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Diagnosing the use of digital technologies for cloud computing, big data and disclosure electronic accountant in Algerian institutions

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***Abstract*---**Through this study, we aim to diagnose the use of cloud computing and big data by Algerian institutions as modern technologies that contribute to: reducing costs, saving time and administrative effort, and easily obtaining information as a result of the existence of a huge database that enables institutions to analyze customer trends and determine their needs, so that institutions become more competitive and innovative, especially if it follows electronic accounting disclosure, which allows for the rapid dissemination and access of financial information to the concerned parties, as well as the possibility of verifying its accuracy and analyzing it. Through this study, we have concluded that despite Algeria's acquisition of land, sea and space-based facilities for fast-flowing wired and wireless communications, as well as the use of cloud computing and big data technologies by some institutions, innovation in the field of technologies is very weak, according to the Arab Digital Economy Index, which reached 17.38 points. In addition, the lack of digital skills by citizens has led to the failure of some institutions' experiences in the field of cloud innovation and big data. The study also concluded that electronic disclosure in Algeria is very modest and is limited to disclosure according to the method pdf which weakens investment opportunities and making sound financial decisions.

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***Keywords*---**Cloud computing, big data, accounting disclosure, electronic accounting disclosure.
***Jel Classification Codes*:** M15, M40

Introduction

Result of evolution technology continuous and global interconnectedness increasing and multiple technological techniques used in the financial sector, this has led to the need to integrate it into all societies and economic systems. Digital technology and software such as: cloud computing technology big data analysis, artificial intelligence, internet of things…An indispensable necessity Traditional methods of collecting, storing and analyzing data are no longer able to handle the huge growth in the volume of data and information, control them and their storage costs, and make financial decisions effectively. Thus, cloud computing and big data analytics have become necessary technologies within the organization in order to reduce storage costs and administrative effort, as well as access any data and information anywhere and anytime through applications and platforms connected to the Internet. As a result of the aforementioned technological developments, the traditional accounting disclosure process that relies on paper has become ineffective, especially after the widespread use of the Internet and its increasing use by business owners, which led to the emergence of electronic accounting disclosure by organizations including their financial reports and appendices on their websites. Electronic disclosure has evolved from disclosure in the form of disclose using HTML to disclosure via extensible business reporting language XBRL.

And in Amidst technological developments, and like other developing countries, Algeria has sought to establish the foundations of digital transformation. Adopting modern digital technologies such as cloud computing, big data and electronic disclosure because it is considered one of the driving forces that are relied upon greatly to ensure the success of social and economic development programmers, regional or national, as well as the advancement of all sectors and all industrial, commercial and service institutions.

Problem of the study:
Through this research paper, we try to answer: the following problem:
What is the reality of using digital technologies for cloud computing big data and disclosure electronic accountant in Algerian institutions?

Sub-questions:
- What is meant by cloud computing and big data and the extent of their use in global markets?
- What is meant by electronic accounting disclosure and what are its most important advantages?
- What is the reality of technological readiness in Algeria and are modern digital technologies being used?

Study hypothèses:
- Algeria has the basic pillars (institutional, infrastructure, digital citizen, innovation...) for technological advancement.
- Algerian institutions are using modern technologies of cloud computing and big data due to the benefits they bring.
- Algerian companies are active in the cloud computing and big data analysis market
- Most Algerian institutions disclose their financial statements electronically.

Importance of the study:
The importance of the study is highlighted by the fact that the application of modern technologies has become an inevitable necessity dictated by the rapid developments in adopting this technology in all sectors.

Study objectives:
- Knowing what is meant by cloud computing and big data and the market share it has.
- Addressing for electronic accounting disclosure, its types and most important advantages.
- Knowing the uses of modern technologies in Algerian institutions and the challenges they face.

Study method: To address the various aspects of the study, the descriptive analytical approach was used.

1-FrameGeneral of modern digital technologies
Before discussing cloud computing, we will first discuss digital transformation, which is one of its technologies:

1-1 Definition of digital transformation and its requirements:
There is there is a kind of discrepancy between researchers and specialists regarding defining the conceptual framework for digital transformation, in addition to the wide difference in describing its details and applications, which is reflected in the existence of many definitions presented regarding it, some of which we will present below:

Digital transformation is defined as :The process of companies moving to a business model that relies on digital technologies to innovate products and services and provide new revenue channels that increase the value of their products by building a digital strategy and improving the status quo. This can only be achieved by measuring current digital capabilities, determining the best business structure for digital marketing activities in the facility, then determining the requirements for investment plans with identifying the obstacles to digital integration to create a comprehensive and well-thought-out plan for all circumstances and then pushing the wheel of transformation towards the desired path, with the presence of change management for digital transformation to achieve strategic goals.**(The Bar, 2018)**

As known by the company ***IDC*** It is: The continuous process by which organizations adapt to the requirements of their customers and markets (the

external ecosystem) by employing digital capabilities to create new business models, products and services that seamlessly blend digital and manual business and customer experiences while improving operational efficiency and organizational performance at the same time.**(Youssef, 2019).**

Digital transformation is characterized by flexibility and intelligence, as the digital system can be designed to monitor the changing conditions of communication channels on an ongoing basis and correct their path.**. (Imad, 1997)**And also reduce costs and save time .It is characterized by high technology, as it offers its services in an integrated manner, so that all organizations benefit from it on the national, regional, and global levels. This is done through the use of communication technologies, such as text, audio, still images, moving images, two-dimensional and three-dimensional graphics, etc.

And rely heavily on intangible assets that include intellectual property, the development and use of software and algorithms, as well as creative content that plays a major role in the production or delivery of services over the Internet.

-Digital transformation requirements

*** Digital infrastructure :**Such as investing in hardware, software and services, which provide the basis for using information systems in the organization, and providing updating and upgrading of devices such as computers, equipment and software to respond to the required changes that qualify them to Keeping pace with rapid technological changes worldwide.

*** Digital Citizen:** Digital leaders and analytical managers represent the knowledge resources and intellectual capital within the organization, including managers, agents, assistants, programmers and data officers who plan, organize, direct and manage. Therefore, the foundation of a successful knowledge economy lies in education and training to develop human capital and qualify individuals to produce, exchange, disseminate and utilize knowledge effectively. **(Fred, 2022).**

* **Digital innovation**: It aims to enable all countries to keep pace with the accelerating technological future at the international level and to provide learning systems and initiatives that help innovate in line with modern technological trends. In order to access knowledge repositories, absorb these innovations, adapt them to protected needs and create new technology. **(Qurain, 2022).**

*** Data:** Business organizations must regularly and effectively engage in data management and analysis. In order to provide reliable and complete qualitative data with appropriate tools for statistical analysis and future forecasting, data must be monitored to ensure that it is constantly flowing and used in line with the organization's goals and expectations.

*** Digital Government**: The government must invest in information and communications technology to serve its citizens, reduce transaction costs, raise the quality of life for citizens, and achieve benefit among the three relevant parties: individuals, companies, and governments.

*** Digital business:** Business organizations must create an effective technology architecture that improves internal and external performance. This involves creating a technology architecture that includes policies and procedures covering all of the organization’s activities and operations, interconnected with the required technologies, developed applications, and processed data. **(Shabi, 2023).**

There are many techniques the fourth industrial revolution brought:
*** Techniques used to obtain and analyze data :**Such as: artificial intelligence, big data, Internet of Things.
*** Technologies used in data storage**: such as block chain and cloud computing.
***Communication and Sales Technologies Group :**Mobile phones and their applications, chat bots, social media, the Internet....
It will be addressed to Computing Arithmetic and big data Model

1-2 Cloud computing

- The emergence of cloud computing and Definition:
The idea of cloud computing dates back to 1960 and its term was inspired by the symbol cloud which was widely used to represent the Internet in maps and graphs and was expressed by the computer scientist **Carthy Mc John** says, "Computing may one day be regulated as a public utility, and computing power will be purchased in the same way as electricity is purchased from an electric utility ."It has been used the term was first introduced in a 1997 lecture by **Cellapa Ramnath** as it is a new computing model.

The actual development of cloud computing it is began in 1999 when the company introduced **SALSFORCE** is a website for providing enterprise applications. Then, **AMAZON** launched **Amazone** Services Web Service in 2002.AI divorced 2AC In 2006 as a commercial service on the Internet In 2007, **GOOGLE** and **IBM**, along with a number of universities, began a research project on cloud computing. The following figure shows:

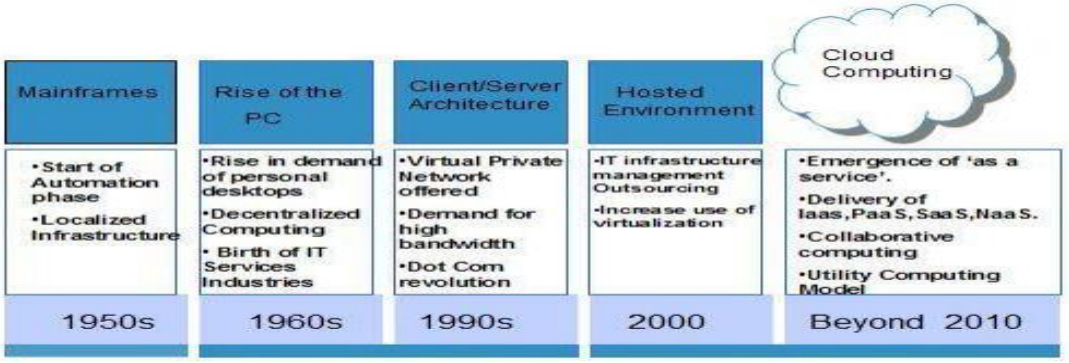

Figure 1-1:Historical development of cloud computing:
Source: Cloud Computing Tutorial Tutorials Point USA 2014 P24

And It was defined by the National Institute of Standards and Technology.***NIST***It is: "a model for enabling continuous and convenient on-demand network access, sharing a set of computing resources (networks, servers, storage, applications, and services), that can be deployed and provisioned rapidly with minimal management effort or interaction with the service provider."(**NIST, 2011**)

Cloud computing is defined as a technology it depends on transferring the processing and storage space of the computer to what is called the cloud, which is a server device that is accessed via the Internet. Thus, information technology

programs are transformed from products to services, as this technology contributes to removing the problems of maintaining and developing information technology programs from the companies that use them, and thus the efforts of the beneficiaries are focused on using these services only. **(Innovation, 2021)**

Or it is the set of devices and machines that use stored data and enable access to the network at any time and place, and help in storing, backing up, restoring and transferring huge data.The following figure illustrates this:

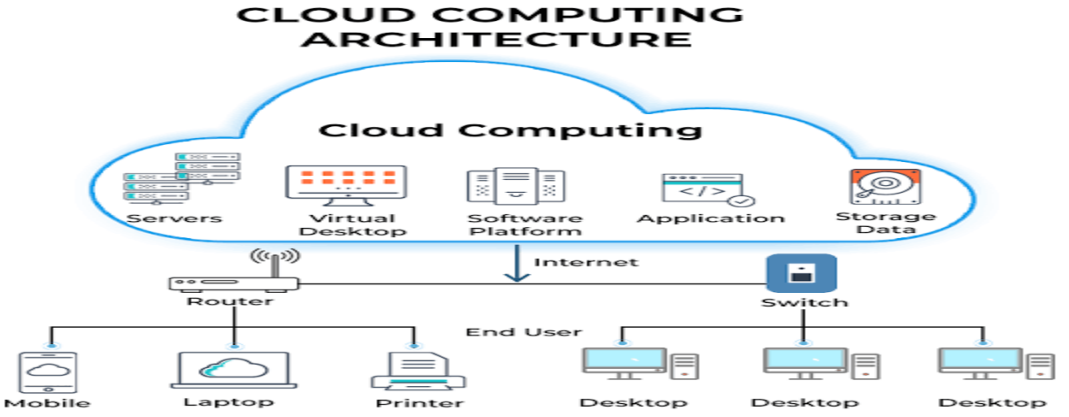

Figure 02: Cloud computing.
Source://www.spiceworks.com/tech/could/articles/what-is-cloud-computing/

Space computing technology is characterized by for many the properties and the many benefits make it widely used in many fields. They are:
-When requesting the service : Users can order and manage the service from the cloud without worrying about technical aspects and infrastructure.
-**Network access**: All beneficiary services, applications and data on the cloud can be accessed by beneficiaries through standardized mechanisms and protocols, and services must be provided to support heterogeneous environments such as phones, laptops and workstations. **(Mazhar Ali, 2015)**
- **Resource pooling**: The IT resources of a cloud computing provider are pooled to serve multiple customers using a multi-tenant model. These physical or virtual resources are dynamically allocated and released according to the customer's request. In general, the user cannot control or know the exact location of the specialized resources.
- **Rapid flexibility**: Resources are allocated and released in a flexible manner, automatically and ideally to quickly adapt to increased or decreased consumer demand. Resources available for allocation appear to be unlimited and can be allocated at any time.
- Service measurement : Resources are provided to each beneficiary quickly, flexibly and on a pay-as-you-go basis.

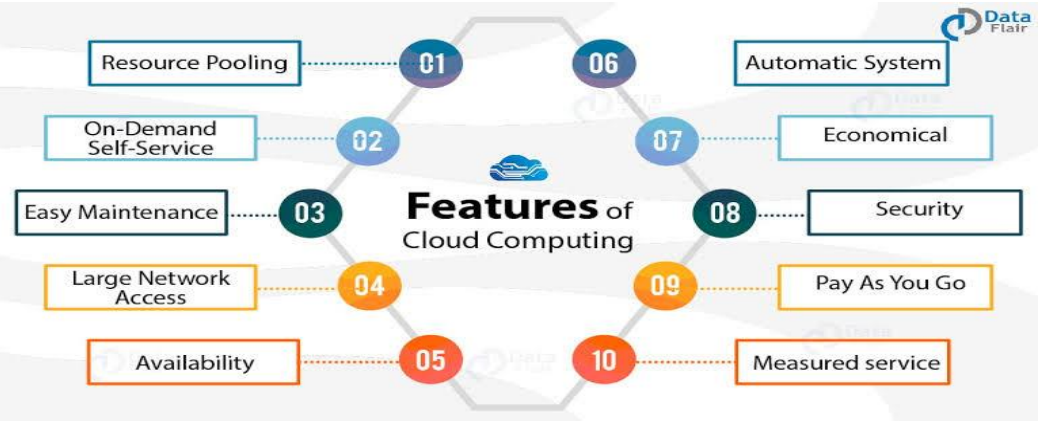

Figure 03: Cloud Computing Characteristics
Source:https://datta-flair.training/blogs/features-of-could-computing/amp/

-Services provided by cloud computing to enterprises and their types: divided to Three sections: **(Warda, 2019)**

The Software *SaaS:
It is the most widely used type began around 1999. The application is licensed to the customer as an on-demand service, hosted on private web servers, downloaded to the consumer's device, and is disabled when the contract expires. These contracts are usually called service level agreements. ***SLA*** Which provides guarantees on the quality of service by specifying what can be expected from the expected service and defining compensation schemes in case the provider violates the pre-specified provider agreements .You do software using a specific application stored in the cloud, for example a program ***Word*** It is located in a data center and you connect to it via the Internet and you write in it, modify and add data and then get the output from it, and all of that while you are on the cloud and your device is just the connection tool, and the user here cannot control the operating system in the cloud nor control the hardware or the network connection like :***Dropbox, Jira, Gmail, Netflix, Office 365***

*** Platform as a service: PaaS**
Using the cloud as a platform to put several applications on it and you can work on all of them, and you can also put a complete operating system and there is integration between the applications. For example, you design something in Photoshop and then it is entered into another application, which animates and adds effects, so you get a video clip with sound, such as***Google***apps is a platform that allows you to add applications as desired.

Infrastructure *laaS:
Here we deal with the cloud as an infrastructure limited to a certain processing capacity, memory size, storage space, and a certain number of users, and you are completely free to use it in the way that suits you. For example, you can install several operating systems and install several applications on each system and allow a certain number of users to enter each operating system to use its applications without allowing them to mix. Windows Azure,Amazon Web services they are important providers of ***laaS***

The following figure summarizes this:

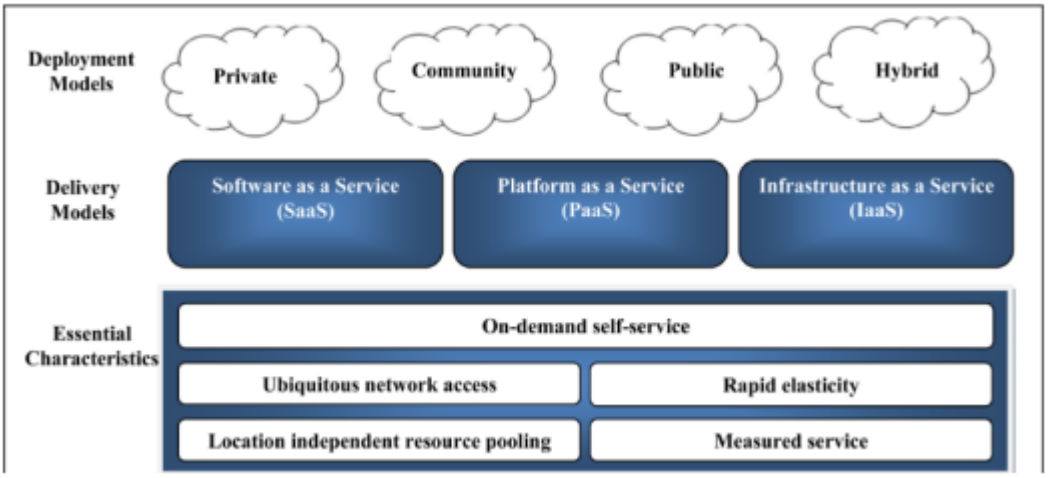

Figure 04: the components Home of Cloud Computing System
Source:T amara Almarabeh, Yousef KH. Majdalawi, Hiba Mohammad, (2016), Cloud Computing of E-Government, Cmmunications and Network Scientific Research Publishing, Volume 8, N°1, P:4.

From the above figure, cloud computing is divided into: to three types:
***Public cloud :**It is an infrastructure that dynamically provides computing resources over the Internet to multiple clients, usually the applications of different clients are mixed with cloud servers. It is the largest sector in the cloud computing market.
***Community Cloud:** It is a collaborative effort in which the infrastructure is shared among several organizations from a specific community with common interests (security, compliance, jurisdiction, etc.) whether managed internally or by a third party, used by a group of organizations that share the benefit and bear the costs with fewer users than the public cloud and more than the private cloud.
***Private cloud**: They represent private networks built for the use of a specific party, and provide complete monitoring of data while ensuring security and data quality. They rank second after the public cloud.
***Hybrid cloud:** It consists of two or more clouds (public and private or public and community) and has distinct components but is linked together by a specific technology that helps access data and applications.

-Cloud Computing Market:

The global cloud computing market is estimated to be worth more than $500 billion.$1 billion in 2023, and globally the cloud computing market will exceed $1 trillion by 2030 as the global cloud computing market has grown to USD 446.51 billion in 2022. It will grow at a CAGR of 17.43% until 2030.The following figure shows:

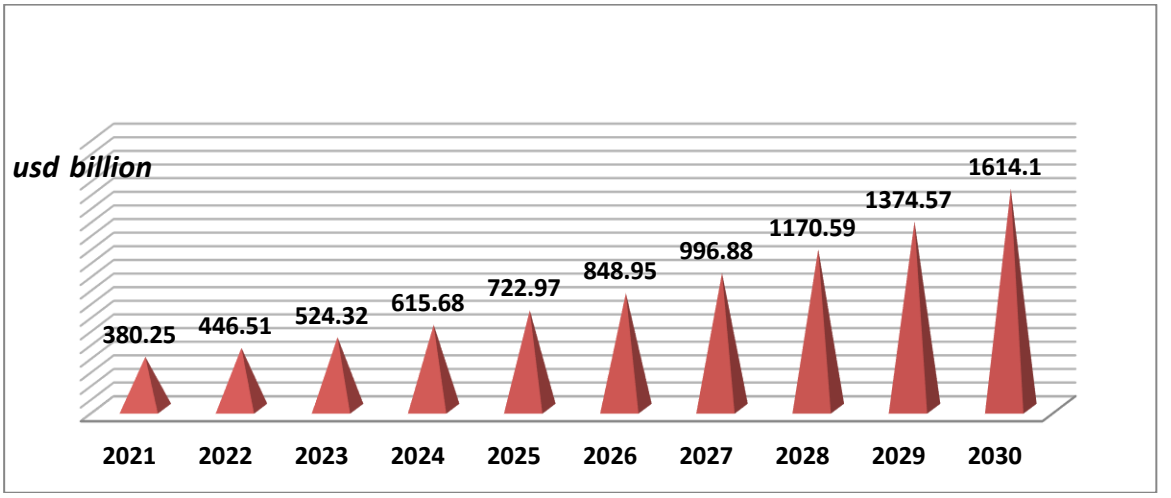

Figure No.05: Global Cloud Computing Market Size And his expectations (2021-2030)

Source: https://wwwprecedenceresearchcom/could-computing –market

North America dominated the global market with a share of revenue over 41% in 2024, and in terms of service, the sector accounted for **Applications *SaaS*** On share revenue reached 55% in terms of publishing and the large corporate sector acquired revenue It reached 51.7% in 2024. In terms of end use, the banking and financial services sector accounted for revenue reached 26% in 2024. As for the United Kingdom, it acquired $431.76 billion in 2024.As for the Arab countries, we mention in particular the Kingdom of Saudi Arabia, where the size of the cloud market is estimated at 4.04 billion dollars in 2024 and is expected to reach 8.8 billion US dollars in 2029, which is a small percentage. The following figure shows the development of the size of the cloud computing market in the United Arab Emirates and its expectations until the year 2034.

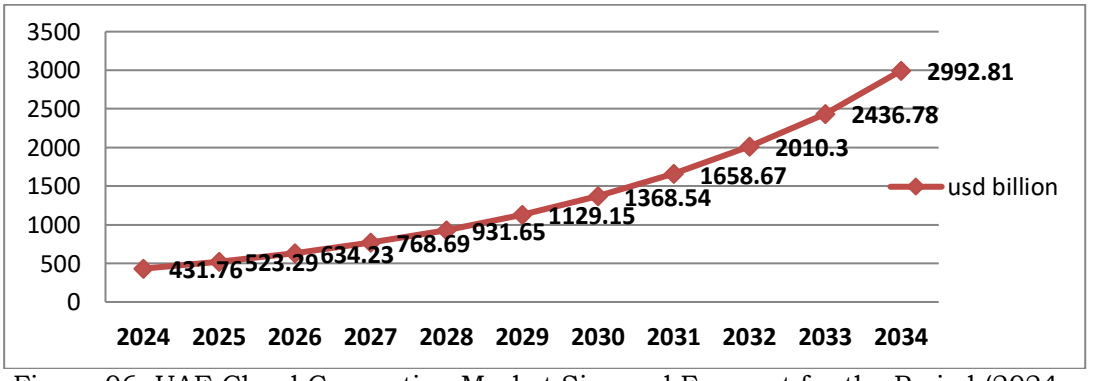

Figure 06: UAE Cloud Computing Market Size and Forecast for the Period (2024-2034)

Source: https://wwwprecedenceresearchcom/could-computing –market

And It arrives Spending Global on public cloud by end userto$599 billion in 2023, up from $421 billion in 2021 and about $500 billion in 2022, according to estimates. GARTNER which is shown in the following table:

Table 01: worldwide public services could (million of us dollars)

	2021	2022	2023
Cloud business process services (BPaaS)	51,410	55,589	60,619
Cloud application infrastructure services (PaaS)	86.943	109.623	136.404
Cloud application services (SaaS)	152.184	176.622	208,080
CLOUD MANAGEMENT and security services	26.665	30.471	35.218
Cloud system infrastructure services (IaaS)	91,642	119,717	156.276
DESKTOP AS A SERVICES (daas)	3.072	2.623	3.224
Total market	410.915	494.654	599.840

Source: couldzerocom/ blog/ cloudcomputing-market-size/

- **One of the leading companies in cloud computing** In 2023 we mention:

***Amazon:** Controls 32% of cloud infrastructure services market according to Sunergy Research Group below are examples of the services we provide:Amazon Elastic Cloud Computing (EC2), Amazon Elastic Map Reduce, Auto Scaling, Elastic Load Balancing, Elastic Cloud Front, Relational DB Services(RDS), Elastic Cloud Search, Amazon Platform, Amazon Infrastructure, Amazon Green Cloud, Amazon App Scale, Amazon Windows Azure, Cloud Stack..

Microsoft Azure:** Controls 23% From the market* Microsoft offers subscribers to the program ***Windows Live Messenger Free storage space for the user through the sky dri service

Google Cloud Platform:** Google Cloud platform control ***10*%from the market*this is what the following figure shows:

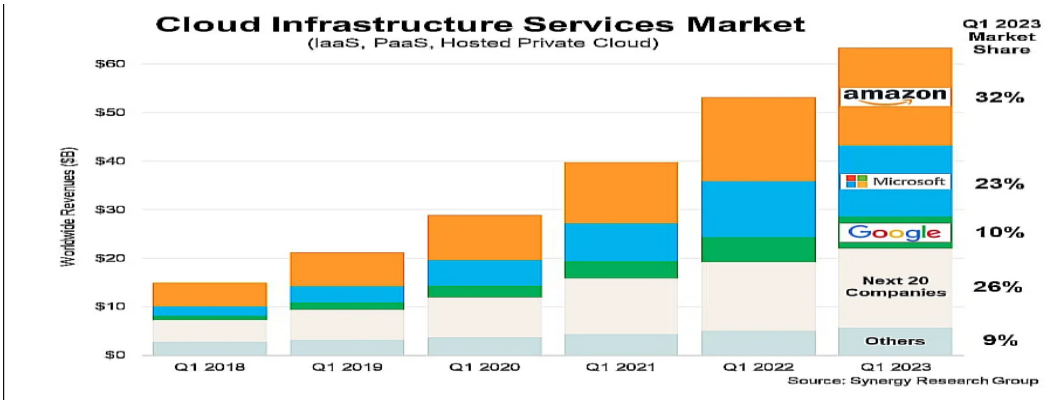

Figure 07: cloud computing market structure

Source: couldzerocom/ blog/ cloudcomputing-market-size/

Advantages and risks of cloud computing:

***Advantages:**

-Reduce costs and benefit from huge economies of scale, instead of institutions and governments spending resources this is the scarcity of equipment and software purchases. And management ICT infrastructures can obtain these

services from cloud computing providers with greater flexibility. **(Development, 12-16 May 2014**).
- Enables organizations to become more competitive due to flexible computing platforms that provide: possibility scalability, high-performance resources, reliable and highly available applications and data
***Risks:**
The biggest risks of cloud computing are security threats to: privacy, identity management, authentication, compliance, confidentiality and integrity, data provisioning, encryption, network security and physical security.**(Mariana Carroll, September 2011)**

1-3 Big data*:*
- Definition:

To get to know Gartner, a leading IT research and advisory company, defines big data as "large-volume, fast-flowing, innovative, and highly diverse information assets that require cost-effective processing methods."Develop insights and assist in decision making.(Laney, 2013)

The McKinsey Global Institute defined big data as:: "Data sets that are too large for typical database software to capture, store, and analyze." Big data is important because the technologies behind it can store, analyze, and manage vast amounts of data that traditional databases cannot handle. One US organization reported that companies that make good use of big data have achieved more than 20% efficiency in formulating their financial indicators.**(Matthias, 2017)**

Accordingly, big data is a set of data that is larger than the capacity to be processed using traditional database tools of capturing, sharing, transferring, storing, managing and analyzing within an acceptable time period for that data. From the point of view of service providers, it is the tools and processes that organizations need to deal with a large amount of data for the purpose of analysis.
-Its sources: It is as follows:
***Sources arising from the management of a program:** whether it is a government or non-government program, such as electronic medical records, hospital visits, insurance records, banking records, and food banks..
***Commercial or transaction-related sources arising from transactions between two entities :**For example, credit card transactions and transactions conducted over the Internet, including via mobile devices..
***Sensor Network Resources:** For example, satellite imaging, road sensors, and climate sensors..
***Tracking device sources:** For example, tracking data from mobile phones and GPS..
***Sources of behavioral data** For example, the number of times a person searches the Internet for a product, service, or other type of information, and the number of times a page is viewed on the Internet.
***Sources of data related to opinions:** For example, comments on social media.**(Milliani, 2019).**

-Big Data Analytics Platforms Tools: There are many platforms, including:
***platform *Apache Hadoop*:** It is an open source software program or platform designed in the Java language, used to process large data stored on distributed applications, where this data is stored on several devices and then the processing process is distributed on the devices to speed up the processing result.
platform *Map-Reduce*:** A distributed computing software model designed by Google and linked to a platform database. ***Hadoop Database It is used to process and analyze huge data stored on several servers called computer clusters. The operations are distributed on these servers, andprocedureThe calculations are performed simultaneously and the results are combined in the second stage.
****platform Apache Hive* :**It is a data ware house. To manage data storage and processing support many systems .administration Databases such as :**Apache HBase (Hadoop database), Mango DB, Cassandra, Oracle Database.**
******platform HPCc :****It* is an open source, free and easy-to-use platform, designed based on distributed computing clusters to provide high-performance, parallel processing. For big data.
******Platform Mongodb*:A free and open source platform classified as a database.***NoSQL***It stores and processes data in a format ***JSON*** It is a very useful tool for big data analysis.
******Platform Cassandra*** It is an open source distributed database management system capable of processing a large amount of data distributed across multiple servers.
******Program Excel* :**It is a common tool of ***microsoft*** Where data stored in can be linked***hadoop***With the program***excel2013***And use it to process big data and extract reports and charts.

- A Use of Big Data in Enterprises:
*Big data has enabled businesses to significantly increase their profits and enhance their competitiveness. Knowing customers' aspirations, trends and psychology enables profitable companies to provide products and services accordingly, thus ensuring customer satisfaction and increasing sales.
* Monitoring information and storing it in a special database in order to track and target advertisements sent to customers' mobile phones and tablets. American Express has succeeded in exploiting a database containing a huge amount of data for credit card holders from around the world and understanding consumer behavior more deeply and predicting future transactions. **(Abdul, 2021)**.
*It enables customers to identify their requirements and what they want, and focuses on providing the best services to meet their demands. Organizations can analyze customer behavior and follow their trends to produce customer-oriented products..**(Statistics, 2021)**
*Enabling banks to achieve greater returns by collecting and analyzing more comprehensive customer data and the ability to promote each product according to each customer's requirements, which increases the rate of customer interaction and use of banking services and products, maintaining customer sustainability in light of the great competition and enhancing the "Know Your Customer" initiative..
*Today, companies and organizations of all kinds can more accurately analyze customer movement, buying, selling, etc., so that they can, accordingly, know the most in-demand or stagnant goods and suggest certain goods to their customers according to the customers' purchases. They also have the ability to understand

customer behavior more accurately and identify the distinguished ones among them and those who need help or to determine their trends and monitor their performance. This is not only for traditional sales centers, but also includes electronic stores on the Internet and on a wider scale.

Figure 08: Big Data Market Size and Data Growth Rate.
Source: Big data market size revenue forecast worldwide from 2011 to 2027, Statista

2- Disclosure electronic accountant:
2-1 Definition:

He knows disclosure accounting is the inclusion of financial reports on all necessary and essential information. To give users of these reports have a clear and accurate picture of the economic unit. **(The Most Gracious, 2023)**.

And he knows disclosure electronic accounting is the establishment of a website by the economic unit on the international information network (the Internet),to disseminate information that sees the economic unit covering different and wide sectors of network users. (**Debreceny, 2005**).

It is also known as publishing financial statements and the information attached to them, such as the auditor's report, whether annual or periodic, using computers and storage media to facilitate their preparation and storage, then using communications and Internet systems to display and distribute them remotely to its users, whether by publishing them on its website .Electronic or link it to an official website, or both. (**Aziz, 2017**)

An institution is considered to be applying electronic disclosure if it provides the following on its website:
*A complete set of annual financial statements including: clarifications margins, auditor's report and board of directors' report.

*Connecting tools ***links*** It works to link the information contained in the rules .and the financial and financial reports on the company's website contain any other important information, whether on the same website or on another website.

2-2 Stages of development of electronic accounting disclosure:

The electronic accounting disclosure of companies, commercial banks and financial institutions has gone through several stages, which can be presented as follows:

The first stage:** It started in the early nineties of the last century, where companies and banks that applied this disclosure relied on the use of cd .CD*** In publishing and distributing accounting information to users, where financial statements and reports were copied onto these discs and distributed in traditional ways through regular mail to users.

***The second stage:** At this stage, companies were making an exact copy of the accounting information using electronic paper, which was called pdf although this stage was characterized by quality and low cost, it took a long time to download files, and there was an inability to create relationships between files through interactive links, which did not allow users to navigate within the site between sections of a single report, in addition to the inability to conduct any direct analysis because the information had to be re-entered again, as well as the inability to index accounting information. (Ahmed, 2015)·.

The third stage:** To avoid some of the previous drawbacks, the interactive text markup language was used at this stage. ***HTML In displaying accounting information on the company's website, despite the positives of this stage, it had fundamental defects and criticisms: such as its low efficiency in saving or printing the required financial reports, not providing additional data, and the user's inability to use it directly for analysis.

Stage Four:** It was characterized by the use of the Internet, where the extensible Markup Language appeared.XML*** It was used in designing programs to prepare financial statements and financial reports, and then the expanded business reporting language appeared. ***XBRL*** It is an idea presented by Charles Hoffman in 1998, a certified public accountant in Washington. Through it, the user can conduct analyses of accounting information without having to re-enter it as before.

2-3The benefits it brings disclosure electronic among these advantages are: The following: **(Al Majid, 2023)**)

- Delivering financial information to the largest possible category of users with minimal effort and in a short and immediate time.
- Providing immediate feedback, as any ambiguity or error in the information can be corrected by the company immediately after observing users' reactions, unlike disclosure paper,
- Facilitating comparisons between the financial information for the current year and previous information for the same company by searching for disclosures for previous periods in the company's website archive.
- Expanding disclosure by attaching explanations, statistics, figures, etc. to the financial statements. Videos can also be attached that include explanations with sound and image, which increases the transparency and ease of understanding

the financial information, especially by investors with limited knowledge of accounting and finance.

3- The use of digital technologies, cloud computing and big data and their role in improving electronic disclosure:

3-1 The reality of technological readiness in Algeria and the uses of cloud computing and big data in some institutions:

In the field of infrastructure, Algeria has:

-The fiber optic link between Algeria and Ain Guezzam is an integral part from the optical fiber sea link between Algeria, Niger and Nigeria .

-A submarine link for human fibers linking Oran and Spain with a capacity of 100 giga bits_/second.

- 4G mobile phone, future work on 5G technology and the Internet of things.

communications satelliteAlcomSat-1 launched by Algeria in 2017.

The following are the indicators of information and communication technology in Algeria:

Table No. 02: Information and Communication Technology Indicators in Algeria

	2017	2018	2019	2020	2021	2022	2023S1
Number of fixed line subscribers	4.100.982	4.164.039	4,635,217	4,785,763	5,097,059	5,576,193	5,934,394
Number of mobile phone subscribers	/	47.154.264	45.425.533	45,555,673	47,015,757	49,018,766	48,915,484
Fixed internet network	/	3,063,100	3,580,455	3,789,128	4.175.372	4,705,846	5,095,712
mobile phone density	/	109.6%	104.7%	103%	104.4%	107.0%3	105.07%

Source: Report on the development of indicators of wired and wireless telecommunications services, Ministry of Post or Telecommunications, Directorate of Statistics, Studies and Foresight for the first half of 2023, pp. 6, 10, 11, 13.

We note from the table above the development of the number of participants in information technology in Algeria for the years (2017-2023), where we note that the number of subscribers to the fixed telephone network has been increasing over the years from 2017 to 4,100,982 subscribers and continued to increase until the first half of 2023 until it reached 5,934,394 subscribers, as for the number of mobile phone subscribers, we note that in 2018 it reached 47,154,264 subscribers, then decreased in 2019 and 2020 to 45,555,673 subscribers, then it returned to rise in 2021 and 2022, then the number of subscribers decreased in the first half of 2023, as we note the number of subscribers to the Internet network is constantly increasing, and this is what the statistics recorded from 2018, the number of subscribers was 3,063,100 subscribers, and continued to increase until it reached 5,095,712 in The first half of 2023, as for the mobile phone density, it recorded its highest value in 2018, then decreased during the three years 2019, 2020, 2021, then returned to 107.03%.% in 2022 and then decreased in the first half of 2023. We conclude that Algeria is witnessing development in terms of information and communication technology indicators and that there is great awareness of the use of technology.

According to the Arab Digital Economy Index for the year 2024, Algeria was included in the group of countries active in digital transformation, which includes: Algeria, Jordan, Tunisia, Egypt, and Lebanon. All of these countries achieved results above 44 points for Lebanon and below 53 points for Jordan. Algeria ranked 11th. This index is based on 5 main axes and 09 basic pillars.

Table No. 03: Digital Economy Index in Algeria

Axes	Pillars	Index value	Arrangement
Digital foundations	Institutions	28.7	11
	Infrastructure	51	8
After innovation	Innovation	17.4	12
	Technology Readiness	60.4	12
	Market development	33	12
Digital Government	Digital Government	56.1	11
Digital Business	Market development	33	12
	Financial market growth	19.5	11
Digital Citizen	workforce	46	6
	Infrastructure	53	8

Source: Arab Digital Economy Index 2024 The Rise of Artificial Intelligence Applications in the Arab Economy, Arab Center for Learning and Future Studies, Abu Dhabi, United Arab Emirates, p. 321.

From the table above, which shows the indicators of the digital economy in Algeria, we notice that: Algeria Ranke ditheistic ten at each level pillar: institutions, digital government and financial market growth And the 12th place: innovation, technological readiness, market development, 8th place in infrastructure for qualifying citizens and providing digital foundations, and 6th place in the workforce because what distinguishes Algeria is the young workforce. The reason for these ranks recorded by Algeria is due to the low level of use of technology, as well as the unsuitable legal framework and other reasons that made Algeria late in adopting and applying modern technology.
Here are some results of the sub-pillars:

Table No. 04: Results of the sub-pillars

Sub-pillars		Index value
Technology Governance	Secure Internet Servers	30.92
	Electronic security	32.79
	Online shopping	8.78
	Access to information and communication technology	72.2
	Use of information and communication technology	66.7
Infrastructure	Technological inclusion	47.11
Innovation	Percentage of total expenditure on research and development	8.3
	Knowledge absorption	20.4
Technology Readiness	Adoption of emerging technologies	47.15
	Investing in emerging technologies	34
	Ai	100

Source: Arab Digital Economy Index 2024 The Rise of Artificial Intelligence Applications in the Arab Economy, Arab Center for Learning and Future Studies, Abu Dhabi, United Arab Emirates, pp. 321-322.

Through the results of the index presented previously, and despite Algeria's progress in rank from 12th to 11th, there is a weakness in the readiness of the Algerian state in general. As for the infrastructure pillar, which shows the state's ability to establish and maintain the physical and digital structures necessary for digital prosperity, its value reached 51 points, and the institutional pillar reached 29 points, which is somewhat weak. As for the workforce pillar, it reached a total of 46.75 points, and the digital government, which shows the extent to which government institutions harness technology, reached 56 points. As for the innovation pillar, the total points were 17.38, which is very weak, and technological readiness comes before it with 27 points, which is concerned with the readiness of the Algerian state to keep pace with development. As for the financial markets, the total points were 19, which is also weak.

*Cloud computing is considered one of the areas relied upon to achieve the technological leap. There are two types of it: the private cloud, where Algeria Post seeks to hold many meetings with public and private operators active in the field of cloud computing services, represented by:***ATM MOBILIS Spa-ELECTRONIC BUSNNESS SERVICES -IICOSNET -ADEX TECHNOLOGY…..** Public cloud is like corporate cloud.***MOBILIS –OREDOO.. .***
*Mobilis has launched its service mechanism For computing in style ***Saas*** and it is a service directed to institutions and offers them a comprehensive professional email. http://www.mobilis.dz/entreprises/cloud_mobilis.php
*The National Insurance Company also**a2**Moving from traditional cloud computing to cloud computing modern has adopted cloud services provided by the company ***Microsoft Azure*** and that starting since august 2018, the service has adopted ***Office 365***gesticulate It included applications such as :One Drive, Outlook, Word, Excel… These are services that require a direct connection to the

Internet. The One Drive service is a group of services that allow storage over the Internet. The Word Online service and the Excel Online service are used for treat tables and convert data to graphs...and share files directly and platform tems that allow By conducting calls and conferences.....**(Najib, June 2021)**
*The applications used by Algeria Telecom are:
***HR Software :program HR Access:** this allows the program HR Access allows access to all information related to each employee from anywhere, whether through the operational directorates or through the General Directorate, which facilitates the work of the Human Resources Department.
***Human Resource Management Information System(FTP):** Which It is used to send and update employee files electronically through the internal network of the Algerian Telecom company, as it allows for the creation of an electronic file for each employee with all his information and documents, and the information can be accessed through the various operational directorates and the General Directorate, and in the event of the employee being transferred before sending the paper file, his electronic file can be viewed, which is considered an important step towards moving towards using cloud storage(Cloud) for use in the electronic archiving process.
***program Oracle:** program Oracle will start using the program, where a number of employees will receive a training period on its use, as this program is used in managing human resources and many other operations, and it reflects the institution's orientation towards continuous modernization and renewal, especially in the field of software and modern technologies, and the program is currently used in other departments such as the support and means department.
***program(NGBSS):** is a program for managing various commercial operations, etc., as the program is also used by mobile phone operators (Mobilis).
***Email (professional email):**Professional email is considered the primary means of communication within the organization, as many operations and tasks are sent through it. Any employee can also request any document that interests him without having to go to the department or office from which he wants to request the document (such as requesting salary statements, requesting vacations, etc.).
***Internal network (Internet):**The institution has a very advanced internal network, which contributes to the speed of access to information between the General Directorate and the various operational directorates, which is reflected in the speed of decision-making....
As for big data analysis, most companies rely on ***Excel***

3-2 The reality of electronic accounting disclosure in Algeria:

According to the study conducted by researcher Bourkaib Mohamed Abdel Majid entitled "Evaluation of the Levels of Electronic Financial Disclosure in Algerian Companies", where he conducted an applied study of 50 companies among the most important companies in Algeria, and analyzed the content of their websites to determine the extent to which they include annual financial statements or not, He found that Algerian companies depend to a modest degree on their location. Electronic For disclosure about their financial statements, most companies focus in their disclosure on the budget and the results account only, and this option, despite its scarcity, depends to a large extent on the use of the electronic paper method.***pdf***.

The following table summarizes

Table No. 05: the most important companies that disclose information on their websites

	The company	HTML style	Style pdf	The number	The company	HTMLstyle	stylepdf
1	Saidal	0	1	6	Algerian Insurance Company	1	1
2	Eurasian	0	1	7	National Insurance Company	0	1
3	Rouiba	0	1	8	National Agricultural Cooperation Fund	0	1
4	Alinas Insurance	1	1	9	Biopharm	0	1
5	Sonatrach	0	1				

Bourkaib Mohamed Abdel Majid: "Evaluating the levels of electronic financial disclosure in Algerian companies - an applied study, New Economy Journal, Volume 14, Issue 1, 2023, pp. 315-316.

From the table above, it is clear to us that there are few companies that provide electronic accounting disclosure. Most Algerian institutions, even the leading ones, do not provide financial information about their activities that benefits external parties: such as investors, customers and suppliers... in making financial decisions. Through the study of Bourkaib Mohamed Abdel Majid, it is clear to us that there are only 9 institutions that provide information about their financial data electronically, despite being limited to information about the general budget and the results account table, i.e. there is not enough information. These institutions mostly rely on disclosure according to the method pdf despite the shortcomings that were previously discussed, **Alinas** Insurance and the Algerian Insurance Company are making electronic disclosures according to HTML style.

Conclusion

We tried through this study to recognise cloud computing and big data technologies as two of the most important modern technologies that institutions must use to store, analyze, and retrieve data whenever they need it, as well as electronic accounting disclosure, which has become necessary in light of technological developments. Through our study, we have concluded that:

- Although Algeria has an internet infrastructure, the foundation of institutionalism, digital citizenship and innovation was weak. The use of cloud computing by national institutions is limited to applications adopted from abroad, especially from the company ***Microsoft Azure*** They are mostly free and rely only on services **Sass** while innovation in this field is very weak, this is due to the lack of qualification and training of the workforce in this technological field, on the one hand, some institutions have tried to invest in cloud computing technology, but their projects have failed, as well as the many

legal procedures that cause the disruption of the establishment of start-up companies qualified to develop pioneering innovative projects, on the other hand, despite the tax advantages granted by the Algerian tax legislator to encourage investment in start-up companies.

- When it comes to big data analysis, most organizations rely on software ***excel***.
- Algerian institutions still rely on the old method of accounting disclosure, while electronic disclosure is very weak and depends only on the method ***pdf*** Which does not allow for analysis and retrieval of data, which requires more administrative effort and greater cost, and does not rely at all on the language of expanded business reports at all. Accordingly:
- Algeria has the basic pillars (institutional, infrastructure, digital citizen, innovation...) for technological advancement that are **not yet achieved**.
- Algerian institutions use modern technologies of cloud computing and big data due to the benefits they **achieve**.
- Algerian companies are active in the cloud computing and big data analysis market**. (Unrealized**)
- Most Algerian institutions disclose their financial statements electronically. **(Unverified)**

Recommendations:

The Algerian state must carry out the following reforms to activate its digital technology market and encourage electronic disclosure:

- Establish fair and transparent legal frameworks that encourage technology investment while simplifying regulations. And remove bureaucratic barriers.
- Advancing technology governance and improving transparency and service delivery.
- Promote technological inclusion and develop policies that enhance Integration different segments of society, even in rural areas.
- Investing in training programmers for public and private sector employees and promoting highly skilled labor.
- Promoting a culture of innovation and start-ups.
- Construction regulatory frameworks for digital services :through establishing legal and regulatory frameworks that govern the provision of e-government services and ensure the preservation of privacy, security and trust.

References

1. Alta van der Merwe Mariana Carroll, September 2011, Secure Cloud Computing, Benefits, Risks and controls. : Information Security South Africa ISSApp 03-04.
2. D. and Le Hong, H. and Lapkin, A, Laney (2013), “Big Data Means Big Business”. Gartner, Inc.
3. NIST, (2011) national institute of standards and technology. us department of commerce, special publication 800-145, p02.
4. Fouweather, I. Gregory I. and Vernon, A1, 2017, p39. Matthias. (2017). “Making sense of Big Data- Can it transform operations management?”. p39.
5. RS Chandra, A. Cheh, J. Guithues-Amrhein, D. Hannon, N. J. Hutchison, P. D. & Vasarhelyi, M. A. Debreceny. (2005). Financial Reporting in XBRL on the

SEC's EDGAR System: A Critique and Evaluation. Journal of Information Systems 196.
6. Samee Khan, Athanasios Vasilakos Mazhar Ali. (2015). Security in cloud computing: Opportunities and challenges. Information Sciences (305(357).
7. Salam Mahmoud Abdel. (2021), Big Data Technology, United Arab Emirates: Introductory Booklet Series (Issue 16), International Monetary Fund.
8. Al-Ayashi Zarzar, Hamza bin Warida (2019). Cloud Computing: Concept and Characteristics (Experiences of Leading Countries), pp. 188-189.
9. Arab Smart Cities Forum, Technology and Innovation Report. (2021). Index of readiness of countries to adopt frontier technologies. United Nations Conference on Trade and Development.
10. Bourkaib Mohamed Abdel Majid. (2023). Evaluating the levels of electronic financial disclosure in Algerian companies - an applied study. New Economy Journal, Volume 14, Issue 1, 312.
11. Bouchi Youssef, Jamila Salimi Digital Transformation between Necessity and Risks
12. Khadija Mokhtar, Farid Bouqriris (2022). Digital transformation in Algeria in light of the Covid-19 pandemic, Herodotus Journal of Humanities and Social Sciences, Volume 06, Issue 02, 855.
13. Report of the United Nations Economic and Social Council, Commission on Science and Technology for Development. (12-16 May 2014). Seventeenth session.
14. Tahani Awad Al-Farsi, Najla Ibrahim Abdul Rahman (2023) "The impact of electronic accounting disclosure on the quality of accounting information: a field study on Saudi banks. Arab Journal of Arts and Humanities, p. 208.
15. Khawla Wasil, Dadan Abdul Ghani, Saie Najib. (June 2021), Diagnosing the reality of cloud computing services in the National Insurance Institutiona2. Algerian Journal of Economic and Administrative Studies, Volume 01, Issue 01, 28-29.
16. Rabie Qurain. (2022), The Digital Transformation Model in the United Arab Emirates. p. 308.
17. Safahloul Fatiha Miliani, Rashid. (2019). Big Data, Journal of Quantitative and Qualitative Research in Economics and Administrative Sciences, Volume 01, Issue 02, University of Khemis Miliana, Algeria, 65.
18. Sanaa Raheb, Halima Shabi. (2023). The impact of digital transformation on the job performance of employees in Algerian commercial banks, 693.
19. Adnan Mustafa Al-Bar. Digital Transformation Technologies. Faculty of Computers and Information Technology, King Abdulaziz University, Saudi Arabia.
20. Ghanemy, Sami Mohamed Ahmed. (2015). "The role of electronic disclosure in developing international financial reporting standards and improving the quality of information in Egyptian banks, a field study. Dar Al-Manzomah, Volume 19, Issue 3, Ain Shams University, 169-170.
21. Mohammed Abdul Aziz Mohsen, Abed Hassan Rashid, and Bayan Siddiq Aziz. (2017). The extent of the banking sector's awareness of the importance of accounting disclosure through publishing financial reports - A study on a sample of banks in Erbil Governorate. Academic Journal of Nawroz University, 178.

22. Makkawi Hassan Emad. (1997). Modern Communication Technology in the Information Age, (Volume 1, Edition 02). The Egyptian Lebanese House, Cairo, Egypt.
23. Statistics Center Competitiveness (2021). General Concepts of Big Data, United Arab Emirates: Issue No. 01.