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THE CURRENT STATE OF KNOWLEDGE IN THE FIELD, CONSIDERING THE DIGITIZATION PROCESS AT THE LEVEL OF A CENTRAL PUBLIC AUTHORITY

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Abstract: Nowadays, there is a growing trend of citizens using different devices connected to the network to purchase their goods and services in the context where the Internet is accessible from any corner of the world. These trends have generated European projects and regulations, requiring governments that are part of the EU to develop and implement digitized public services, to meet the demands of citizens to have access to public services and the online system. Central public authorities are obliged to develop and implement strategies that allow adaptation to new developments in the field of technology and implement information systems that ensure sustainable, efficient activities according to future connectivity needs, thus satisfying citizens' expectations. In this context, a manager must know, also, what are the essential elements for connectivity needs and the differences between an information system and digitization to adopt the best decisions at the level of a central public authority.

Keywords: technology information, digitalization, central public authorities

1 INTRODUCTION

Specialists in the field regularly publish information on the trends in the field of technology for the coming years. First of all, the visibility, from a global point of view, of the activity of any organization is perceived in the online space, and it is the Internet that facilitates this process. Over the years, the Internet has developed systematically, and today researchers are addressing new concepts regarding the development of the Internet system.

The World Wide Web was the invention by scientist Tim Berners-Lee in 1989 (CERN, 2022), when he was working at the European Organization for Nuclear Research, in French "Organisation Européenne pour la Recherche Nucléaire" and in English "European Organization for Nuclear Research". This project, disseminated in 1990 in the form of a "management proposal" had the role of making it possible to share information and research results of scientists from universities and research institutes around the world through the use of a "global information

system" exploiting computer, data networking and hypertext technology.

2 THE CURRENT STATE OF KNOWLEDGE IN THE FIELD, CONSIDERING THE PERSPECTIVE OF INFORMATION TECHNOLOGY IMPLEMENTATION

2.1 The key elements specific to different phases of the Internet

The first Internet, known in specialized literature as Web 1.0, represented in Fig. 1, had the attribute of being such a database, which could not be intervened by other users but could be queried and read. Over time, the Internet has become the largest existing database, containing both quality information, such as the latest research disseminated through scientific papers but also information that is false or that, at times, has a harmful character for certain categories of public- aim.

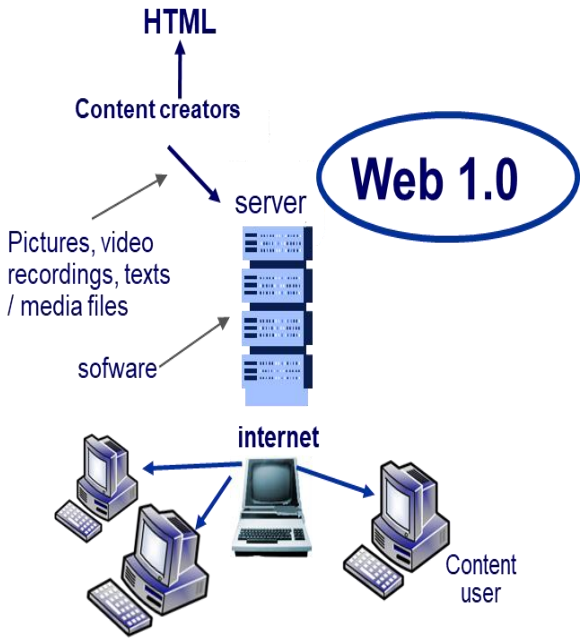

Figure 1. The representation of key elements of internet in Web 1.0 (CERN, 2022)

The period in which Web 1.0 took place was established between the years 1989 and 2005, according to the specialized literature. In 2006, Web 2.0 appeared, and was defined as follows: «Web 2.0 is the business revolution in the computer industry caused by the transition to the Internet as a platform and an attempt to understand the rules of success on that new platform. Chief among these rules is this: "Create apps that leverage network effects to get better the more people to use them. (This is what I have called elsewhere the exploitation of collective intelligence"). (O'Reilly, 2006)

Web 2.0, currently used, includes "relational technologies, participatory media and social media technology that, in a term, can also be defined as a network of wisdom. This generation of the Internet, shown schematically in Fig. 2, use flexible design, creative reuse, updates, collaborative content creation and modification, to help gather collective intelligence". (Choudhury,2014)

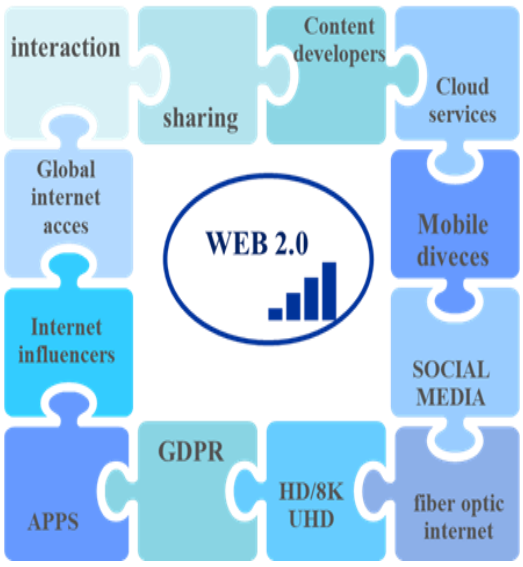

Figure 2. The elements that are specific for Web 2.0 (Choudhury, 2014)

Web 3.0 or semantic web considers that in the future for this generation of the Internet there will be the ability to use a combination of

artificial and human intelligence, which will use non-browser applications. This variant of the Internet, shown in Fig. 3, promises to eliminate powerful companies from the world of technology, such as Google and Microsoft, becoming a decentralized, Peer-to-Peer platform without intermediaries or third parties who will centrally manage the data provided by users.

Web 3.0 has a more powerful language derived from neural networks and genetic algorithms, with a particular focus on analysis, processing capacity and how to generate new ideas based on user-generated information. (Benito-Osorio, Peris-Ortiz, Rueda Armengot, & Colino, 2013)

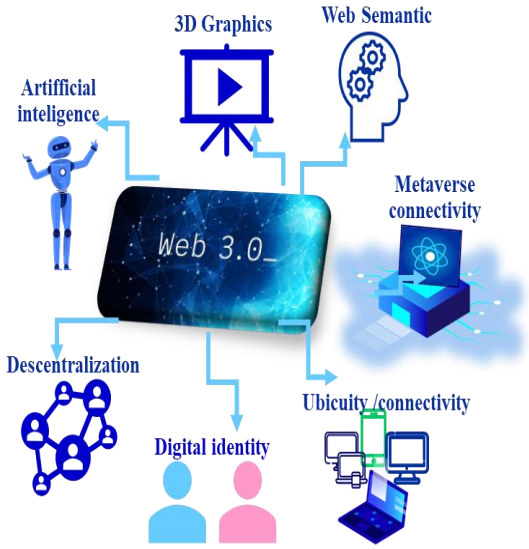

Figure 3. The elements that are specific for Web 3.0 (Marr, 2022)

IT specialists predict that the Semantic Web will use "technologies like blockchain, cryptocurrencies, non-fungible tokens (NFTs) and decentralized autonomous organizations (DAOs) to give us the tools we need to create online spaces that we truly own, and even to implement digital democracies". (Marr, 2022)

The literature presents blockchain as a database that is used as storage for a decentralized network, being used for the purchase of cryptocurrencies such as Bitcoin. (Pierro, 2017)

The Internet is an essential component for any central public authority, as though it takes place:

- the process of disseminating public information, by publishing relevant data for the authority's activity;
- realization of the decision-making transparency process, by publishing all the projects of
- normative acts to be modified by the authority;
- bringing to public attention the wealth declarations of dignitaries and civil servants;
- bringing to public knowledge all public procurement contracts concluded by the public authority;
- information on the contests organized by the central public authority;
- information on the funding sessions that a central public authority periodically launches etc.

In this context, it is important to analyze what are the trends from a technological point of view regarding the novelties of the Internet to have the ability to adapt the public services offered by the central public authorities to the new social realities.

To manage the databases and information resources owned by any organization as well as possible, it is important to invest in the latest generation computers, whether referring to desktops or laptops. First of all, the investment is justified because it is not possible to administer a database, which will later be exploited for the benefit of the organization, with central units running at low speeds and slow Internet connections. Thus, it can be considered that one of the development strategies for any organization should also include the modernization of computers.

Today, the offer of computer manufacturing companies is generous, having established specialized offers for different types of activities. For example, some companies tout their offerings with the latest technology solutions

that promise to "improve productivity and streamline operations." These technological offers are addressed to different categories of activity, such as:

- the field of business, with offers for large enterprises or small businesses;
- for study, addressed to students in particular;
- for organizations active in the media and entertainment industry;
- for developers and programmers or IT specialists;

Also, the offers of technology manufacturers propose solutions for the following categories of systems:

- security systems;
- cloud systems, such as APEX, developed by the Dell Technologies Company or the Azure cloud platform, developed by Microsoft;
- data recovery systems;
- payment systems etc.

The integral part of information technology is represented, in addition to data, by hardware and software, and currently the most important companies producing computers or processors in the world bring the latest technologies to the attention of the target audience.

2.2 Information technology versus the concept of digitization

The expression information technology (IT) was used for the first time in an article published in the Harvard Business Review, and the authors stated that this technology consists in three related elements, which are:

- "techniques for rapid processing of large amounts of information and is symbolized by the high-speed computer;
- a second part focuses on the application of statistical and mathematical methods to decision-making problems, represented by techniques such as mathematical programming and methodologies such as operational research;
- a third part is in progress, although its applications have not yet emerged very clearly, consists in the simulation of higher-order thinking using computer programs". (Leavitt & Whisler, 1958)

Technology experts believe that "microprocessor speed, information storage capacity, software capacity, and communications bandwidth open up possibilities to either improve existing products and services or invent new ones. Thus, the use of technology has turned into an important challenge for the management of most organizations". (David & Kenneth, 2002)

At the same time, the development of technology and the openness of governments to a modern public administration, which has partially adapted to technological realities, can be seen from the reactions of citizens to the communications published on the official pages of public institutions, open on social media channels. It can be seen that, currently, there is an increase in the reaction of citizens vis-a-vis the events that take place at the level of a central public authority, which subsequently generate press articles and which can lead to resignations at the level of the government apparatus.

Another problem arising from this new environment is that "citizens are using information technology-generated applications as a platform for mobilization and activism even for the smallest and most radical groups". (Bretschneider & Mergel, 2011) It is easy to notice on social media networks, especially in the run-up to parliamentary and/or local elections, where well-rated candidates are "attacked" by so-called "trolls, haters or by the unidentifiable persons that launch attacks messages against certain candidates, being paid for this activity by political groups.

An aspect pointed out by IT specialists (Bretschneider & Mergel, 2011) is that "the current lack of reliable, evidence-based

assessment measures of the current impacts of new information and communication technology, especially applications which have the potential to change the way government creates and disseminates information".

According to specialists, by implementing government projects, such as the E-governance project, central public authorities "have the opportunity to increase public responsiveness and the feeling that the government is efficient, although, so far, it is not clear whether investments in e-governance have the potential to transform service delivery and public trust in government.

Cybersecurity, accountability, and identity management are open issues that address the question of how government data can be protected from unintended access, who the government will allow access to, and how the government will guarantee an individual's identification. A topic currently under discussion is related to the use of cloud computing and shared services and resources. Contracted cloud service is likely to lead to major security and privacy issues, which can lead to a diffusion of control and services with an overall loss of control." (Bretschneider & Mergel, 2011)

According to the specialized literature, "an information system consists of the collection of processes, data, models, technology and, in part, formalized language, making up a coherent structure that serves an organizational purpose or function. From a functional perspective, an information system is a technologically implemented environment to record, store and disseminate linguistic expressions as well as for supporting the making of inferences". (Hirschheim, Heinz, & Lyytinen, 1995)

The term digitization stands for "the act of digitizing and its result. To digitize defines the act of converting analogue signals into digital signals, and the term digital is defined as that which is or can be represented by numbers or refers to devices that generate, measure, process or store digital signals. (Romanian Academy, 2016)

"Digitalization is a process that has both symbolic and material dimensions. Digitization converts analogue signals into bits represented as 1s and 0s. Therefore, digitization produces information expressed in many different ways, on many different types of materials, and in many different systems. Theoretically, almost any material with two slightly differentiable states can be used to store and communicate digitized signals, including silicon transistors, punched cards or atoms." (Kreiss & Brennen, 2016)

"The potential benefits of digitization are multiple and include increases in sales or productivity, innovations in value creation, also new forms of customer interaction, among others. As a result, entire business models can be reshaped or replaced." (Downs & Nunes, 2013)

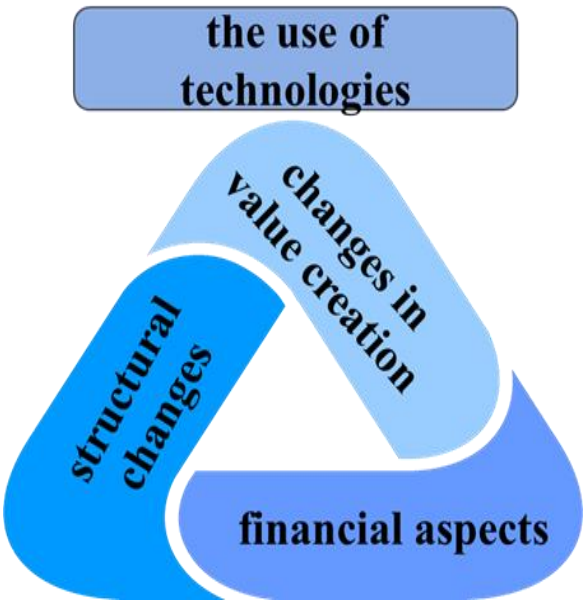

Figure 4. The digital transformation elements (Matt, Benlian, & Hess, 2015)

Technology researchers believe that "a digital transformation strategy is a model that supports organizations in managing the transformations that occur as a result of the integration of digital technologies, as well as in their operations after the transformation.

However, academia still lacks specific guidelines for organizations on how to formulate, implement and evaluate digital transformation strategies". (Matt, Benlian, & Hess, 2015) Regardless of the type of organization, digital transformation strategies have certain elements or four dimensions, as also represented in Fig. 4.

- the use of technologies refers to the behaviour adopted by the organization towards new technologies and its ability to capitalize on them;
- changes in value creation, which refer to how the basic activity of the organization is modified, if the products and services offered by the organization have developed, improved, or the organization has been subjected to some risks, due to lack of experience, as a result of the implementation of new technologies;
- structural changes are considered the changes that an organization must make to specialized structures so that the processes run smoothly. The specialized literature recommends new specialized structures in a situation where the changes brought by the implementation of new technologies are significant;
- financial aspects refer to the economic possibilities of an organization, in terms of financing the implementation of new technologies, respectively to digitally transform the organization's activity.

The specialized literature recommends the top management of any organization carefully analyze all four dimensions to ensure the successful implementation of the digital transformation strategy through the integration of new technologies.

"Governments, over time, aimed to centralize and process collected data. So, data processing has always been central to public administration, and new digital data technologies have enabled a leap in quality due to data density, granularity, linked data and machine learning. These new qualities enable more comprehensive monitoring, more sophisticated analysis and predictions, and thus more effective and anticipatory governance". (Basanta, 2019)

Information technology and digitization are essential for the development of any organization

Thus, according to specialized literature, IT refers to the technological system through which and understanding the differences that exist between IT and digitization is important to note. information technology, such as those presented in Table 1.

Table 1. Defining elements for IT

No.	Defining elements for IT	Defining elements for digitization
1	The computer hardware is used for input, processing and output. It consists of computers, mobile portable input, output and storage devices (Laudon & Laudon, 2014)	Social media applications
2	Computer Software	Sites
3	The Internet connects millions of different networks globally	5G; Digital Commerce;
4	technology (comprises the physical devices that facilitate connections between different hardware components and transmit data such as voices, data, images, sounds and video recordings from one place to another. A network connects one or more computers.	Network and communication; Search engines; Blockchain technology; Big Data

No.	Defining elements for IT	Defining elements for digitization
5	Technology platforms: • intranet (with internal users, which facilitates the connection between different networks and systems within an organization; • extranet (represents the intranet extended to authorized users from outside the organization, with the role of coordinating joint activity);	Cloud Computing; mobile devices; Artificial Intelligence;

3 CONCLUSIONS

At the level of a central public authority, the possibilities of implementing the latest solutions in the field of information technology are reduced, even impossible, in the context where budgetary austerity and the legislation in force regarding the public procurement system, sometimes limiting the quality of equipment and software that are purchased by public authorities. Computers used at the level of central public authorities are most of the time outdated in terms of technical specifications, and special software necessary for the current activity carried out at the level of an institution is non-existent.

Presently, there is a need to purchase multifunction devices whose scanners are connected to the network or which work via a wireless system since the multifunction devices currently in use are not equipped with a system that allows documents to be scanned directly into the computer, a fact that extends the time needed to digitize documents, such as addresses, notes, reports, memos etc. Although the central public authorities do not benefit from the latest IT systems, some young public officials have implemented modern and free data management tools at the institutional level, such as Dropbox or Google Drive, which facilitate the processing of documents. One such example is the one related to the use of a document created in Google Drive for the completion by all 95 institutions subordinate to the Ministry of Culture with information about the events they organize, file subsequently becomes the source of a newsletter that is published, weekly, on the internet and Facebook pages of the institution.

Also, at the level of the ministry, the response to petitions in electronic format is often used in situations where this fact is possible, such as linking to the website where the information exists, for redirection to other public institutions, for providing recommendations or for explaining to the citizens that their requests do not fall within the scope of competence of the institution address. To manage the databases more effectively, registers were created in Google Drive, which can be processed from any computer, this aspect being important specifically when telework situations intervene. Another benefit is that the registers can be queried, in cases where a citizen requests information about the submitted petition, and most importantly, it is much easier to process the data for the elaboration of the annual governmental reports.

To implement the national digitization project, it is necessary to establish, at the level of each central public authority, a modern IT system by investing in computers with technical specifications to be updated, eliminating systems older than 6 years and acquiring, at the same time, special software to help the authority to apply the legislation in force, such as the protection of personal data. Access to fast internet and mobile devices that are always connected via wireless systems is also a must.

From our point of view, digitization at the level of culture would involve the transformation

of the current system (submission of paper files) for obtaining the opinions issued by the specialized commissions established under the Ministry of Culture, into a digitalized system, in the sense that the files be submitted on a digital platform, in electronic format, and the opinion issued by the Ministry of Culture to be issued and available to beneficiaries of public services on the same platform.

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