

Digitization concepts and dimensions

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Received: 01/05/2024

Accepted: 11/05/2024

Published: 06/08/2024

Abstract:

Digitization is the process of changing data into a digital form that can be easily read and processed by a computer. It started in the middle 50s in United States of America and western countries, firstly it began by changing some simple data, but it was quickly developed. The process of digitization involves converting analog information into a digital format. In this format, the information is neatly organized into discrete units of data known as bits, which can be addressed separately. These bits are often grouped together in bytes, forming multiple-bit groups. This smart process led to multiple fruitful uses, in late stages by effecting the digital and the legal organizations.

Keywords: digitization, process, idata, computer.

1. INTRODUCTION

The issue of digitization and digitalization is very used nowadays, because the whole use of digitization in many fields specially in our country Algeria, which begins with the digitization of civil individual documents such as certificates of birth and so on.

To speak about this issue, we must tackle it from its first beginning in the world, The importance of digitization and digitalization is very big in so many domains and is in highly increased way, because of its flexibility of use in difficult times and in far places between so many people as what is used in electronic trade and electronic learning, during the epidemic. I'm going to use the descriptive and comparative approaches in my paper. I'm going to speak in this paper about the creation and different definitions of



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these two terms and in the same time. I'm going to distinguish between them, in the following problematic which is: **what is meant by digitization? What is meant by digitalization? And what is the difference between them? What are the characteristics of digitalization?**

I'm going to tackle this issue in two sections; the first one will deal with the different definitions of digitization, digitalization and digital transformation and the difference between them, while in the second section, I will show the various dimensions and use of the whole technical preceding terms.

2. Definitions of digitization, digitalization and digital transformation

I will deal with these terms one by one, but before that I will start by the history of digitization.

2.1 History of digitization

The charge-coupled device (CCD) invented in 1969 was the first technology to convert light into digital signals, paving the way for the development of digital cameras and imaging. Steven Sasson later created the first digital camera, enabling photos to be stored using computer memory instead of film.

The concept of digitization dates to many historical developments in information facilities and institutions, to facilitate progress.

The office session involves logging into the computer in the United States, in the United States and Britain, since the 1950s, according to Hertz, through the results achieved by the disappearance of paper card records to be replaced by electronic records, which will allow libraries to participate in record networks and exchange them in the field of cooperative cataloging, as well as in the loans between libraries according to the global library project.

The meaning of unifying the catalogs and their texts in the form of libraries of the worlds of the Western superpowers meet the G7 in July 1994¹. With the aim of making all sources searchable via the Internet as a space for information and knowledge in libraries, extending beyond numerous meetings were held by the great powers to digitize libraries by

¹ Ahmed Al-Kubaisi, The development of automated systems in libraries from computing to digitization, Arab Magazine Issue 29, 2008, p8..



intensifying digital connectivity to borrow libraries with the intention of expanding knowledge more broadly borders, and came after many meetings with these forces, the most prominent of which was the Brussels meeting in 1995 to support development in the field.

The economic, social, scientific, and cultural issues adopted by the United States of America, with funding from the National Science Foundation and the Agency NASA satellite channel affiliated with the Ministry of Defense. This project includes the establishment of digital libraries that contribute to scientific research for wellness education, with the support of effective institutions in the United States of America¹.

It then moved across Europe with new projects called Memoria, with the participation of the French National Library (and the Oxford Taste).

Archives and the Toulon Institute for Scientific Research and Institutions in Informatics, or what is known as Toulon to preserve electronic intellectual production.

For qualitative and substantive sectors, which are later linked to the libraries of many developed countries through giant digital library projects².

This long development, over the course of half a century, made it clear that there were labels that imposed themselves on the literature of library sciences, information sciences, and libraries electronic, digital, or virtual, and there has been confusion between them, it should be clarified according to the meanings included in these terms adding thousands of different formats and analog signals that include all digital devices of electronic origin and require an electronic device to become readable, because an electronic statement describes how devices work more than it is a description of the data they report.

The electronic library is the term is more general and has a broader meaning, as it includes both analog and digital, and includes all concepts that aim to use electronic devices such as video machines, microfilm readers, and computers, it includes electronic and digital materials, but these terms, despite their popularity, still suffer from a lot of confusion and

¹ Ahmed Al-Kubaici, The development of automated systems in libraries from computing to digitization, Arab Magazine Issue 29,2008, p6.

² Opcit, Ahmed Al-Kubais.same page.



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confusion due to the lack of interest of a number of Arab theorists in digital writing, and some are interested in defining the meaning of these terms and controlling their boundaries¹.

2 Definitions of degitization

Oxford dictionary defines digitization as the process of changing data into a digital form that can be easily read and processed by a computer² whereas the Cambridge dictionary defines it as changing something such as a document to a digital form (= a form that can be stored and read by computers)³, but others define degitization as follow : (Digitization is the conversion of physical information into a digital format, marking the first step towards a broader digital transformation. It includes tasks like scanning paper documents to create digital copies and converting analogue data (e.g., photos and sound recordings) into digital files.⁴ But same time preserving their shapes . Digitization strives to enhance accessibility and simplify the management of information. It's crucial to understand that the process itself doesn't fundamentally transform how we use the information; rather, it merely modifies its presentation. In other words, digitization is the process of converting data into digital form in order to send it to be processed by a computer⁵. However, this term can take on several meanings depending on the field in which it is used, as it is noted that digitization means:

1- In accounts: the data is presented in digital form so that it can be processed by a computer.

2- In the context of information systems: printed texts (such as books and images, whether photographs, illustrations, or maps).

and it sought from the traditional forms of the forms that can be read by humans (that is, analogues of the forms that can be read by humans).

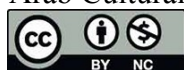
¹ Ahmed Alkubaici, opcit ; p 8.

² Oxford dictionary.

³ Cambridge dictionary .

⁴ Will Doyel, On the cite <https://www.gatherinsights.com/en/resources/blog/the-difference-between-digitization-digitalization-and-digital-transformation-explained>

⁵ Saeed Yaqtin, from text to text, an introduction to the aesthetics of interactive creativity, Beirut, Arab Cultural Center, 2005, p. 21.



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Computer scanning, i.e. binary signals, by using a type of optical scanning device through digital silencers¹

3. Definition of digitalization

Digitization refers to the process of converting analog information into a digital format; Like scanning a physical document into a digital file or creating a digital record of a paper transaction, the benefits of digitization include improving productivity and reducing cost while maintaining accurate data access.

Digitalization is process of transforming the structure, processes, people skills and culture of the entire organization so it can use digital technologies to create and offer products, services and experiences that customers, employees and partners find valuable². In this definition there is an explicit use of digitalization as broader view, though only on organizations (Interchangeable use of digitization and digital transformation not enabling a clear conceptualization)³, but still digitalization as the manifold sociotechnical phenomena and processes of adopting and using these technologies in broader individual, organizational, and societal contexts⁴. Digitalization also defined as processing, storing and communicating, it is a matter of energy and information comprising our world, using strings of ones and zeroes⁵. Interchangeable use of digitization and digitalization not enabling a differentiation and a clear conceptualization⁶, these definitions although they differ in some aspects we are agree about the main idea which is the transformation of data from the

¹ Naglaa Ahmed Yassin Digitization and its techniques in the Arab Library, Cairo Publishing and Distribution 2013, p. 20

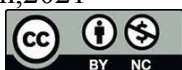
² Frenzel, Adeline ; Muench, Jan C.; Bruckner, Moritz Tobias; and Veit, Daniel, "Digitization or digitalization? – Toward an understanding of definitions, use and application in IS research" (2021). AMCIS 2021 Proceedings. 18.p7.

³ El Sawy, O. A., Kræmmergaard, P., Amsinck, H., and Vinther, A. L. 2016. "How LEGO Built the Foundations and Enterprise Capabilities for Digital Leadership.," MIS Quarterly Executive (15:2), pp. 141–166.

⁴ Legner, C., Eymann, T., Hess, T., Matt, C., Böhmman, T., Drews, P., et al. 2017. "Digitalization : Opportunity and Challenge for the Business and Information Systems Engineering Community," Business & Information Systems Engineering (59:4), pp. 301–308.

⁵ Lyytinen, K., Yoo, Y., and Boland Jr., R. J. 2016. "Digital product innovation within four classes of innovation networks," Information Systems Journal (26:1), pp. 47–75

⁶ Adeline Frenzel, Jan C. Muench, Moritz Tobias Bruckner Daniel Veit, Digitization or digitalization ? – Toward an understanding of definitions, use and application in IS research, Aug 9th, 2021



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pure nature to the digital nature. But return it to the Algerian legislator, he doesn't give it clear definition for Neither digitization nor digitalization, For example articles organising the ministry of digitization, They speak about how to organise the operation of digitization. So, article one states that The General Directorate of Digitization is responsible, in particular, for the following: - Preparing and ensuring the implementation, within a consultative framework, of the national policy for the promotion and development of digitization and digital transformation of public administrations and institutions - Preparing, within a consultative framework, the national strategy in the field of digitization, - Promoting the use of digitization technologies, - Developing, in consultation with the relevant ministerial departments, mechanisms that allow accompanying digital transformation in order to improve the quality of public service, - - improving the competitiveness of economic operators through digitization, - ensuring the establishment of the appropriate environment for implementing electronic governance in consultation with the active parties - a proposal, with the active parties, Elements of the national policy for developing the digital economy, - Participation in promoting and developing environmental systems for digitization and the digital economy, as well as technology transfer and evaluating research results, - Studying and controlling sector development plans and programs and ensuring their implementation, - Promoting, with the relevant ministerial departments, training programs in digitization and the use of future technologies. In the field of digitization, - Preparing periodic reports on the progress of digitization development indicators and proposing every measure and procedure aimed at improving them. The General Directorate includes three (3) directorates)¹.

3.1 Sub-Directorate of Cybersecurity:

It participates in preparing and implementing the national policy for information systems security, - Participate in updating the national reference for information security and ensure its implementation at the sector level, - Participate in preparing the national strategy for developing electronic

¹ Paragraph A from article two from Executive Decree No. 20-364 of 1442, corresponding to December 5, 2020, includes the organization of the central administration of the Ministry of Digitization and Statistics



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certification and participate in its implementation, - Prepare and update, in coordination with the active parties, a map Risks and threats to which the sector's information systems may be exposed, - Participate in implementing awareness-raising, prevention, and citizen protection operations from the risks associated with digitization in coordination with the active parties. - Participate, in advance with the active parties, in developing mechanisms related to protecting the citizen online, and are tasked with the following¹:

-To participate in the preparation and implementation of the national strategy in the field of digitization.

-Implementing operational tools and means for coordination between ministries to enhance synergy between ministerial departments in the field of digitization,

- Preparing periodic reports on the progress of digitization development indicators and proposing every measure or action aimed at improving them, - Implementing, in consultation With the sectors concerned, appropriate financing mechanisms to develop sectoral action plans in the field of digitization and facilitating access to them. - Implementing, in consultation with the sectors concerned, the legislative and legal framework related to the development of digitization.

-Ensuring, in coordination with all effective parties, the collaboration, rationalization and use of government digital resources. Optimum. We notice now that the legal platform to put strong protection for digitization, but till now the Algerian criminal law still as it is except some rare technical crimes.

3.1 Digital Transformation

The long history of digital transformation begins with the first computers, which turned handwritten notes into computerized information that could be processed, analyzed, and shared. With the advent of networks and the Internet, these capabilities have become advanced and data sets are very

¹ Paragraph C/article 2 from Executive Decree No. 20-364 of 1442, corresponding to December 5, 2020, includes the organization of the central administration of the Ministry of Digitization and Statistics.



large. Big data requires more robust digital data management and analysis processes, supported by data centers, data warehouses, and now, data lakes.

3.1 The cloud

Cloud computing is now an essential part of most households and businesses. It has played a vital role in minimizing the social disruptions and economic damages caused by lockdowns and restrictions due to the COVID-19 pandemic. Cloud computing consists of information, application, and computing utilities¹.

The development of the cloud has been in part a response to increasingly large amounts of data and the need for ever-expanding capabilities to manage, analyze, and process this data. AI and machine learning offer more advanced technology options for organizations seeking to transform their operations to achieve better outcomes. Virtual and augmented reality, along with video analytics-based technologies, are part of a mix of innovative capabilities that contribute to digital transformation at scale.

E-learning has become a prominent phenomenon in the digital and technological revolution. The COVID-19 pandemic highlighted the importance of e-learning, showing that it can be as valuable as face-to-face education, if not more so². Distance learning has provided unique features and data, leading to the emergence of skilled professors proficient in computer and electronic technologies. Overall, e-learning has brought about positive changes in education.

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3.1 Demensions of digitization

¹ <https://www.techtarget.com/whatis/feature/The-history-of-cloud-computing-explained>

² https://www.researchgate.net/publication/378658399_E-Learning_A_Communication_Style_Between_Students_and_Instructors_A_Study_of_Its_Nature_Negative_and_Positive_Effects?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19.



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Digitization have many fruitful dimensions and use , such as learning, business, healthcare, administration and so on, restart by do use of digitization in administration.

3.2 Digitization in the Algerian dministration:

Algeria has started using digitization for nearly ten years ago, starting with local administration especially by birth certificates of far residents citizens, which was very helpful and facilitating action For many people because of it's good effect for those people who are suffering from travelling long distances send costume match of money and lose a long time.

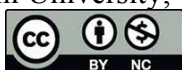
The Algerian state sought in various ways to improve public service, especially at

the local administration level, it benefited from successful experiences in this field, starting with framing and training human competencies, digital services, and monitoring their financial covers to enable the local administration and bring it closer to citizen, adopting modern technologies in the administrative field has become an inevitable necessity, to create a qualitative transformation not only with governmental and administrative functions, but also establishing an information society that has the ability to deal with technical developments¹, which contribute to creating a partnership between most sectors and institutions.

3.3 Causes of using digitization in the Algerian local administration:

- 1) -Local groups are under constant pressure to improve their services due to the many complexities in the field of transactions in various departments.
- 2) -(Bureaucracy is growing daily, as government agencies suffer from a low level of performance in services citizens due to routine procedures and manual methods.
- 3) -Increasing the cost of performing the service.
- 4) -Business disruption and documents being damaged.

¹ Faozia Safi, The reality of digitizing local administration, Journal of Humanities at Oum El Bouaghi University, Volume 7, Issue 3 - December 2020 ,P21.



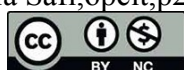
- 5) -The number of offices that citizens must go to to obtain services.
- 6) -The acceleration of technological progress, which led to the necessity of responding and adapting to the surrounding environmental requirements)¹.
- 7) -The application of digitalization methods in many organizations and societies is considered a path that requires countries to catch up development to avoid the possibilities of isolation and lag in keeping pace with the age of speed and information.
- 8) -The need of employees in local authorities for quick and guaranteed transactions through a database.

3.4 Challenges of activating digitization in local administration

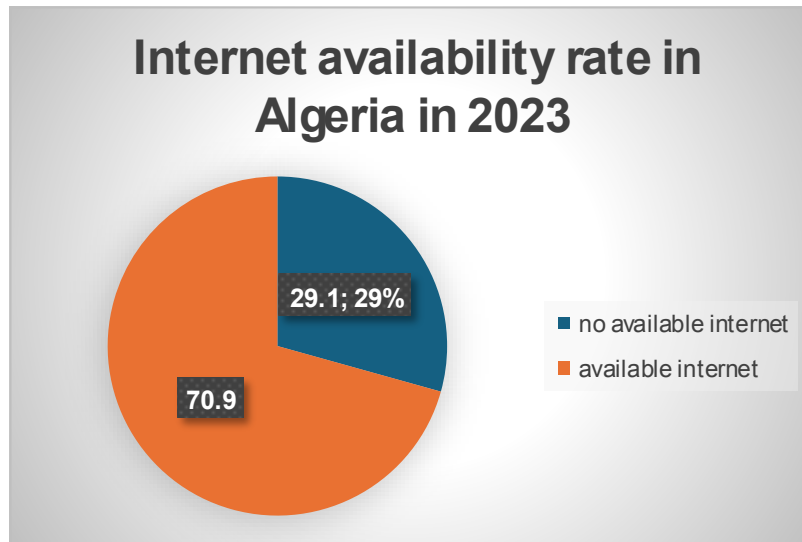
- 1) Protection systems when adopting modern technology are one of the important demands in institutions, with support a system that protects documents and files to become more secure against hacking, especially in financial transactions between Institutions.
- 2) The regulatory aspect is an important aspect in the uses of technology in institutions and the physical aspect and equipment with technical equipment.
- 3) The human aspect and the challenges of training and training in using technology.

3.5 Rates the use of internet in Algeria during 2023

¹ Faozia Safi,opcit,p22



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From the above pie we notice that 29.1 % from the Algerian people have no internet, whereas 70.9 % of them have internet. we can find the majority of people who haven't the internet are those who live in countryside and there for we can't speake about digitization at all in this case, in addition of the low speed of Internet.

4 Digitization in education and higher education learning in Algeria

Algeria has started electronic learning since the beginning of the epidemic, and now It has realised a good position In this kind of learning, using the modal platform of e-learning, Some professors who have a good training even have remote tests and exams and upgrade them, it was really successful experience, but because of the operation of learning needs teachers and students to be aware of use this platform, students should have the same training as the professors otherwise it is useless to use this kind of learning. After the use of the old version of e-learning platform and while professors have started to understand well the use of that platform, an other new platform has been used, however the new one is better specially in the capacity and volume of applauding files and videos, it's still very difficult for a huge number of professors, however, an e- training is having being done nowadays, Which means that our universities need more trainings for both of professors and students. Algeria is not obliged to follow the policies of countries that have been in this regard for a long time.



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Digitisation is fruitful if the service is good itself, for example if any digital operation are going to be held, there must be a great effort to inform people about the use and the deadlines of the operation. As what happened last year concerning the operation of orienting pupils from the middle school to the secondary school about choosing their favourite branch, so the administration of some schools did not you inform well the parents about the importance of the issue and about the digitalization of it, and even about the deadlines, so many parents and pupils suffered a lot from that action, and all administrators reject any solutions and their justifications where that the operation is digitalized, so they couldn't do anything, whereas the issue is a top important for the future of the pupils, I mean by that digitalization is a smart technic to help people not to be obstacle for them, as the jurist Montesquieu said in his book "The Spirit of Law" laws are for solving problems not making them", digitalization IS a so good and important, but before that administrations should be human and logic and must be in favour with citizens not against them at anytime.

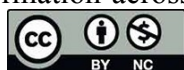
5 Digitization in gaz and oil

The oil and gas industry is experiencing a remarkable shift due to the emergence of advanced technology. Employing various digital tools that are becoming more prevalent across different sectors, such as IoT-powered remote sensors, AI, virtual reality, and big data analytics, the influence of digital transformation on the oil and gas sector is significant. This transformation enables companies to reduce expenses, enhance customer connections, improve operational efficiency, and establish innovative business models in highly competitive global markets¹.

6. Digitalization of trade and shopping services

However, digitization is a fundamental stage of digital transition, it is important to spotlight some dangerous phenomena, that must the legislator

¹ Mustapha al gaouri on <https://www.linkedin.com/pulse/what-use-cases-digital-transformation-across-different-mustafa-kaouri/>



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consider strong laws and sanctions for those who make electronic or cyber crimes, especially in selling goods or delivering them. That's why one can be afraid from using digitization on electronic trade during these circumstances. So before to use this technology, beginning from digitization, digitalization, and digital transformation, we must strengthen our laws and sanctions to be suitable for this technological era.

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4- Conclusion

We conclude that, digitization digitalization and digital transformation are different conceptions for different stages Of digital transformation, so Digitisation Is the first and the basis of the other two stages, I mean digitalization and digital transformation Which deals weather results of digitization use in services, however, what can be confused between the conceptions of digitalization and digitalization, We have tried to clarify and distinguish This technical terms, And then I have presented the very issues all the digital transformation specially in Algeria, I have found in this paper the obstacles that this operation is facing now, and we as jurists, we focus on crimes done in this field and what Should the legislator do concerning just suitable sanctions for those who cheat or tell lies in using or sharing wrong informations, and concerning the technical side there must be well cyber security, these measurements must be done before to use any of these forms of digital transformation.Finally, I have present the results in this paper as flowing:

- 1) The Algerian legislator does notgive a clear definition for the technical following terms: digitization, digitalization, and digital transformation.
- 2) The need of much cyber security.
- 3) The need of strengthening crime sanctions concerning crime is about digitisation and digital transformation.



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- 4) A lack of immediate technical solutions for cyber crimes.
- 5) Michael training and making aware and conscious for those who use electronic devices, either at cybercafés, desks administrations or For individuals.
- 6) On the light of these results, I can present now, my suggestions.

Suggestions:

- 1) The Algerian legislature must give a clear definition for the following technical terms: Digitalization, digitalization, and digital transformation.
- 2) The Algerian legislator must strengthen sanctions all the different cybercrimes.
- 3) The Algerian legislator I must give more cyber security.
- 4) The Algerian administration have to make much more training for all of those who are using electronic devices in order to spread the legal and technical culture among huge amount of people specially those or are concerned.

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