

The Role of the National Statistical Council in Digitizing Statistical Data - a Comparative Study of The Tunisian and Algerian National Statistical Council –

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Abstract: This study aims to compare the achievements of the Algerian National Statistical Council and its Tunisian counterpart. deliberative objectives and results achieved on the ground, In order to access reliable statistical information that contributes to improving strategic and forward-looking vision in various areas, especially social and economic The study found that the Algerian National Statistical Council, since its revitalization in 2021 to the present day, has been virtually disrupted by the lack of access to digital transformation by most economic sectors, despite its trend of digitization. This has led to the lack of access to a huge database that collects all the statistical data. Tunisia's National Statistical Council is an effective council that has been working with public bodies and private institutions for some time to improve the digitization of the various economic sectors in order to achieve the objectives of the Council and the State. This is evident from the general statistics of 2024.

Keywords: Algerian National Statistics Council; Tunisian National Statistics Council; digitizing statistical data; Big Data

Jel Classification Codes : C10 ; P51; L86

Introduction:

Recently, most public bodies and institutions of all kinds in different countries of the world have been rushing to obtain information related to the growth of their societies and their various activities as soon as possible and utilizing the most recent information and communication technology to obtain trustworthy and truthful data

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that aids in making wise decisions and organizing long-term plans for state policies, its institutions, bodies and civil society. Algeria and Tunisia have strived to obtain reliable national statistical data, but this data has remained relative, which may sometimes lead to the construction of studies and policies that do not rise to the aspirations and strategies of the state, and may be incorrect due to their inaccuracy and the lack of use of modern digital tools. In this context and in view of the requirements of reality, both of these countries, have recently rushed to digitize national statistics in various sectors and fields, to obtain a large or huge database (Big Data) by adopting modern information programs. Therefore, it was necessary first to amend their legislation related to their bodies responsible for statistics, organizing them, and defining their objectives and responsibilities. From the above, the problem raised in this study was:

What are the efforts made by the bodies organizing statistics in both Algeria and Tunisia in light of modern information and communication technologies? Is there an effective will on the ground to reach a large and reliable statistical database?

I- Modern technologies for digitizing statistical data:

Before discussing the concept of digitization, its objectives and types, we must know that digital transformation is more comprehensive than digitization, which is the first step towards digital transformation of all sectors, activities and administrations across nations and combining them into a single digital database system.

Digital Transformation: The process by which an organization incorporates digital technology into every aspect of its operations is known as digital transformation. This procedure radically alters how a business provides value to its clients. Businesses use cutting-edge digital technologies to change their operations and culture to better meet the evolving needs of their clients. Examples of digital transformation include:

- Start companies to create digital solutions, such as mobile apps or an ecommerce platform;
- migrate companies from local computer-based infrastructure to cloud computing;
- Companies adopt smart sensors to reduce the operating cost.

1-1 Digital Transformation Goals:

There are several goals that can be achieved through digital transformation (Djennai & boumad, 2024):¹

- Achieving the quality of digital services provided to individuals in society, together with a radical change in services provided to them in the areas of health, education and security;
- Changing business models and improving thinking methods;
- Improving efficiency and reducing expenditure, reducing procedures and applying new services that are fast and highly flexible;
- Work to protect digital data and transparency and raise confidence rates;
- Providing a strategy for creating higher competitive value, sophisticated task forces and sustaining a culture of creativity;
- Utilizing modern techniques for a more cognitive, flexible workforce, predictive blindness and planning;
- Adopt the application of more innovative business models focusing on the use of modern technology and advanced electronic systems.

2-1 Reliability Requirement for Digital Transformation:

The reliability of the information allows for the guidance of decisions, and the reliability of the information is measured by the availability of three necessary characteristics, namely the low rate of error and the elevation of neutrality in transport as well as honesty in expression.

The information is reliable if it is error-free, slavishly biased and genuinely representative of reality and verifiability, and this is what digital information seeks to achieve using modern digitization technologies.(Namir & Saddiki, 2011).²

2) Definition of digitization:

Digitization is defined by several definitions: "The process of producing electronic or digital codes, through the document of another physical object, or by analog electronic signals".

It was further defined as: "The process of digitizing data for computer inspection. In the context of information systems, digitization usually refers to the conversion of printed text or images, whether photographs or maps, into binary signals using some type of scanning device that allows the result to be displayed on a computer screen. .(Mensouria & Rabab, 2024)"³

2-1 Digitization Goals:

Digitization looks forward to achieving many goals, the most important of which are: .(Mensouria & Rabab, 2024) ⁴

- Mass provision of information on digital media;
- Preservation of the original information from damage;
- Facilitating the search and retrieval of information in many ways and making it available to many users;
- Reducing information burdens and time when dealing with customers;
- Provide new information services,
- Reducing human effort in data processing.

2-2 Types of digital technologies used:

Digital technologies play a pivotal role in digital transformation, using these technologies to improve their performance and operational efficiency. Of these techniques used: (cherrad & Tamassaout, 2024) ⁵

- **Cloud computing:** This technology allows data and resources to be stored online, making it easier to access and manage effectively when studying companies' financial data.
- **Artificial Intelligence:** Talk about it is almost endless, but concisely it provides advanced analytical capabilities through machine learning and identification of patterns in any text of whatever type or what it is from corporate data, enabling a more accurate and effective audit.
- **Big Data Analysis:** It enables the extraction and analysis of huge amounts of diverse data for companies at high speed and accuracy.
- **Internet of Things:** Connecting devices and systems to the network to exchange data and corporate data
- **Augmented Reality and Virtual Reality:** creates real-life interactive experiences that contribute to a deep understanding of companies' data arising from different private financial activities that require proper understanding in their context.
 - **Blockchain:** Blockchain allows companies to access the same information in real time from different sources. Most companies use this delivery method to secure their sensitive accounting data and speed up complex processes. (Guellil & Djemaa, 2024) ⁶

3) The relationship between digitization digital transformation:

Digitization refers to the process of converting analog information into digital format; in case scanning a physical document to 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.

Digital transformation, on the other hand, that indicates the integration of digital technology into all areas of business or enterprise, leading to a radical change in how it works and delivering value to customers. This can include not only digitizing existing processes and systems, but also creating brand new business models, products and digital services.

Digitization is component of digital transformation, but it more than digitization of existing processes and systems, requiring a fundamental shift in the way enterprises operate, deliver value and leverage digital technologies to drive innovation, growth and achieve the enterprise's competitive advantage,(Link, 2024).⁷

4) Large data projects for statistical and economic purposes in Arab States:

Some Arab countries have begun the real application of big data at a small pace in the hope of developing these projects and creating other new projects that can be used in official statistics and in the economy as a whole in various sectors, ,(Mekenani & Presenter, 2019,10-11).

⁸ and experiences as follows: ,(ykhlef & Al-Muhammad, 2024).⁹

Table 01: Projects to digitize statistical databases in some Arab countries

Country	Project Name	Project issuer
Saudi Arabia	Data Warehouse project and preliminary project of appropriate mechanisms and applications to apply the concept of big data to support statistical services and products	Saudi Arabian Monetary Corporation
Jordan	National strategy for building a comprehensive statistical system, building administrative records and connecting institutions	General Statistical Authority
UAE	Using big data as a new data source for ICT indicators through innovative methods	General Statistics Department
Oman	Production of statistical indicators from the use of mobile phone data	Federal Competitiveness and Statistics Authority

Source: Imane ykhlef & Al-Taiba Al-Muhammad,IBID.

5) Challenges and solutions for real application of big data in Arab countries:

there are challenges to the actual and real application of large data in the Arab States, as well as providing helpful solutions for statistics and the economy.

1. Challenges:

The main ones are,(Lotfi, 2018, 27):¹⁰

- **Technical infrastructure challenge:** To access large data, it is necessary to provide an infrastructure for data extraction and processing;
- **Challenging software and tools:** Large data needs software and tools needed to centrally store, store and analyze data and integrate all enterprise data. These software and devices need continuous development and upgrading due to the continuous increase in data volume, as well as the need to employ different techniques to maintain information security;
- **The challenge of adequate financial resources:** the introduction of large data helps to reduce costs and provide the required data within a short time and time, but this requires resources to help develop, access and analyse the information technologies necessary for large data systems;
- **Defying legislation and laws:** which must be applied to safeguard the security, confidentiality and privacy of critical information;
- **The challenge of human resources:** the application of large data requires specialists and experts in data science and analysis, as well as the need for technical and practical expertise of human resources, as well as the need to develop the human resource in several specialized and multiple areas;
- **The challenge of cooperation and partnerships:** the need to collaborate with international institutions active in the field of big data, and to contract with multiple partners to provide different services such as data storage.

Other challenges: In addition to previous challenges, other challenges may arise, which may be presented below:

- Different standards and classifications of large data applied by their producers and the lack of global methodologies for the use of large data in the production of statistics;
- How to access modern sources of modern and new statistical data and the continuity of their flow;

- The absence of clear mechanisms, methodologies and policies for the use of such data;
- Difficulty in obtaining and maintaining the availability of large data;
- The governance, relevance, quality and reliability of large data and the collection of full data in a special database;
- A strategy for capacity-building, skills, training, competencies and scientific empowerment in the field of large data;
- Failure to develop and adopt regulations and legislation to protect privacy, confidentiality, security and integrity of data;
- Lack of unstructured data;
- Identifying the needs of parties wishing to use large data;
- Managing change in the area of large data.

2. Solutions that large data can offer in the field of statistics and economics to Arab States:

One of the solutions provided by large data in the field of statistics and economics is: (Lotfi, 2018, 19-21)¹¹

- The use of advanced statistical techniques in data analysis and development of statistical databases;
- Modernization of statistical production processes;
- Improving the quality of statistical models, indicators and outputs of statistical products;
- High-speed, timely and real-time statistics for decision-making;
- Provide record numbers;
- Clarification of analysts' vision;
- Making development decisions;
- Reduce costs and reduce the response burden;
- Accelerate and improve decision-making processes;
- Assists decision makers in the formulation of administrative and economic policies with real-time predictability of economic variables before they occur;
- Timely and immediate economic and financial studies;
- Helping to properly understand current events and promoting awareness of events;
- Large data are assets that increase the value of the companies they acquire.

II. Reality of digitization of statistical data in Algeria and efforts made:

Algeria has carried out a number of statistical operations in various fields, activities and various products. However, it has not been accurate. This is why it decided, through the National Statistical Council under the auspices of the National Statistical Office, to try to digitize the general statistics for the year 2021-2022 in order to obtain reliable information to help build the State's strategies.

1) National Statistical Information System:

There are many statistical bodies in charge of various sectors, but we will focus on the role of the National Statistical Council, which is responsible for collecting all the data.

1. Algeria's National Statistical Council (CNS):

The National Statistical Council was established by Executive Decree 94-01 of 15 January 1994 on the statistical system, which defines the general principles and establishes the regulatory framework as well as the rights and obligations of natural and legal persons in the areas of production, conservation and the use and dissemination of statistical information. ,(Executive Decree No. 94-01, 1994)¹² Under the responsibility of the National Statistical Office* (ONS), the Council's functions were regulated by Executive Decree No 95-160 of 03 June 1995 on the organization of the National Statistical Council, ,(Executive Decree No. 95-160, 1995)¹³ which was amended by Executive Decree No 21-246 of 02 June 2021. ,(Executive Decree No. 21-246, 2021)¹⁴ It was mandated to prepare the planned statistical investigations and works programme for the Year on Statistical Registration and to ensure its implementation by the statistical system's organs. It also provides for the preparation of the Code of Ethics for the profession, respect for statistical confidentiality and the use of scientifically established curricula.

Definition of statistical information: All quantitative or qualitative information that allows knowledge of economic, social and cultural realities through digital processes. ,(Legislative Decree No. 01-94, 1994)¹⁵

The production, processing and dissemination of statistical information is subject to the harmonization and standardization rules formulated and adopted by regulation after the advice of the National Statistical Council. The preservation of statistical information is

consistent with the provisions of Act No 09-88 of 26 January 1988 on the National Archives. ,(Provisions of Act No. 09-88, 1988) ¹⁶

2. Functions of the National Statistical Council (Legislative Decree N° 01-94):

Algerian legislators have entrusted the National Statistical Council with the following tasks:

- Formulation of views and recommendations on the Government's national policy on statistical information;
- Establish and propose a programme containing surveys and statistical work planned for the Year that would benefit statistical registration;
- Ensure, within the framework of the Government's national statistical programme, that the organs of the statistical system ensure the needs of key users of statistical information;
- Prepare the Code of Ethics for the profession and ensure that statistical secrecy is effectively guaranteed and that statistical obligation is respected and scientific curricula are used;
- Participation in the preparation of the organization of statistical information, in particular through the expression of an opinion;
- Each year, the National Statistical Council, at the suggestion of its Bureau, approves a report outlining the circumstances of the previous statistical work programmed and the directives for future programmes submitted to it for consideration. This report, which contains in particular the conclusions and observations made during the year by the Council's specialized committees, is sent to the Minister for Statistics for publication. ,(Amoura, 2024) ¹⁷

III - Reality of digitization of statistical data in Tunisia and efforts made:

For some time now, Tunisia has been trying to obtain accurate and reliable statistics that help to shape the State's future policies and institutions. This is only if it can digitize the statistical sector, such as what it did in the business intelligence information system through the big data lab of the Central Bank of Tunisia.

1) Digital Transformation of Statistics in Tunisia:

1. Definition of the Tunisian National Statistical Council:
Tunisia's National Statistical Council is the official body responsible for collecting, analysing and disseminating statistical data at the State

level and aims to support decision makers by providing accurate and reliable information. Among the Council's objectives are,(Ajina, 2024):¹⁸

- The Council sought to strengthen and develop the national statistical information system to support Tunisia's economic and social growth;
- The Council's commitment to digital transformation, especially with accelerated technological development;
- The Council is committed to adopting digital tools in the process of data collection and dissemination, enhancing the speed and accuracy of its access to beneficiaries.

2 Digital transformation and its importance for Tunisia's economy and economic institutions:

Among the most important achievements of Tunisia's economy in terms of digital transformation are: ,(Ajina, 2024) ¹⁹

- **Economic challenges:** Tunisia faces increasing economic challenges, including the need to create jobs that increase productivity and enhance competitiveness in the domestic and international markets;
- **The role of digitization in addressing these challenges:** Digital transformation is one of the key solutions to help companies improve their efficiency, reduce costs and increase productivity;
- **Opportunities:** Digitization offers Tunisian companies opportunities to access new markets, improve their products and services, and attract foreign investments;
- **Cost enhancement:** digitization can reduce management costs, especially in sectors such as agriculture, textiles and tourism;
- **Competitiveness and growth:** Digital enterprise can reach larger customers and respond quickly to market trends.

3 . The role of Tunisia's National Statistical Council in supporting digital transformation:

- **Providing accurate and up-to-date data:** The Council helps companies and institutions to make informed decisions where it provides accurate and up-to-date social and environmental economic data.

- **Support for strategic decision-making:** The data provided by the Board contribute to the design of business strategies and the direction of investments in a more effective manner.

- **Encouraging SMEs:** Through its data and software, the Council helps SMEs take advantage of digital transformation, increasing their competitiveness and enhancing their growth

4. The Council's contribution to economic development through digitization:

- **Modernization of economic sectors:** Through the data and analysis provided by the Council, economic sectors such as agriculture, industry and tourism can improve their performance and modernize their working methods.

- **Achieving sustainable development goals:** Digital transformation contributes to achieving sustainable development goals by improving efficiency, reducing loss and promoting sustainability in different sectors.

- **Support for national strategies:** The Council contributes to the implementation of national strategies for digital transformation by providing data for their implementation, thereby promoting long-term economic and social development.

- **Innovation:** Modern technologies facilitate the development of innovative products and services, which is essential for the growth of Tunisia's startups.

2) Tunisia's main statistical legislation and regulations:

Among the most important legislative and regulatory texts of statistics in Tunisia are:

- Resolution of the Minister for Development, Investment and International Cooperation of 30 September 2015 concerning the adoption of a national charter for official statistics

- Organic Act No. 63 of 2004 of 27 July 2004 on the protection of personal data

- Legislative Decree No. 2011-54 of 11 June 2011, amending and supplementing Legislative Decree No. 2011-41 of 26 May 2011 on access to administrative documents of public bodies.

- Order No. 2797 of 1999 of 13 December 1999 concerning the formation, organization and working methods of the National Statistical Council.

- Organic Law No. 42 of 2014 dated 21 July 2014 concerning the ratification by the Republic of Tunisia of the African Statistics Charter.

- Decision No. 2002-2925 of 04 November 2002 amending Decision No. 99-2797 of 13 December 1999 on the organization and functioning of the National Statistical Council.

- Decision No. 2004-2659 of 29 November 2004 amending Decision No. 99-2797 of 13 December 1999 on the organization and functioning of the National Statistical Council.

3) Data literacy program:

1- Definition of statistical knowledge: The ability to read, write and communicate data in context to its users, whether internal or external.

2- The development of statistical data in Tunisia: its objective is to develop the culture of data in Tunisia in general, statistical culture and users of statistical information and information public policies and institutions for the private sector or ordinary citizens and the press, The year 2024 was launched by the Tunisian National Statistical Institute in cooperation with the World Bank and the British National Statistical Institute through the organization of workshops to contribute to the development of statistical culture in order to ensure that the data user has the capacity to contribute and use data in a manner where the Government is based and there is no data manipulation. This increases the comprehensiveness and accuracy of the comprehensive census and helps to build a reliable database for proper planning and construction.

The National Statistical Institute for the Development of the Statistical System in Tunisia also aims to develop information through a number of mechanisms under the Statistical Act of 1999 and to revise it in accordance with the new legislation, and to move towards comprehensive statistical information for the public and private sector, through the General Census of the Population, to obtain information useful to public administration in aggregate and economic policies through the digital census.

The National Statistical Institute also has competencies in modern statistical technologies. The World Bank has therefore contributed to helping the Tunisian National Statistical Institute to improve and develop statistics in Tunisia for the benefit of policymakers, the media, decision makers and civil society to link the State, institutions and society.

The year 2024 is statistical census No. 13 in Tunisia's history and the eighth after its independence, through the use of information and

communication technologies and the reliance on digital paintings in the two stages of tribal counting and actual counting through digitization and total reliance on geographic information system (New and Technical Census) This programme allows for documented information that helps to plan and build sound strategies, especially with Tunisia's Vision 2026-2030 strategic planning. ,(Tunisia's National Statistical, 2024)²⁰

3 GIS functioning:

Tunisia's geographic information system planning began in 2010. The program contains digitized maps where agents use digital plates to citizens and institutions through these maps "Each Aoun follows the map of his area so as not to be lost and also to follow the program of these maps and affects the buildings that have been counted, the filling and automatic recording of the data. This shows the buildings that have been aided in the green and have not been through the red. This is in the first phase where the inhabited buildings and uninhabited buildings, as well as the economic installations, are called the tribal stage. After that, the actual stage, which is directed at the dwellers, will be followed by a number of people.

During the use of the Statistical Programme for 2024, commitments have been made that must be adhered to:

- Strengthening the security of information technology SI, which is essential for the protection of personal information as stated in the Organic Act No. 63 of 2004 of 27 July 2004 on the protection of personal data;
- Mobile data collection solutions;
- Integration into SIG's private cloud geographic information systems and redesign of the public network;
- Posting, networking and social networking.

4 Network infrastructure in the framework of the programme's accounting work:

The workplan is as follows: digitization through censuses; Preparations for the general population and housing census (recensement général de la population et de l'habitat 2024); The pre-census phase of the population and housing census, 2024 ,Census phase (RGPH 2024); Requirements and challenges.

Stages of the General Population and Housing Census 2024 (RGPH 2024):

- **Preparatory stage:** methodology, methods, budget approval and transaction completion in addition to preparation of draft census form.
- **Preliminary phase:** (May-September 2004) consists mainly of a trial counting process to confirm the effectiveness of methodology, methods and applications; Tribal counting process during which administrative units are divided into counting areas.
- **Actual counting phase:** (November-December 2024) During the adoption of the reference day for the general census of population and housing, the comprehensive counting of all housing, families and individuals residing on Tunisian soil and the reconstruction of the census form for each family.
- **Two-dimensional survey phase:** (Janhvi-Feffrey 2025) Survey through a sample of provinces in order to validate and comprehensively the data collected during the actual counting phase.
- **Data processing and publication phase:** (March-April 2025) takes place during this phase according to the process of data processing and analysis and the preparation of tables demographic, educational and economic characteristics at the level of all administrative units.²¹

1. Explanation of the network's work: Our main central database (Data centre principle), Contains many virtual devices (VM) which are monitored where tasks are exchanged to be mutual control and confirmation of information protectionist software and information security as well as backup of data, Information is collected from agents in each geographical area using electronic dashboards using a web program led by a group of digitized offices using high-speed antenate flow in order not to delay data collection.

Figure 1: Network engineering for the programme's infrastructure:

- **Inadequate digital infrastructure:** the need to improve Internet coverage in some rural areas. The solution lies in the Council's cooperation with the authorities to modernize infrastructure and provide more accessible data portals.
- **Awareness challenges:** Institutions often lack expertise to effectively analyze and exploit data. The solution is for the Council to organize seminars and training on the use of statistics and digital tools for small, medium and large enterprises.
- **Security challenges:** ensuring the confidentiality and security of data shared with the public. The solution is linked to the establishment of advanced security systems and data protection policies in cooperation with the Government

- **Improving the quality of information:** reliable data allows companies and the state to make accurate forecasts.
- **National economic growth:** thanks to sound decision-making, companies increase their productivity.
- **Global integration:** Successful digitization can enable Tunisian companies to meet the requirements of international markets and attract foreign investment.

Major statistical data have become a prerequisite for many countries and are even being contested by major economic institutions to benefit from them in their various economic activities, as do the major

countries that pay substantial funds for statistical science and provide great possibilities to enable them to find reliable information as soon as possible to build their different strategies and in the multiple areas of socio-economic, political and environmental... This data must, of course, be protected and the necessary means must be provided for information security, especially with a trend towards digitization and digital transformation, which has become an imperative that it must be kept in line and that cybersecurity must be provided because it does not fall into abusers. Algeria and Tunisia, like those States, have been quick to digitize statistics through the bodies responsible for the statistics. The foremost among them is the National Statistical Council of each of the two countries. However, the difference is that Tunisia has reached a digital transformation in the collection of major statistical data and has put in place regulatory, material, human, scientific and technological means in this regard. But in Algeria, despite the delay in activating the Algerian Competition Council, it remains affiliated with the National Statistical Office and has not yet done so. Even with regard to the use of digitization in the collection of statistical data in the general statistics for 2022, it was almost by conventional means and lasted for a full year compared to Tunisia's general population and housing census for 2024.

Results:

- Digital transformation is an imperative for sustainable economic development in Tunisia and Algeria;
- Success in digital transformation must be through the concerted efforts of all actors to maximize the benefit of society and the national economy;
- The National Statistical Council plays a pivotal role and is an essential partner in the digital transformation of the State and economic institutions;
- The Council contributes to guiding the national economy towards a sustainable digital future, based on reliable data and modern tools.

Recommendations:

- All public administrations and economic institutions in all areas should be encouraged to take advantage of available data and invest in digital transformation to achieve sustainable development;
- International experiences should be used to obtain reliable and substantial data;

- Digital transformation is achieved only through the use of modern and secure digital technologies. Therefore, the State, its institutions and economic institutions must provide the latest technologies both for data collection and protection;
- Legislation and laws governing digital operations and the protection of information must be enacted and updated on an ongoing basis and not only through the Protection of Personal Data Act, which Tunisia was the first to enact.

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