the level of the cultural ecosystem in Romania

In Romania, a functional analysis of the cultural ecosystem is very important because it is carried out by a group of independent experts and in 2022 had as a starting point for the development of the "Sectoral Strategy in the Field of Culture for the period 2023-2030" (SIPOCA project 709) identified the following problems with facing the cultural-creative sectors in Romania, with impact from the perspective of the valorization of cultural heritage through digitalization:

- The existence of very large differences between the urban and rural areas in the field of financing, both from the perspective of average expenditures per inhabitant for the culture sector and as a share of expenditures for culture in total expenditures, which led over time to the increase of urban-rural gaps and the very limited access of the rural population to the cultural offer.
- The evolution of the cultural infrastructure over the last 15 years, marked by both positive and negative fluctuations in the number of public cultural institutions (with considerable reductions in the case of libraries, cinemas, and cultural establishments, fluctuating developments, but with an increasing trend for museums and performance institutions), as well as their unequal territorial distribution at regional and county level, with major differences between urban and rural areas;
- In Romania, against the background of the insufficiency of financial resources and the shortage of specialized personnel, this process has been marginally treated, the degree

of digitization being extremely low, and there are still high risks from the perspective of the loss of this heritage through damage or even destruction.

- Another important deficiency, as in the previous cases coming from outside the sector and generated mainly by the marginal place given to the culture sector in national policies, is that the cultural sector does not benefit from a permanent, unitary system of statistical data collection, the existing information is often redundant, outdated and incomplete.

An example in this regard is the evolution of the cultural infrastructure of the "E-culture: Digital Library of Romania" project, which is being implemented at the level of the UMP - Ministry of Culture (financed by the European Regional Development Fund through the Competitiveness Operational Program 2014-2020. Priority Axis 2, Action 2.3. This project aims to digitize the cultural heritage with the help of IT technologies, so that the national cultural heritage can be preserved, promoted, and transmitted to future generations by digitizing at least 550 thousand cultural resources (texts, images, audiograms, video grams, 3D digital objects), of which at least 200 thousand will be exhibited in the European Digital Library.

Added to this is the fact that, in the case of occupations specific to the field of culture, there is currently no accepted unitary format, adapted to the sector, for training, specialization, and improvement, which is reflected in the poor performance of graduates and the insufficient capitalization of digital opportunities in the design and provision of cultural services.

Even in the conditions in which the institutions in the field, face a lack of adequate financial and human resources, in Romania, there are already a series of initiatives in the field of digitization of cultural resources, both at the level of libraries and museums in the national system, but for the fruition of these initiatives, it is imperative to correlate and coordinate digitization efforts to widen the access of the Internet using public to these cultural resources.

A recent survey on elements of cultural infrastructure (SIPOCA 607) revealed that in terms of digital infrastructure, representatives of cultural institutions, both public and private, emphasized the need for IT equipment, software acquisition, and licenses as well as telecommunications equipment.

A digital revolution is transforming the world as we know it at unprecedented speed. „Companies in the pre-digital age, to align their business, need to rethink their business vision, not by updating technology, but rather by changing their business strategy and corporate thinking to compete more efficiently in a world based on technology, in which more and more economic sectors become dependent on new technologies" [6].

The European Union will increase its support for digital transformation in the coming years, as illustrated by the recent proposal for the Digital Europe program (for 2021-2027) [7] – which would be the first-ever funding program dedicated solely to supporting digital transformation in the EU.

Further EU action will boost innovation, foster digital champions and businesses' digitalization, reduce existing digital divides, remove remaining barriers in the digital single market and ensure an adequate legal and regulatory framework in the areas of advanced computing and data, artificial intelligence, and cybersecurity.

The importance of digitalization is becoming increasingly pronounced within the EU and therefore the European Council in June 2016, called for fixed and high-capacity broadband radio connectivity across Europe. „The digital transformation in the field of electronic communications is extremely important for optimizing performance in all key sectors of society, through organizations around the world, especially in the areas of design thinking, big data and analysis, portfolio management and agile delivery" [8].

New digital applications - such as virtual and augmented reality, increasingly connected and automated driving, remote surgery, artificial intelligence, and precision agriculture, will require achievable speed, quality, and responsiveness only with the help of very high-capacity broadband networks.)
Thus, the "Strategic Agenda 2019-2024" of the European Council, adopted in 2019, states the need for Europe to ensure its sovereignty at the digital level. The proposed goal of briefly reviewing the importance and role of digitalization in the European Union has been achieved.

4.1. The main challenges and possible solutions to the efficient management of public administration in Romania

The local authorities have the difficult task of managing difficult and complex issues in the local communities.

The public authority ensures the management of financial resources, to meet the strategic objectives to satisfy the immediate or future needs of the local communities, and citizens should not be viewed as customers of government, as reinventing-government advocates assume, but rather as government's owners [9].

The main concerns being those related to the redefinition of strategic objectives: people, technological infrastructure, storage spaces, data security, information transparency, artificial intelligence management, etc. Several research studies have shown that public administration management in Romania has many challenges that there are many challenges of public administration's management, related to the problems of urbanization, industrialization, sustainability, efficiency and effectiveness of the public services delivered to the citizens, etc.

Improving public administration's management is possible if it is based on a coherent strategy of digitalization and decentralization, which may take into account the economic, social, and environmental problems that need to be solved to ensure the transition to the new era of e-government and to lay the foundations for a "Smart City" shortly.

4.2. Possible solutions identified for improving the management of the public administration

Some solutions available for systemic efficiency could be:

1. Decentralization of public services and reconfiguration of technological infrastructure through the "blockchain approach" and transformation into independent units, coordinated by an intelligent system based on the best examples of good practice. (Fig. 2)
2. Establishing clear, specific, measurable, achievable, and relevant objectives in a well-defined time, like a roadmap for redesigning public administration.
3. Creating public policies for encouraging self-financing to generate profit and performance in public administration.
4. Implementing a management system for evaluating the performance of human resources and improving public policies through the promotion of specialists in public administration.
5. Creating self-control and regulation mechanisms so as not to deviate from the proposed objectives by promoting and implementing master plan in-laws in direct correlation with resource planning systems, such as enterprise resource planning platforms – ERP.

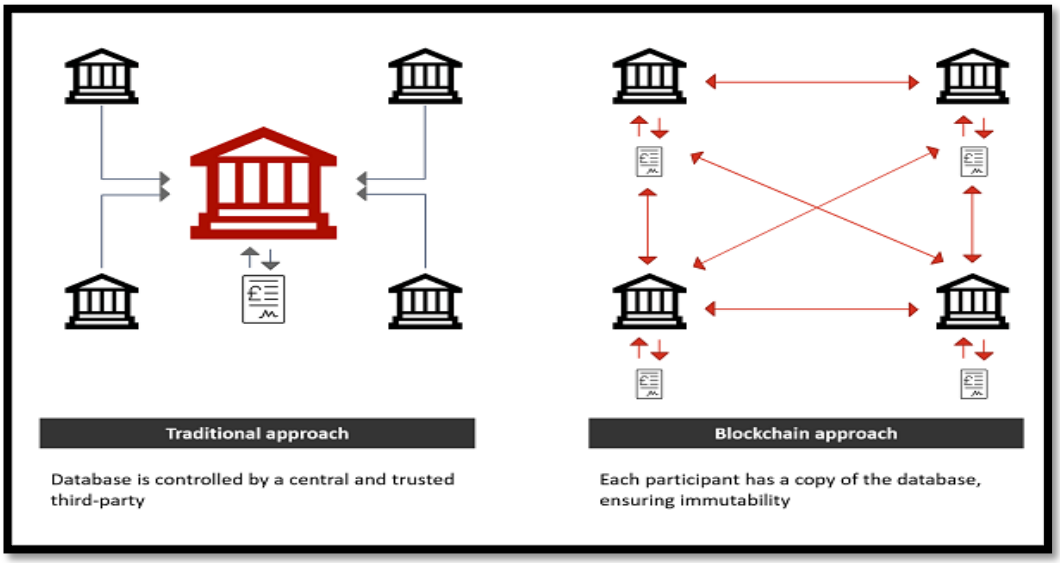

Fig. 2. Blockchain approach of database technological infrastructure.
Source: Blockchain - model picture from Internet

Decentralization of public administration is important because it represents a method of consolidating democracy and involves moving decision-making away from centralized control and closer to citizens with the main objective of improving their responsiveness and performance.

They are better able to respond to changing environments and citizens needs.

4.3. Measures that can be taken to improve the digitization process.

There is no simple strategic way to deal with the multidimensional nature of digital change. Is in vain to have the best IT experts if the rest of the population is not connected to technology. Our parents and grandparents look at technology reluctantly: paying by card, shopping online, reading the news, and all of this is largely foreign to them. IT experts are too few and too little connected to the smooth running of the "city" and citizens do not trust the use of online technology.

Even in the conditions in which the institutions in the field face a lack of adequate financial and human resources, in Romania, there are already a series of initiatives in the field of digitization, both at the level of public and private sector in the national system, but for the fruition of these initiatives, it is imperative to correlate and coordinate digitization efforts in order to widen the access of the Internet user public such as social media, online payments, and recreational activities.

4.4 Steps that can be taken to improve the level of digitization

In this direction, we must consider 3 levels of addressability: A. Government, B. Business, and C. Citizens.

So we'll look at them one at a time.

A. At the governmental level we could consider:

1. *Regulation.* The main role of government is to build trust in digital services. For this, we need well-defined standards so that users know what the legal value of a digital signature means, the rights and obligations of data processors, and access to EU funds. („Next Generation EU") [10]. Thanks to the „Next Generation EU" instrument, worth EUR 750 billion, as well as specific increases in the EU's long-term budget for 2021-2027, the total financial capacity of the EU budget will reach EUR 1.85 trillion. Together with the three major safety nets for workers, businesses, and states, which were approved by the European Council on 23 April 2020 and together constitute a package of EUR 540 billion, these exceptional measures taken at the EU level would exceed EUR 1.290 trillion, in line with the EU's multiannual financial framework approved by the European Council. https://ec.europa.eu/info/strategy/recovery-plan-europe_en
2. *Deregulation.* Another role that the government has is to stimulate innovation. For this, in some areas, unfortunate regulations must be eliminated: in urban transport (UBER cases, Taxify), in hospitality services (Airbnb), etc.
3. *Construction of digital infrastructure.* In Romania, 10% of the population does not have access to internet connections, largely because their connection is not economically viable. For a faster transition to a digital society, the government needs to develop policies to cover these areas (the RO-NET project being one of them).
4. *Digital administration/e-government.* Increasing the number of forms that can be completed online. Interconnecting at a faster pace the various databases of various

public institutions. Electronic services that the state provides to citizens such as identity authentication or validation of a digital signature can be one the examples.

B. From the perspective of the business environment, we could consider the following:

1. *Innovation.* Much of the digital evolution is given by the global digital industry. Google, Facebook, and Microsoft have contributed immensely to the digitalization of society. Ideally, we should be able to develop Romanian services with high added value both in Romania and in the EU. (A good example is the case: of "Bitdefender" and "GeCAD Software" which are one of the top local software manufacturers and one of the largest exporters of IT services fully developed in Romania.)
2. *Increasing the number of users by making technology accessible* (lowering prices, eliminating language barriers, etc.). The only major criterion in the DESI index in which Romania is not in last place is connectivity, and this is primarily due to industry.
3. *Adoption and integration of new and functional concepts* from private sector companies, such as (ERP / CRM / RFID)
4. *Attracting additional EU funding through the „Horizon Europe"* program will be strengthened to fund vital research in the fields of health, resilience, the transition to a green economy, and the digital transition. The EU will support its global partners by allocating an additional € 16.5 billion to external action, including humanitarian aid: (https://ec.europa.eu/info/horizon-europe_en)

C. In the chapter citizens, we could consider:

1. *Education.* Traditionally, the world views education as part of the first part of a person's life. It is wrong. Any of us can teach our parents and grandparents to use the internet, tablets, smartphones, and cards, with their advantages and risks.
2. *Pressure on the authorities*. Authorities need to be pushed more and more to use digital technologies. From the publication of operating data (budgets, tenders, forms) to the acceptance of the submission of documents and the collection of taxes in electronic format.
3. *Civic Involvement.* Those who want to can get involved in digital digitization projects. OpenBudget, Geeks for Democracy, Code for Romania, and Civic Tech are initiatives that help immensely to digitize Romania.

Besides, to adapt the Romanian legislation to the digitalization strategy of the European Union, the central Romanian authorities have made efforts, at the governmental level, to harmonize as well as possible the conditions for obtaining the strategic technical support of the European Union. Therefore, through the new legislation for electronic signature - GEO no. 38/2020, all public institutions are practically obliged to accept documents in electronic format from citizens.

The new Technical Assistance Instrument (TSI), which is part of the "Next Generation EU" [10] package of measures is closely linked to the Reconstruction and Resilience Mechanism for the period 2021-2024 and has a total amount of over EUR 864 million in the period 2021 -2027 for all Member States, an allocation about 40% higher than in 2017-2020.

Among the major projects of strategic support granted to Romania by the European Union, for the central digitization projects of the local authorities is also the project: "Improving the access and quality of services for citizens". The project is carried out in partnership with the Association of Romanian Municipalities (AMR) and the Norwegian Association of Local and Regional Authorities (KS) - which is also a partner of the program.

The project activities aim at setting up an e-ICT information center which will mainly provide, through an online support office, information and advice to ACoR and AMR members on ethical issues, transparency, conflict of interest, and incompatibility, and conducting training courses for local authority representatives. The target groups are represented by 3,300 representatives of local governments (of which 2,000 beneficiaries at the commune level, 800 beneficiaries at the municipal level, 300 newly elected - mayors, deputy mayors, and local councilors, and 200 elected and heads of municipalities Departments from 5 pilot communes and 3 municipalities).

Romania's role in the context of redefining and adapting the concept of systemic digitalization within the EU is a very important one, and in this sense in February 2015, Romania adopted the „National Strategy on the Digital Agenda for Romania 2020" [11] (SNADR) in which four areas of action are defined to support the EU's digital strategy in Romania as follows: e-Government, ICT (Information and Communication Technology) e-Commerce, and "Broadband"(Digital Services Infrastructure).

A recent study estimates that the successful deployment of 5G technology could benefit around € 113 billion a year in four industrial sectors (automotive, health, transport, and utilities), with these benefits being widespread among businesses, consumers, and society at large.

Regarding Romania's performance in the chapter "Electronic Governance" the report „eGovernment Benchmark 2019" [12] assesses the use of information and communication technologies in public administration, as well as the levels of cross-border interoperability and digital interaction between administrations and citizens or businesses in the EU Member States and eight other third countries. The report shows that Romania has an above-average level (63%; EU average 57%) of using the online channel in administrative services (Access) and a low level (40%; EU average 68%) of administrative digitization (Digitization).

The degree of "Access" - describes the extent to which the online environment is used in administrative services, while "Digitization" refers to the level of digitalization of public administration counters. In this direction, to support the improvement of vulnerable segments, Romania has undertaken several legislative actions to create new support mechanisms, such as Government Decision no. 89/2020 of January 28, 2020, which provides for the organization and functioning of a new body, "Authority for the Digitization of Romania" (ADR) [13] Under the coordination of the Prime Minister, ADR takes over the activities and structures of the Ministry of Communications and Information Society related to the fields of information technology, information society, and the national interoperability framework.

4.5 The implementation of an ERP legislative master plan at the governmental level

The implementation of an ERP system is a solution, given that we need more predictability of the legislative changes that must be correlated with the digitalization administrative reforms, to ensure more targeting and efficiency of the reforms in the public administration. Such an implementation would bring added value in terms of planning and tracking processes and activities, as well as creating systems for monitoring, reporting, and controlling the performance of the institute's employees and deputy directors. Enterprise Resource Planning systems eliminate data duplication and provide data integrity through a single true source, ensuring a series of savings in the institution's budget, decision-making chain management, and operations, economically, efficiently, and effectively.

Capitalizing on such an approach having the direct role of effectively managing the vital information related to the digitization reforms in the public administration, which will oblige policies class, regardless of political color, to collaborate when it comes to the national strategic interest for the sustainable development of society, for increasing the quality of life of citizens.

5. Conclusions

Several research studies have shown that public administration management in Romania has many challenges that there are many challenges of public administration's. Moreover, it is very important to upgrade the national electronic system "www.e-guvernare.ro" and cloud infrastructure Project for Public Institutions in Romania "www.icipro.ro" The main conclusions of this study are that improving public administration's management is possible if it is based on a coherent strategy of digitalization, which may take into account the economic, social, and environmental problems that need to be solved to ensure the transition to the new era of e-government and to lay the foundations for a "Smart City" shortly. To reach our central goal of having a city and smart public policies aimed at increasing the quality of life of the citizen, we need a re-planning of the way things are done through electronic reforms at the administrative level, decision-making decentralization and implementation of financial autonomy when it comes to implementing vital community projects.

On the other hand, it is necessary to draw up an action plan for the development of critical technological infrastructure on the three coordinates: time, money, and quality, in the form of a smart roadmap together with the implementation of control and verification mechanisms, similar to those used in the master plan for the creation of, with clear, precise and measurable objectives. Besides, the acceleration of the expansion of the distribution network ("backhaul") in "white areas, systemic interoperability, and digital services, common problems in the European Union can be achieved through the Agency for Digitalization of Romania created for better monitoring and control of implementation Of the National Digital Agenda Strategy given the EU's 5G strategic goal for 2025.

The challenge of digitalization in public administration is immense, and yet it is achievable if we address the issue systematically. "This challenge can seem ginormous! So when asked, how do you eat an elephant?..meaning when a challenge seems so large, where does one begin, I respond: One byte at a time, and invite a lot of friends" [14].Thanks to the EUR 750 billion Next Generation EU instrument, as well as specific increases in the EU's long-term budget for the period 2021-2027, the total financial capacity of the EU budget, will reach EUR 1.85 trillion. Together with the three major safety nets for workers, businesses, and states, which were approved by the European Council on 23 April 2020 and together constitute a package of EUR 540 billion, these exceptional measures taken at the EU level would exceed EUR 1.290 trillion. Consequently, the redefining and adapting of the concept of organizational reform through digitization in the European Union and Romania is based on solid support and has already made considerable progress, made in the European Parliament and the Council.

All in all, the success of the development strategy by implementing digital reforms and public administration through efficient management of intelligent systems, can be done by promoting and implementing master development plan in-laws, that oblige the political class, regardless of political color to collaborate when it comes to the national strategic interest for sustainable development of society, to increase the quality of life of citizens.

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