People's Democratic Republic of Algeria
Ministry of Scientific Research and Higher Education

L'École Supérieure de Commerce
Higher School of Commerce

Thesis submitted as part of the requirements for obtaining Master's
Degree in Management Sciences.
Option: Companies organization and management

TOPIC:

The effect of digitalization on public organizations performance
Case study: The National Pension Fund (Caisse Nationale des
Retraites)

Submitted by: **Supervised by:**
NEDJAH Wiam   Dr. GUECHTOULI Mohamed

Training organization: The local agency of the National Pension Fund
-El-Oued-
Training duration: 26/02/2023 to 26/03/2023

Academic Year
2022/2023

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Dedication:

First and foremost, I offer my heartfelt gratitude to God, for shaping

my path and providing me with the strength and perseverance to

overcome challenges along the way.

To my loving mother and father, your sacrifices and unwavering

support have been the driving force behind my achievements, and I am

forever indebted to you both.

To my loving grandmother, whom I'll be forever grateful.

To my dear friend RAHMA, whom I have shared this exciting journey

with.

To my sister Aya for her constant support and belief in my abilities.

To my best friends SHEIMA, AMINA, ZINEB, FARAH, I am immensely

grateful for your understanding and endless support.

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I am indebted to every professor and administrator of the Higher School of Commerce for providing a conducive learning environment, and for their commitment to academic excellence.

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Lastly, I would like to express my gratitude to every fellow student I have encountered during my studies.

Tables list:

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Acronyms list:

CAO: Centre d'Acueil et d'Orientation

CIS: Compte Individuel de Salarié

CNR: Caisse Nationale des Retraites

CNAS: Caisse Nationale des Assurances Sociales

CASNOS: Caisse nationale des assurances sociales des Non Salariés

ERP: Enterprise Resource Planning

ICT: Information and Communication Technology

IS: Information System

NPM: New Public Management

STAR: Système de Traitement Automatique de Retraite

TDR: Traçabilité des Dossier de Retraites

Appendix list:

Abstract:

This thesis aims to highlight the importance of digitalization in public organizations and address the challenges they face in adopting digital processes. Through a well-structured approach, the study explores the concepts of performance and digitalization, emphasizing the need for public sectors organizations to embrace digital transformation. By examining the current state of digitalization in public organizations and the hurdles they encounter, specifically in the National Pension Fund local agency, this research emphasizes the significance of concerted efforts to stay abreast of technological advancements. Ultimately, the study advocates for increased efforts in digitalization to enhance the performance and of public organizations in an ever-evolving digital landscape.

Key words: Digitalization, Performance, Public organizations, effect, ICT.

ملخص:

تهدف هذه المذكرة إلى إبراز أهمية التحول الرقمي في المؤسسات العمومية ومعالجة التحديات التي تواجهها في تبني أدوات الرقمنة. باستعمال منهجية منظمة، يغطي البحث مفاهيم الأداء والتحول الرقمي في هذه المؤسسات، ويسلط الضوء على ضرورة تبني المؤسسات العمومية لوسائل التكنولوجيا والاتصالات. من خلال دراسة الحالة الحالية للتحول الرقمي في مؤسسات القطاع العمومي والعقبات التي تواجهها، تحديدا في الوكالة المحلية للصندوق الوطني للتقاعد. في النهاية، يدعو البحث إلى زيادة الجهود في مجال التحول الرقمي لتعزيز الأداء والكفاءة في المؤسسات العمومية في ساحة رقمية متطورة بشكل مستمر.

كلمات مفتاحية: الرقمنة، الأداء، المؤسسات العمومية، أثر، تكنولوجيا الاتصال والمعلومات.

Summary:

General introduction

GENRAL INTRODUCTION:

In today's rapidly evolving world, digitalization has become an integral part of our lives, revolutionizing the way we work, communicate, and access information. This technological transformation has extended its reach beyond the private sector and has made significant inroads into the realm of public organizations. The phenomenon of digitalization in public organizations is not confined to a particular country or region, as it is a global trend that has gained momentum in recent years, from developed nations to emerging economies, public sector organizations are embracing digital technologies to streamline their operations and to improve citizen satisfaction.

Public organizations are adopting digital tools, with the aim of modernizing administrative processes, enhancing public service delivery, and fostering innovation, the Algerian government has been actively promoting digital transformation initiatives.

One key aspect of digitalization in public organizations is its potential effects on performance. As public entities leverage digital tools and platforms, they can potentially achieve higher levels of performance, and enhance decision-making processes.

The performance of public organizations has always been a matter of concern for managers, executives, policymakers, and citizens alike. These organizations, being responsible for the provision of public resources, are anticipated to attain the intended results.

However, with the rapid advancement of information and communication technology tools and their increasing implementation in the public sector, the focus on performance has become even more critical. The rise of ICT tools implementation in public organizations has raised expectations and demands for better performance outcomes. Moreover, the integration of ICT tools enables data-driven decision-making, evidence-based policy formulation, and performance monitoring and evaluation, which are vital for achieving desired outcomes.

The aim is to investigate and provide a response to this main question: **What is the effect of digitalization on the performance of the National Pension Fund local agency (CNR)?**

In order to answer the main question, it is necessary to answer these follow-up questions:

1. How do public organizations define and achieve performance?

2. What is the actual state of digitalization of Algerian public organizations?

3. How does digitalization affect public organizations performance?

To address these questions, we have formulated the following hypotheses:

Hypothesis 1: In public organizations, performance is determined by the degree of achievement of objectives and the quality of services.

Hypothesis 2: There is a gap between the current state of digitalization and the expected or desired level of implementation and utilization of digital technologies and processes.

Hypothesis 3: The use of appropriate digitalization tools, mechanisms and processes contributes to the improvement of public organizations performance.

Research plan:

To provide insights and answer the research question, we have divided our thesis into three chapters.

The first chapter of this study is dedicated to providing a comprehensive overview of the global context, with a specific focus on the literature review that aims to define performance within the context of public organizations. This chapter aims to highlight the subtle distinctions between various types of performance and shed light on the measurement of performance through the use of relevant indicators.

The second chapter aims to provide a comprehensive analysis of the current level of digitalization within Algerian public organizations, taking into account factors such as the adoption of digital technologies, the extent of integration of digital processes, and the utilization of ICT tools. Furthermore, it explores the relationship between digitalization and

performance, investigating how the implementation of digital strategies and initiatives can influence various aspects of performance.

Finally, the third chapter is dedicated to the empirical analysis of the implementation of these principles and methods. In order to gain deeper insights into the practical application of these principles, a mixed-methods approach was employed. This approach combines both qualitative and quantitative research methods to provide a comprehensive understanding of the subject matter. The qualitative aspect involves presenting the various digital tools used within the agency to improve its overall performance. Additionally, a questionnaire was designed and administered to employees to gather quantitative data on their perspectives and experiences regarding the effect of digitalization on performance. By employing this mixed-methods approach, this chapter aims to provide a rich and multi-dimensional analysis of the implementation of digitalization in public organizations.

The importance of the research:

The significance of a master's thesis lies in its ability to bridge the gap between theoretical knowledge and practical application in the professional realm. In our study, we have chosen to investigate the effect of digitalization on the performance of public organizations. This topic holds great importance because just like the private sector, the public sector is trying to adopt the Information and Communication Technology (ICT) tools in order to keep up with the world changes, and to improve the performance of public organizations. By examining the effects of digitalization on public organizations, we aim to shed light on how these advancements can enhance the efficiency and effectiveness of public services. This, in turn, is vital for the well-being of citizens, the success of businesses, and the overall growth of the economy.

CHAPTER 01: PUBLIC ORGANIZATIONS PERFORMANCE

Chapter 01: Public organizations performance

Public organizations play a crucial role in the development and growth of all societies, as they contribute in providing a large variety of goods and services, they also carry out functions with which they guaranty the well-being of citizens. The measurement of the performance of such types of organizations is therefore extremely essential, since it helps them to improve their ways and processes in providing goods and services with better value for money to customers and all tax payers. Measuring the performance of public sector organizations, due to their complexity can also be of a great challenge.

For these reasons, the first chapter will mainly focus on conceptual aspects of performance in public organizations and on how to measure it, in order to understand, furthermore, how it is affected by the requirements of digitalization.

Section 01: The concept of performance

1. **Performance in literature:**

The term performance is ascribed to the Latin word **"performer"** which was firstly used to refer -during the 18 the century- to "execute" or "accomplish", whereas during the 19th century, the term "to perform" appeared in the English language to express both the accomplishment of a process, of a task with the results that flow from it, and the success that can be attributed to it (Pesqueux, 2004, p.6).

The oxford English dictionary takes performance to be as how well or poorly you do something or how well or badly something works. It is also described as the act or process of completing a task, an activity, etc. Through the literature, scholars continuously insist that no standardized or uniform definition of performance exists, and they argue on how it is a multidimensional concept (Ghalem et al., 2016, p.1).

2. **Definition:**

The term performance is commonly used in organizational circles to indicate a certain level of excellence. However, it is quite ambiguous because it is overused in common parlance and does not imply precise definitions and measurements. In fact, those depend on the main goal, the angle of analysis and the user's area of concern.

Webster's dictionary defines performance as "the execution of an action" and "something accomplished" ("Definition of Performance", 2023).

In physics, performance is considered as a "useful effect" regarding the purpose, hence the possible reference to the Larousse definition: "Set of qualities which characterize acceleration, maximum speed, autonomy etc... of which a vehicle or an aircraft are capable" (Pesqueux, 2004, p.6).

An organization's performance is also defined as its ability to deliver basic level of products or services, also to provide a suitable policy and regulatory environment for development to take place (Innocent, 2017).

Organizations strive to achieve the set goals through the use of available resources, therefore the higher quality of the products or services using smaller volumes of resources, means an increase in the level of performance (Brewer & Selden, 2000, p.685).

▶ From the many definitions proposed by the scholars Bessire (1999) chooses to give the example of Bourguignon (1997) who was conducted to identify three main senses (Ghalem et al., 2016, p.5):

- o Performance is success, performance doesn't exist by itself; it is a function of representations of success, variable according to enterprises, according to actors.

- o Performance is the result of action, oppositely to the previous; this sense doesn't have a value judgment. Performance measurement is understood as the ex-post evaluation of results.

o   Performance is action. In this sense performance is a process and " not a result that appears in a moment in time"

▸ Overall, these interpretations offer different angles on the nature of performance, emphasizing its subjective nature, its link to actions and results, and its continuous and evolving nature as a process.

3. Types of performance:

The concept of performance is polysemous, complicated and difficult to define. It has been developed throughout the years and in the current context, it should be noted that this concept has become multidimensional after having been one-dimensional (Issor, 2017).

This complexity implies that performance can't be easily categorized or captured by a single definition, as it encompasses diverse aspects and considerations.

3.1.   Financial and economic performance:

This type of performance has long been considered as the organization's overall performance. It is a measure of the change of the financial state of an organization, or the financial outcomes that results from making and executing decisions made by members of the organizations (Carton, 2004, p.2).

It reflects the effective and efficient firm's usage of its human, material and financial resources. Economic profit is the difference between revenue and the **opportunity cost** of all resources used to produce the items sold ("000: General Economics; Theory; History; Systems," 1983).

Financial ratios are used to get insights and important information on the company's performance, profitability, and financial health. profitability, liquidity, solvency, and valuation.

3.2.   Environmental performance:

It is achieved by the rationalization of first materials and energy use, and the reduction of risks associated with environmental damage. Environmental performance is usually linked

and more emphasized in other sectors like agriculture, transport, industry, tourism and energy. However, models and frameworks for environmental performance measurement are primarily developed for business and may not be directly applicable to public organizations (Lundberg et al., 2009, pp.1017-1024).

3.3. Social performance:

The rising interest about social performance gave birth to the concept of "Corporate Social Performance". It is a concept whereby organizations consider the interests of society by taking responsibility for the impact of their activities on customers, suppliers, employees, shareholders and communities in all aspects of their operations. Organizations are voluntarily taking initiatives to improve the quality of life for employees and their families, as well as for the local community and society at large. Governments are beginning to view social performance as a cost-effective means to enhance sustainable development strategies (Iamandi, 2007, p.4).

4. Performance components:

According to Salgado (2013, pp.3-4), performance is associated with three fundamental components:

4.1. Effectiveness:

Effectiveness is the level of achievement of objectives, it's the ratio of the results and the objectives. In public management it focuses on the extent to which public organizations are able to achieve their intended outcomes and meet the needs of their stakeholders.

$$\text{Effectiveness} = \text{results obtained} \setminus \text{targeted objectives}$$

4.2.   Efficiency:

Usually measured in terms of resources use, with the relationship between the results and the amount of input used. for instance, in the public sector, it refers to the ability of public organizations to minimize resources use while achieving their goals.

$$\text{Efficiency} = \text{results obtained} \setminus \text{Used resources}$$

4.3.   Relevance:

The volume of resources used must be relevant to the objective.

Figure 1: Performance triangle (Gilbert 1980)
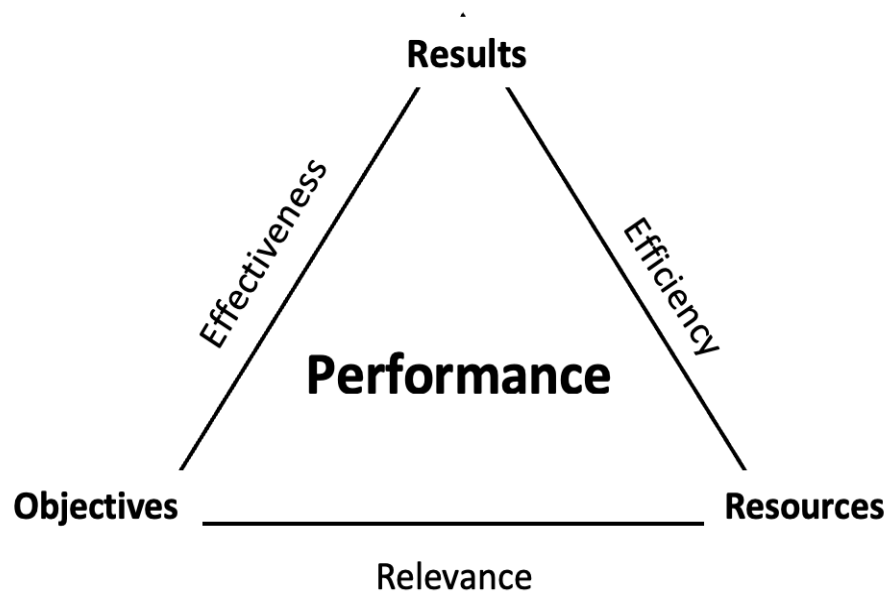
Source: Performance triangle (Gilbert 1980)

It should be noted that:

- Resources are so much more difficult to quantify in the public sector, because they are generated and used from different sources. But, in general, the inputs are given by the expenses incurred for the project or the service in matter.

- Results are much harder to quantify in public sector than resources, because they can have both an economic and a social dimension.

Section 02: The conceptual framework of public organizations

1. **Definition:**

"It can best be looked at as an instrument that is used for the realization of the goals of government" (Mohit Bhattacharya, 2011, p.1).

Kast and Rosenzweig (1985) viewed the organization as an open, sociotechnical system composed of a number of subsystems.

It is an institution or entity, usually controlled by the government, which provides public services for the society:

In an organizational sense, we designate all the bodies and personnel responsible for the conduct and execution of public tasks.

In a functional sense, a public organization aims to achieve the needs of general interest in a disinterested way.

2. **Key concepts related to public organizations:**

2.1. **The public interest:**

All the government bodies aim to highlight this concept through various public policies and mechanisms put in place to promote the public interest which distinguishes public organizations from private ones. they must serve a higher purpose, and even though some people may disagree about precisely what is the public interest, it should be considered as a general guide for their actions. A public organization's main concern is assuring the interest shared by the citizens of the state or community, and preventing those exercising public power from using it for private gain (Rosenbloom et al., 2008, pp.7-8).

2.2. **The Sovereignty:**

It is the concept that refers to the government as the ultimate dominant power or supreme political power and authority within its jurisdiction (Rosenbloom et al., 2008, pp.7-8).

It is not possible in any case for any person, to carry out an economic activity, political, or social activity as well, without obtaining a legal license to practice these activities, which is granted by public organizations.

2.3. The public service:

Any activity that results in the public interest of a society, supported by public authorities. There are three public services principles as conceived by Louis Rolland (Michel, 2020, pp.231-248):

- o The principle of equality: it imposes equal access to public services, and equal treatment for the users. This principle can be modernized by implementing the principle of neutrality, that prohibits any distinction based on religious, political, ethnic or cultural affiliation.

- o The principle of continuity: this principle prescribes regular operation of the public service, without interruptions except in the case of a regulated strike.

- o The principle of mutability: or the principle of constant adaptation of the public service, meaning constant enhancements must be carried out by public organizations so the users can have the best of what the public service has to offer.

3. The evolution of public administration concept:

Public administration as an independent subject of study began in 1887 and the credit goes to Woodrow Wilson. Likewise, Nicholas Henry (2015) has explained the evolution of this discipline following five successive paradigms:

Phase 01: The politics /Administration dichotomy: 1887-1926

1887: Woodrow Wilson originated the politics/administration dichotomy, which is the distinction between political activity and administrative activity in public organization he said in his essay 'The Study of Administration' that it was more difficult to run a constitution rather than framing one and he stressed the need for a separate study of administration.

1900: Frank J. Goodnow wrote his book, 'Politics and Administration' emphasizing the politics-administration dichotomy, "politics has to do with policies or expressions of the state will while administration has to do with the execution of these policies". He explained.

1912: a Committee on Practical Training for Public Service was established in 1912 by the American Political Science Association which recommended that professional schools were needed to train public administrators.

1926: Leonard D. White wrote his work, 'Introduction to the Study of Administration' that was the first textbook of Public Administration.

Phase 02: Principles of public administrations: 1927-1937

Theme: To discover Principles of Administration.

1927: W. F. Willoughby wrote on the importance of the 'Principles of Public Administration', where he asserted that "in administration there are certain fundamental principles of general application analogous to those characterizing any science"

1937: Luther H. Gulick and Lyndal Urwick's 'Papers on the Science of Administration' in which the general thesis was "that there are principles which can be arrived at inductively from the study of human organization which should govern arrangements for human associations of any kind"

This phase is regarded as a golden era in the evolution of the discipline.

Phase 03: THE CHALLENGE: 1938-1950

Theme: Challenge to the principles of administration & politics- administration dichotomy and stress on human relations.

1938: Chester I. Barnard's 'The Functions of the Executive'

1946: Fritz Morstein Marx's 'Elements of Public Administration' was the first to argue that politics and administration couldn't be dichotomized, because of the latter's political nature.

1947: Simon's 'Administrative Behaviour: A Study of Decision-Making in Administrative Organization' was published. He demonstrated that there existed a counter-principle for every administrative principle, rendering the concept of principles irrelevant.

Also, Robert Dahl in his essay entitled 'The Science of Public Administration: Three Problems' argued that Public Administration is not a science and should focus on psychological aspects of human behavior.

Similar critiques emerged in the late 1940s, burying the assumption that principles of administration, whether public or private, could be discovered in the same way that laws of science and nature could. As a result, by the mid-century, the two defining pillars of Public Administration - the politics/administration dichotomy and administrative principles - had been abandoned.

Phase 04: Crisis of identity (1951 - 1970)

Theme: The future of the discipline appeared uncertain due to challenge to the principles so stress on interdisciplinary study.

- Many moved to administrative science and founded the 'Journal of Administrative Sciences Quarterly' in 1956, on the assumption that there is no distinction between business and institutional administration and that administration is administration.

- Further, such works as James G. March and Herbert Simon's 'Organizations', Richard Cyert and March's 'A Behavioural Theory of the Firm', 'March's 'Handbook of Organizations' and James G. Thompson's 'Organizations in Action' gave solid theoretical reasons for choosing Management as the paradigm of Public Administration.

But in both the situations, either with Political Science or Management, the essential thrust was one of Public Administration losing its identity.

Phase 05: Public policy perspective new public administration (1970 - PRESENT)

Theme: Public Administration became Inter disciplinary and led to rise of New Public Administration.

Public Administration went through the following events:

- The first was the creation of multidisciplinary programs centered on policy science. Three significant inter-theoretical links may be recognized in this regard: a) politics-administration union, b) economics-administration confluence, and c) organization theory-administration intermixing.

- The second was the creation of New Public Administration (NPA), a result of the first Minnowbrook Conference, hosted by Dwight Waldo in 1968, which placed a greater focus on values rather than the conventional aims of efficiency and effectiveness. Furthermore, it emphasized relevancy, social equality, and transformation.

- In the late 1980s, the New Public Management (NPM) idea proposed by David Osborn and Ted Gaebler in their book 'Reinventing Government' stressed the use of private society style models to enhance the public sector's service and service orientation. Individuals were viewed as 'customers' or 'clients,' rather than as citizens. Some critics believe it is unsuitable because individuals are treated as economic units rather than democratic participants. Despite this, the paradigm is broadly recognized at all levels of government. It also explored the transformative powers of modern Information Technology tools.

  The distinction between administration and management is becoming irrelevant.

4. New Public Management:

Public sectors underwent reforms in the late 1970s under the New Public Management (NPM) umbrella. Management concepts from the private sector have found their way into all areas of the public sector, including transportation, security, and even central bureaucratic functions, in ways that were previously unknown of in the public organizations. The fundamental premise was that adopting business-like procedures would increase public organizations' effectiveness and efficiency, and most scholars agree on a minimal definition for New Public Management and its basic elements, it is an "attempt to implement management ideas from business and private sector into the public services" (Lapuente & Van De Walle, 2020, pp.461-463).

4.1. The principals of NPM:

NPM does not have a single model, but it appears in these principles (Kalimullah et al., 2012, pp.10-11):

1. An emphasis on hands-on professional management skills for active, visible, discretionary control of organizations (freedom to manage)

2. Explicit standards and measures of performance, meaning that goals and targets are defined and measurable as indicators of success.

3. Greater emphasis on output controls. Resource allocation and rewards are linked to performance.

4. Shift to disaggregation of units in the public sector, signifying a transition from unified management systems to corporatized units of activity, organized by products, with devolved budgets.

5. Shift to greater competition in the public sector, a move to term contracts and public tendering procedures, introduction of market disciplines in public sector, as to lower costs and achievement of higher standards through term contracts … etc.

6. Stress on private-sector styles of management practice, such as the use of short-term labor contracts, the development of corporate plans, performance agreements, and mission statements

7. Stress on greater discipline and economy in public sector resource use, such as cost-cutting, efficiency, raising labor discipline ... etc.

Figure 2: From traditional public administration to New Public Management
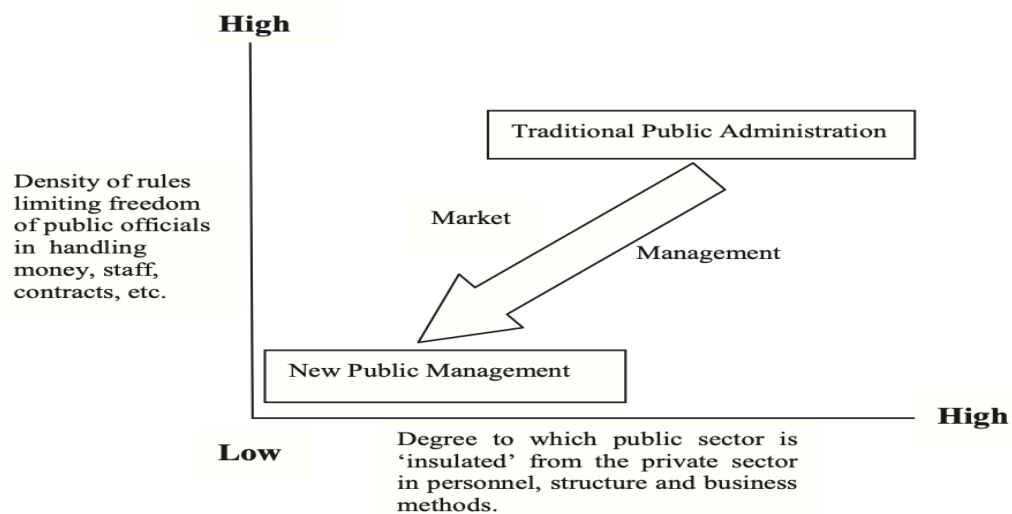
Source: P. Dunleavy and C.C. Hood, 1994, p.10.

4.2. The goals of NPM:

According to Bodemann (2018, pp.57-58), researchers in the field of public management presented this exciting new method, to address and achieve the following objectives:

- Improving and increasing the effectiveness of public institutions, also enhancing the quality of public services.

- Modernization and development of several elements in governmental organizations; **the use of ICT.**

- Aiding public organizations in attaining their objectives and strategies.

- Minimizing the negative effects of excessive centralization and bringing public administrations closer to the citizens

- Lessening the pressure and strains on public organizations by enlisting the assistance of the private sector when necessary.

- Orientation towards performing services in a modern way, using modern technological tools, according the citizens and individuals' needs and aspirations.

- Changing the perception of public administrations at the national level, especially those that have a poor reputation among the public, which necessitates implementing radical reforms.

▸ **The primary goal of New Public Management is to ensure the efficient and effective delivery of public services to citizens and to promote the public good.**

5. **NPM reforms in Algeria:**

According to Bekhechi-Chouikhi and Benmansour (2016, p.25), several initiatives have been taken to improve the quality of public services and decentralize decision-making power, such as:

• Prior controls have been eliminated or lightened.

• Contracting is becoming widespread.

• Budget preparation procedures are reviewed with a view to increasing the responsibility of managers in terms of allocating financial envelopes.

Section 03: The measurement of public organizations performance

Performance measurement is a concept rooted in private organizations. This practice derives its legitimacy from the fact that it represents an engine of development for the activity of the organization and contributes to its expansion. In recent decades the concept of performance measurement has in turn invaded the public sector, through the advent of New Public Management.

1. Performance measurement systems:

According to Neely a performance measurement system is "the process of quantifying the efficiency and effectiveness of action". Poister, s.d. suggests that evaluating performance should be done by a defined performance measurement system in order to systematize data collection, analysis and production of indicators. Public organizations must take their time to establish the procedures and run the processes and not make a sudden and unannounced leap towards measurement, so that the system works correctly and has the expected results. The level of dedication of the organization's managers will determine how well the measurement performance system works, they gain a better understanding of the system during its design and implementation (learning by doing) (Assou & Chemlal, 2021, pp.35-36).

Figure 3: Performance measurement systems
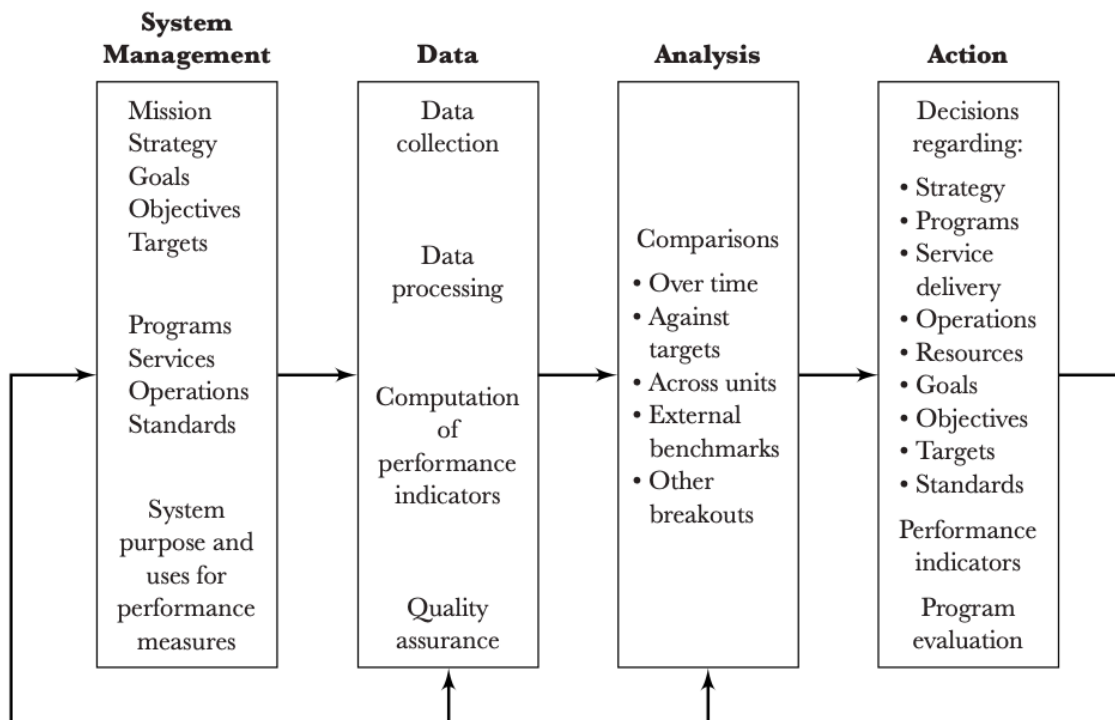
Source: Measuring performance in public and nonprofit organizations (Poister, 2003)

Poister (2008, pp.15-17) explains the four steps to a successful performance measurement system:

- management is in charge of creating, implementing, and maintaining the organization's programs, services, and operations as well as its standards. Management is also in charge of employing measuring methods to boost performance generally, managers must clarify and communicate the strategic framework including the agency's mission, strategies, goals, and objectives, within which the performance measurement system will be employed. They must also make sure that the system is suitably oriented to that framework.

- Data collecting and processing is the most time-consuming and expensive aspect of performance monitoring, The information must be combined and integrated in common databases since it is frequently entered by decentralized organizational units

scattered across different locations. The indicators must be calculated from the raw

data pieces since the raw data by themselves typically do not represent the real

performance indicators. These computations frequently take the form of averages,

percentages, rates and ratios, and rates of change. In addition, the system must

produce reports, displayed in formats that are useful given the purpose.

- Analysis Component: performance measurements on their own are frequently

  ineffective because they are devoid of context. To translate the indicators into

  information and allow for meaningful interpretation, they must be compared to

  something. The most relevant comparisons often indicate performance metrics across

  time; has performance improved, deteriorated, or remained static? or against

  predefined objectives or targets; is performance where we want it to be?

- Active actions If the primary test of a successful measurement system is how well it

  improves performance, then the data must be utilized to influence decision making.

  Managers should pay attention to performance data and take the findings into account

  when making choices on overall strategy, program design and implementation, service

  delivery systems, ongoing operations, resource acquisition and usage, and a range of

  support systems. As the agency has more experience with the system, the performance

  data may be utilized to adjust goals and objectives, targets, and standards, potentially

  "raising the bar" for expectations as actual performance improves over time.

2. Performance indicators:

According to Probst, Deller, and Maher (2009), performance indicators are precise

numerical metrics used to evaluate different aspects of performance. They emphasize that the

actual amounts utilized, rather than the initially planned or budgeted amounts, are crucial

when measuring performance. The authors further state that performance indicators generally

include the following (pp. 11-13):

- **Input**

- **Output**

- **Efficiency**

- **Service Quality**

- **Outcomes**

The performance indicators should also be accompanied by **explanatory data.**

2.1.   Input indicators:

Input indicators represent the resources allocated to and used by a program. Costs, including both direct expenditures and fringe benefits, as well as labor hours, are included. The materials utilized to create outputs and outcomes are known as inputs. Examples might be:

- Service cost, it includes the amount spent on personnel, administration and logistics.
- Direct labor hours.

2.2.   Output indicators:

Output indicators relate to the quantity of units produced; how much work has been done. They are the products provided and the services delivered and are typically under managerial control. Outputs include not only the products and services produced by the organization but also by contractors. Examples might be:

- Total number of served citizens.
- Total number of treated files.
- Total number of treated patients.

2.3.   Efficiency indicators:

Efficiency indicators are calculated by using the ratio of inputs utilized to produce one unit of output, (or output per unit). Examples might be:

▶ **Cost per unit**:

- Cost per mile of street or road paved.
- Cost per counter transaction.

▶ **Productivity:**

- Hours per service user complaint.
- Files treated per employee.

2.4.   Service Quality Indicators:

Indicators of service quality relate to citizens satisfaction, accuracy of service delivery, and/or timeliness of service delivery. Examples might be:

- Percentage of respondents satisfied with service.
- Frequency of repeat repairs.
- Average wait time.

2.5.   Outcome Indicators:

Outcome indicators are the qualitative results associated with programs and services. Outcome indicators are the result of your program efforts and resource expenditures. They focus on the purpose for providing a specific service. While outputs are what work the organization does, outcomes are what these outputs accomplish. Examples might include:

- Reduction in fire deaths/injuries.

- Increase in service users' satisfaction.

- Increase security.

- Rise in citizens' awareness about offered services.

- Reduction in service users' complaints.

- Improvement in workers productivity.

Figure 4: the relationship between inputs, outputs and outcomes
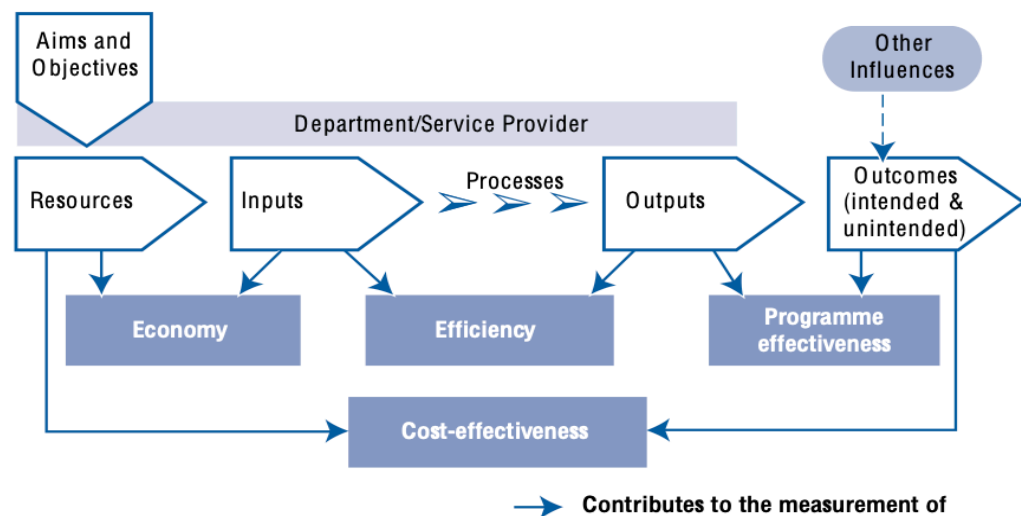
Source: National Audit Office

3. Balanced scorecards in the public sector:

According to Pidd (2010, pp.207-209) significant distinction between the private and public sectors public sector organizations frequently confront multi-dimensional missions, where financial considerations are just one of numerous that must be taken into account. This multidimensional challenge makes the idea of a balanced scorecard seems like a highly appealing tool. The balanced scorecard is a management tool that can be utilized in public service organizations to monitor and evaluate performance. It provides a comprehensive view of the organization's operations by measuring key performance indicators in four perspectives: financial, customer, internal processes, and learning and growth. The balanced

scorecard approach enables public service organizations to align their strategy with their mission and vision while ensuring accountability and transparency.

The use of balanced scorecards in public sector organizations can help improve their overall performance by providing a comprehensive view of their operations and identifying areas for improvement.

Figure 5: A generic public sector framework
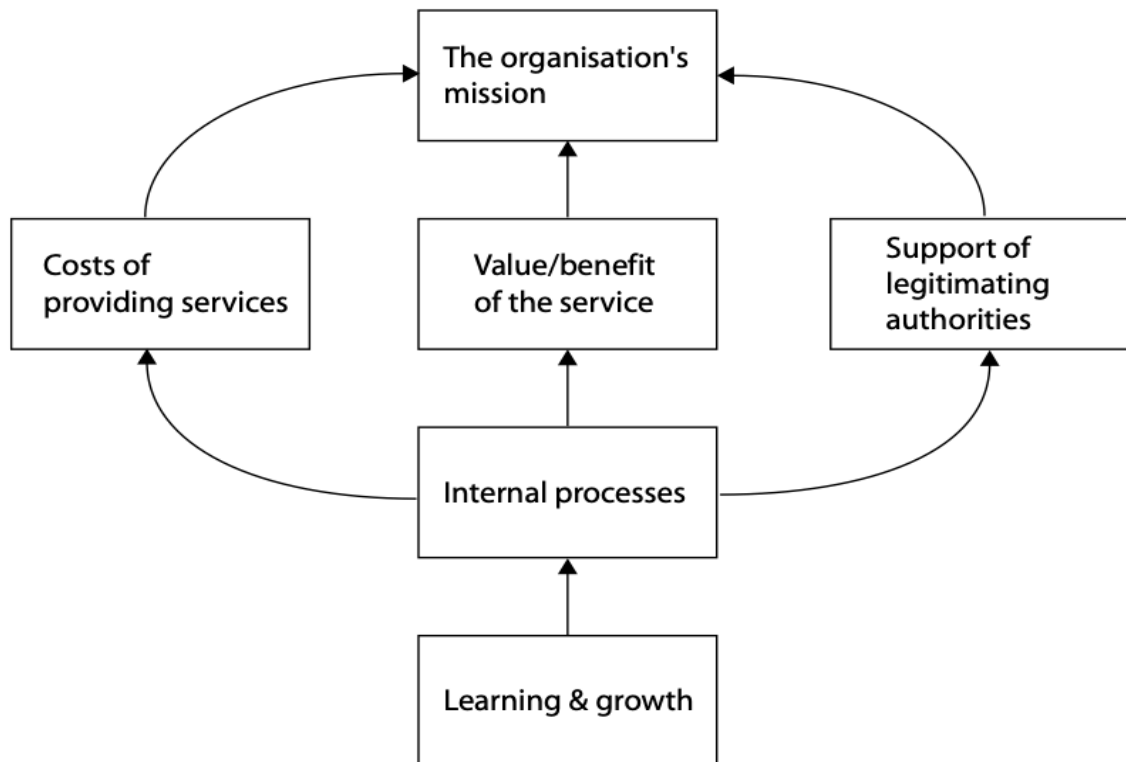
Source: A generic public sector framework (based on Kaplan and Norton, 2001, p. 136)

An interesting variant of the public sector scorecard is presented by Moullin in 2002, that keeps the strategic core while varying the original four views from the Kaplan and Norton balanced scorecard, as depicted in Figure 6. Nonetheless, Moullin displays arrows going both ways to and from the card's other four components and strategic centers. This indicates that the card includes important performance metrics relevant to the services offered and that the agency's strategy is crucial to the development of the card. His strategic core is meant to take the place of the Kaplan and Norton balanced scorecard's initial financial emphasis (Pidd, 2012, p.210).

Figure 6: Moullin's public sector scorecard
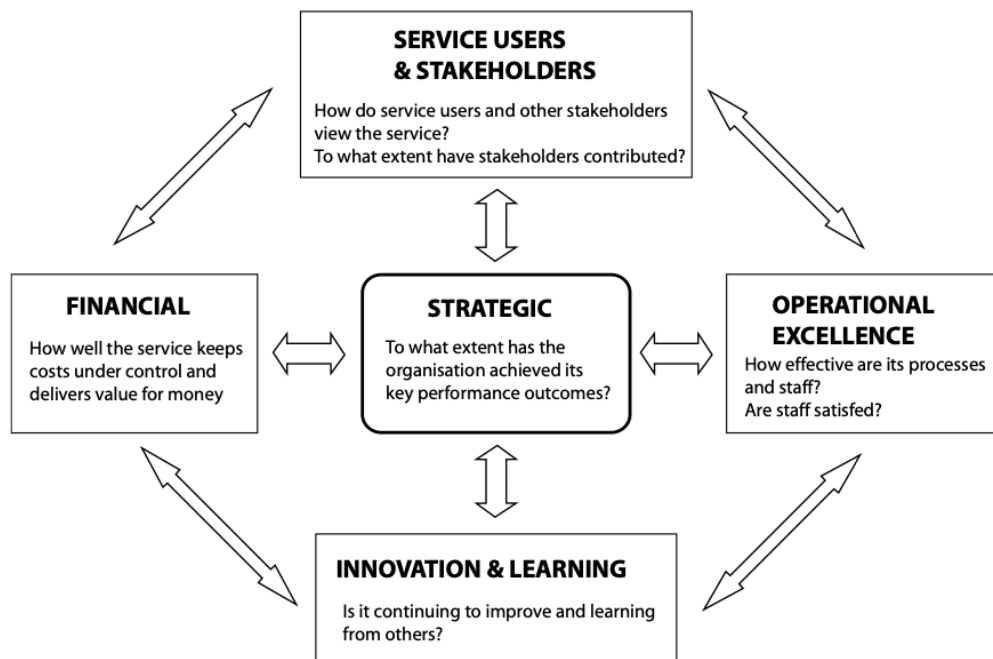
Source: Michael Pidd, Measuring the Performance of Public Services: Principles and Practices, Lancaster University Management School, Cambridge University Press, 2012, p. 211.

Another significant difference is a perspective that emphasizes the need to comprehend and value how service users and other stakeholders feel about an organization or a service. The term "service users" is selected since it reflects more accurately the reality than the terms "customers" and "clients". A public service or organization may also have a variety of stakeholders, including components of the legitimizing environment, such as those that fund the service, other cooperating agencies, and co-producers, as was previously mentioned. The agency has to develop methods to track how satisfied each group is with the work it accomplishes (Pidd, 2012, p.211).

4. **Benefits of performance measurement in public organizations:**

Behn (2003, pp.587-589) mentions the benefits of performance management in:

▸ Increased transparency and accountability in governments.

▸ Improved decision-making processes, and better allocation of resources.

▸ Governments can identify areas for improvement enabling institutions to focus on those areas and allocate resources more effectively.

▸ Helps to build trust between citizens and their government by providing evidence of the effectiveness and efficiency of public services.

▸ Helps in setting targets and monitoring progress towards achieving those targets.

5. **Challenges in performance measurement in public organizations:**

Despite the benefits of performance measurement, due to their nature, public organizations may encounter several challenges:

▸ One challenge is **the lack of reliable and accurate data**, which can affect the validity and reliability of performance measures.

▸ Another challenge is **the difficulty in measuring intangible outcomes**, such as social and environmental impacts, which are often critical for public organizations.

▸ Moreover, performance measurement can be time-consuming and resource-intensive, **requiring significant investments** in data collection, analysis, and reporting.

Conclusion:

Performance measurement is a critical process for public organizations to ensure they are delivering high-quality services and achieving their objectives. It provides valuable information that can help identify areas for improvement, optimize resource allocation, and enhance accountability and transparency. While there are several challenges in performance measurement, public organizations can overcome them by adopting appropriate approaches and tools.

CHAPTER 02: THE CURRENT STATE OF DIGITALIZATION IN ALGERIAN PUBLIC ORGANIZATIONS

Chapter 02: The current state of digitalization in Algerian public organizations

Over the past ten years, there has been a strong emphasis on the digitalization of public organizations. This effort is not only a response to the demands of the digital age, but it is also derived from the principles of New Public Management (NPM). Various initiatives have been implemented to integrate into the information society and digital economy, facilitating the modernization of public organizations and improving their performance.

The purpose of this chapter is to offer a comprehensive and insightful overview of the current state of digitalization in Algerian public organizations, while examining its ramifications on performance.

Section 01: The concept of digitalization

1. **Historical overview:**

The word "digital" comes from the Latin word "digitus," which means "finger" or "toe." The word was first used in English in the early 15th century to describe the use of fingers for counting, and it later came to be associated with the use of numerals to represent quantities. In the context of modern technology, the term "digital" refers to the representation of information in discrete, numerical form. Digital technologies use binary code, which consists of only two digits (0 and 1), to represent all forms of data, including text, images, and sound. The use of the term "digital" to describe these technologies dates back to the mid-20th century, when digital computers and digital communication networks first began to emerge, and the term was popularized by Claude Shannon, a mathematician and electrical engineer who is widely regarded as one of the pioneers of digital communication.

Claude Shannon's 1948 article "A Mathematical Theory of Communication" is often cited as a key moment in the history of digitalization. In this article, Shannon laid out the fundamental principles of digital communication and introduced the concept of the "bit" as

the basic unit of information. This work laid the foundation for the development of digital communication technologies (Shannon, 1948).

Shannon's work was instrumental in the development of modern digital communication technologies, including digital computing, data storage, and telecommunications.

We are currently experiencing the fourth industrial revolution, also referred to as Industry 4.0. Characterized by increasing automation to work more efficiently and productively across the value chain. this digital revolution transformed various industries by enabling faster, more efficient, and more reliable communication and information processing (IBM, 2022).

2. The concept of digitizing, digitalization and digital transformation:

Digitization, digitalization, and digital transformation are often used interchangeably. These concepts are frequently employed to describe how organizations are embracing current technologies nowadays. While these terms may appear to be interchangeable, they actually have distinct meanings and refer to different aspects of the technological shift occurring in organizations. Using these three terms alternatively is a mistake since they refer to completely different things. According to Bloomberg (2018), it is crucial to recognize the distinctions between these concepts as they play a significant role in describing the current technological changes happening within organizations, and he outlines the following differences:

2.1. Digitization: The Straightforward Term

As a concept, digitization is relatively simple and involves the process of transforming an information from a physical format into digital format that can be accessed, stored, and manipulated using electronic devices and software. Nothing more important for creating business value than data. And digitization creates excellent sources of data. In the

organization context, digitization is important both for dealing with analog information as well as paper-based processes. Examples of digitization:

- Writing notes on paper and then typing them out into a Word file or an Excel spreadsheet.

- Scanning a document and saving it on the computer's hard drive as a digital file in a format such as PDF.

- Converting analog VHS cassettes to DVD or CD.

It's essential to note, though, that you're digitizing information, not processes; this is where digitalization comes in.

2.2. Digitalization:

J. Scott Brennen, Doctoral Candidate in Communication, and Daniel Kreiss, Associate Professor, both at the University of North Carolina School of Media and Journalism: "We refer to digitalization as the way in which many domains of social life are restructured around digital communication and media infrastructures."

Gartner also weighs in on this term: "Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities" according to Gartner's glossary: "It is the process of moving to a digital business."

- Based on this definition, digitalization primarily emphasizes enhancing and updating business operations, as opposed to social interactions.

- Digitalization means putting the digitized information to work. It's about using digital technologies and data to improve processes, create new revenue streams, and building a digital culture. The idea is to put digital information at the core of the organization's processes, all to become more efficient and productive

- Digitalization is a process that takes advantage of digitization in order to improve business processes. Examples of digitalization:

- Uploading a PDF file from the computer's hard drive to the cloud so that it can be shared with many people at once and analyzed using yet another tool based in the cloud.

- Uploading digital movie files from CD or DVD to online services to allow people to download, stream, or rent them online.

- Converting a Word document or Excel spreadsheet to a file in Google Docs or Google Sheets stored in Google's cloud platform so the document can be shared among several users at once.

In short, while digitalization has a stronger emphasis on improving operations, it should not be seen as disconnected from the other two concepts.

2.3.   Digital transformation: Beyond digitalization

Digital transformation, however, is quite distinct from digitalization. Instead, this broader term refers to the customer-driven strategic business transformation that requires cross-cutting organizational change as well as the implementation of digital technologies. Digital transformation initiatives will typically include several digitalization projects, but executives that believe that there is nothing more to digital transformation than digitalization are making a profound strategic mistake. In reality, digital transformation requires the organization to deal better with change overall, essentially making change a core competency as the enterprise becomes customer-driven end-to-end. Such agility will facilitate ongoing digitalization initiatives but should not be confused with them.

Digital transformation is the last stage in this journey, it takes advantage of both digitization and digitalization. In its essence, digital transformation uses digital technologies in order to create new or modify the existing business models, processes, cultures, employee and customer experiences. In order to address the changing business and market requirements, digital transformation is all about reinventing organizations for the digital age, it starts with how a company thinks about and engages with customers.

♦ In the final analysis, we digitize information, we digitalize processes and roles that make up the operations of a business, and we digitally transform the business and its strategy to reap the full benefits of modern technologies.

Figure 7: Digitization, digitalization and digital transformation.
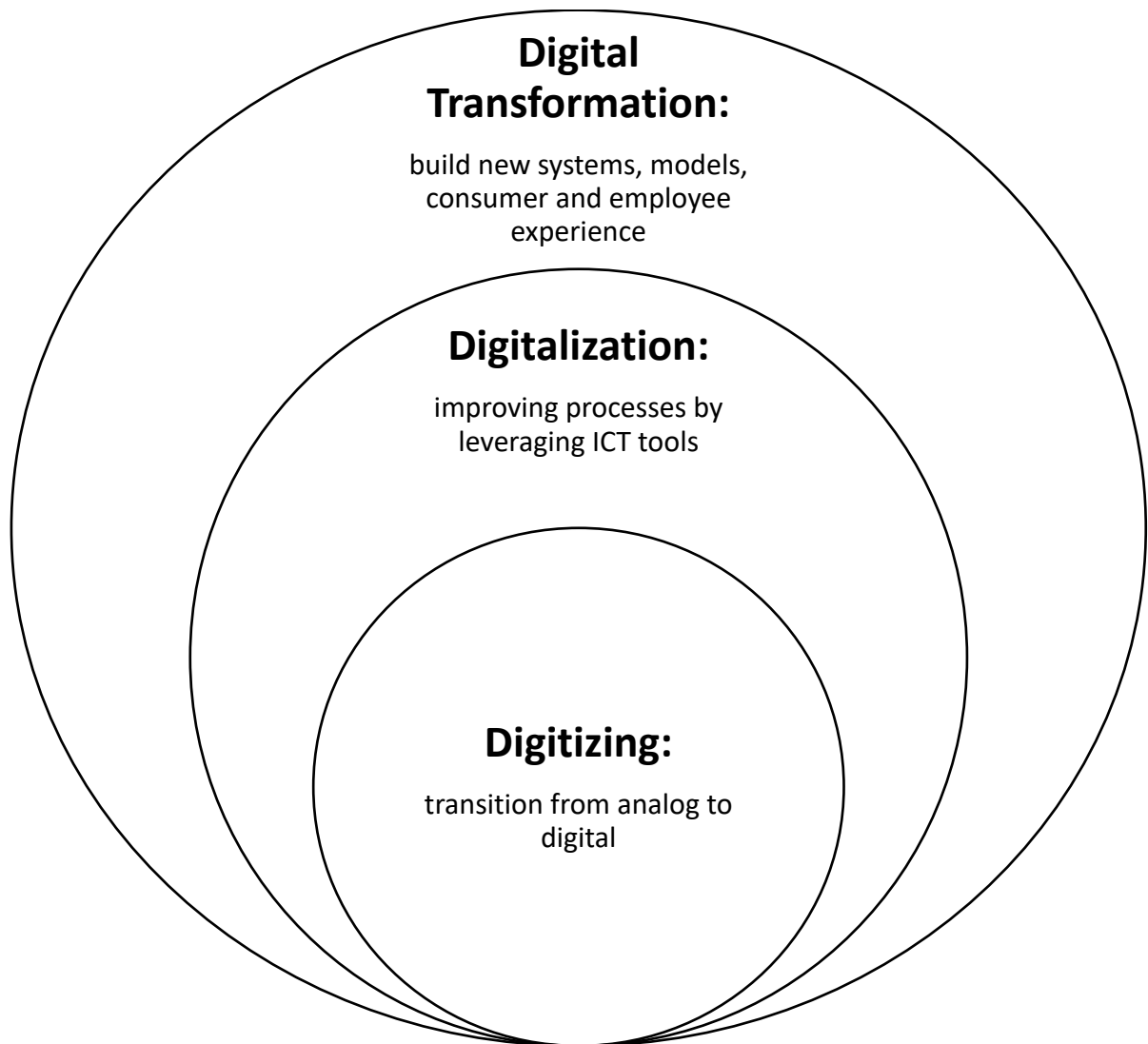
Source: Elaborated by the student

3. Digitalization in public organizations:

It is the private sector service delivery models that have raised the level of user expectations for public services. Thus, social pressure from ordinary users or professionals

has driven the government to invest heavily in ICT and digitalize administrations in order to provide a quick, dependable, and efficient public service.

The World Bank defines "e-administration" as the use of information and communication (ICT) technology by public organizations for a variety of purposes, including:

• Improved delivery of administrative services to citizens.

• Better interactions with businesses and industries.

• Citizen empowerment through access to information.

• More efficient administration management.

4. **Axes of digitalization in public organizations:**

• Process automation: the use of digital technologies to automate routine and repetitive processes, such as data entry and record-keeping, can help to reduce errors, increase efficiency, and free up staff time for more value-added activities (Janssen et al., 2012, p.258).

• Service delivery: digitalization can help to improve the accessibility and responsiveness of public services, by providing citizens with online portals and mobile apps for accessing information, submitting applications, and requesting services (Welby and Tan, 2022, pp.3-4).

• Data analytics: advanced data analytics tools and techniques can help public organizations to gain insights into citizen needs and preferences, as well as to monitor and evaluate the effectiveness of policies, programs and processes (Copeland et al., n.d., p.7).

• Collaboration and engagement tools: digital technologies can support collaboration and engagement between public organizations, citizens, and other stakeholders, by providing platforms for online consultation, feedback, and co-creation (OECD, 2018, P.7).
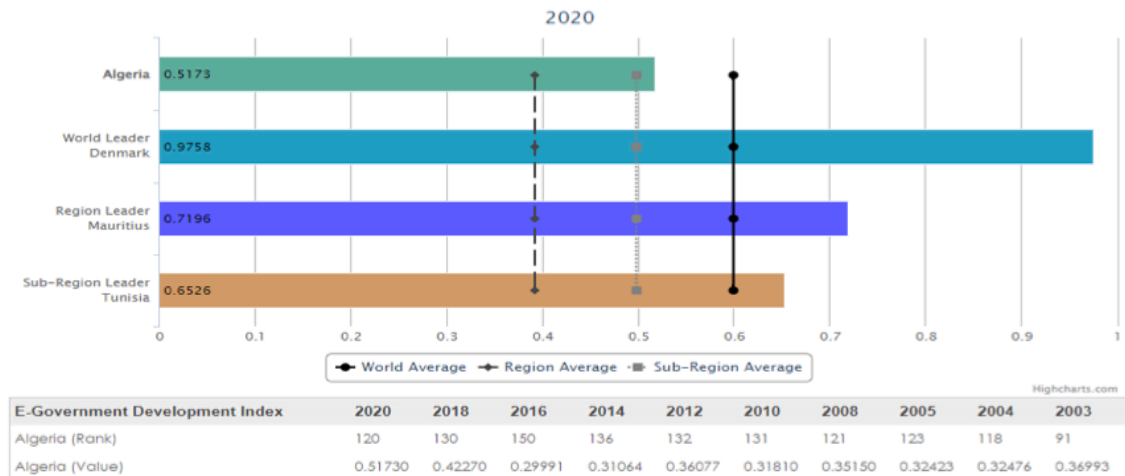
- Cybersecurity and data privacy: as public organizations increasingly rely on digital technologies to store and process sensitive data, ensuring the security and privacy of this data has become an important priority (Karpiuk, 2021, p.46).

Section 02: Digitalization in Algerian public organizations

According to a report published by the United Nations Economic Commission for Africa (2020), the level of digitalization in public organizations in Algeria remains low.

Figure 8: The E-Government Index

E-Government Development Index	2020	2018	2016	2014	2012	2010	2008	2005	2004	2003
Algeria (Rank)	120	130	150	136	132	131	121	123	118	91
Algeria (Value)	0.51730	0.42270	0.29991	0.31064	0.36077	0.31810	0.35150	0.32423	0.32476	0.36993

Source: Publication of UN, 2022

However, Algeria has made some progress in recent years, with the launch of a number of initiatives aimed at improving digital infrastructure and services in the public sector.

1. **"e-Algeria" program:**

"e-Algeria 2013" is a government initiative launched in 2009, that seeks to improve the performance and modernity of organizations in the public sector through the utilization of information and communication technologies (ICT) (Lounes, 2018, p.500).

⇒ **The ultimate aim of "e-Algeria" is to realize a transparent, paperless, and citizen-centric government capable of addressing the evolving needs and expectations of the Algerian people in the digital era, and to allow public organizations to work together more efficiently.**

(Djilali & Djeddi, 2013, pp.90-94) explain the axes of the e-Algeria program:

- **The acceleration of the use of ICTs in public administration:** this area of focus is dedicated to increasing the use of ICTs in public administration and making significant changes to its operations and organizational structure. These changes aim to enable the public administration to re-evaluate its organization and operating methods, with a focus on improving citizen services, including the online provision of various services. To achieve this, individual sub-objectives were established for each ministry department of the government, with some objectives overlapping occasionally.

- **The second axis is the acceleration of the use of ICTs in enterprises:** to enhance performance and competitiveness in a fast-paced, expanding market, utilizing ICTs has become essential. As a result, a primary objective has been established to incorporate ICTs into the economy and facilitate businesses in adopting them.

- **The third axis is development of mechanisms and encouragement measures for citizens' access to equipment and ICTs networks:** the process of generalizing access to the Internet which is the major objective.

- **The fourth axis boosting the development of the digital economy:** the digital economy consists of three primary elements: software, services, and equipment. Encouraging local entrepreneurship and producing original content can help to drive innovation in this sector. The primary goal of this area of focus is to establish the necessary conditions for the extensive growth of the ICT industry.

- **The fifth axis is to enable the telecommunications infrastructure in high and very high speed:** the broadband and high-speed telecommunication network must have the capability to fulfill the needs of the entire country, while adhering to strict quality and security standards. The primary goal of this area of focus is to establish

a broadband and high-speed telecommunication infrastructure that is secure and

provides superior quality services with high and very high speeds.

- **The sixth axis is the improvement of human skills:** in order to promote the

    widespread use of ICTs and ensure its adoption at all levels, enhancing

    infrastructure and expanding access must be supported by significant efforts to

    train and develop human skills.

- **The seventh axis is the reinforcement of research development and**

    innovation: for a knowledge-based economy to flourish, it is crucial to establish

    strong collaboration between the realms of research and development, as well as

    the economic sector. Innovation is key to the creation of valuable ICT products

    and services. Therefore, the main goal of this area of focus is to enhance research

    and development activities through innovation, in order to create valuable products

    and services within the field of ICTs.

- **The eighth axis is starting up a national legal frame:** upon examining the

    Algerian legal system, it is evident that the current laws do not adequately address

    the challenges arising from the use of ICTs. Therefore, there is a need to establish

    a legal framework that aligns with international best practices and meets the

    requirements of the information society. Consequently, the primary goal is to

    create a secure environment that enables electronic governance through the

    formulation of appropriate laws and regulations.

- **The ninth axis is information and communication:** the primary aim of this axis

    is to showcase the significance of ICTs in improving the standard of living of

    individuals and their role in advancing the socio-economic development of the

    nation.

- **The tenth axis is valorization of international cooperation:** collaboration with

    other countries in the field of ICTs is crucial for Algeria, as evidenced by the

numerous projects undertaken with the European Union under MEDA II. The primary goal of such international cooperation is to advance and enhance the country's technological capabilities and knowledge while also promoting its global reputation.

- **The eleventh axis is providing mechanisms of evaluation:** the goal of this axis is to establish a system for notification, monitoring, and assessment, which can gauge the influence of ICTs on economic and social progress on one hand, and continually assess the status of the e-Algeria 2013 plan on the other.

- **The twelfth axis is organizational measures:** the main goal of this axis is to establish a well-structured institutional organization consisting of three levels: direction, sector coordination, and execution. This organization will ensure the efficient implementation of the ambitious e-Algeria 2013 plan.

- **The thirteenth axis is financiers and planning means:** the development of the e-Algeria 2013 strategy requires significant financial resources, and it is important to use them wisely. The strategy has a yearly budget that is based on the progress of the plan, and this budget will continue until the end of 2013.

The table below presents the 12 axes of the "e-Algeria" program along with their corresponding level of implementation by the year 2018:

Table 1: Status of e-Algeria plan realization as of March 31, 2018

Number of planned actions	Major axes (objectives)	Implemented actions	%	Budget (DZD Million)	%
866	a- the acceleration of the use of ICTs in public institutions	242	28%	81476	21,13%
13	b-the acceleration of the use of ICTs in companies	2	15%	29175	7,57%
14	c-Developing mechanisms and incentive measures to enable citizens' access to ICTs equipment and networks.	3	21%	150968	39,16%
27	d-Boosting the development of the digital economy	10	37%	13030	3,38%
20	e-Strengthening high and very high-speed telecommunications infrastructure	5	25%	104500	27,11%
8	f-improving human skills	1	13%	1600	0,42%
21	g-Reinforcement of research and innovation	6	29%	950	0,25%
7	h-Upgrading the national legal framework	3	43%	12	0,00%
5	i- Information and communication	1	20%	1010	0,26%
7	j-Valuing international cooperation	4	57%	300	0,08%
12	k-Evaluation and monitoring l-Mechanisms Organizational measures	7	58%	2500	0,65%
1000	Total	287	28%	385521	100%

Source: Lounes Houda, The e-administration in Algeria, between plan and achievements, Revue des Sciences Economiques, de Gestion et Sciences Commerciales, volume: 11. 2018, p: 503.

The time frame of the "e-Algeria" initiative was initially set for the year 2013. However, the project has continued beyond its original time frame, and the Algerian government has continued to invest in implementing ICT tools in public organizations. The achievement rate of the e-Algeria program is estimated at 28%, which can be considered acceptable, however, it took more than 9 years to reach this level (Lounes, 2018, p.502).

The e-Algeria program has the potential to serve as an effective tool for implementing and utilizing ICT in various sectors. However, to strengthen local and national policies in this area, the program needs to be thoroughly reviewed and based on reliable and robust data.

2. Digitalization tools used in Algerian public organizations:

2.1. E-government platforms: e-government portals and platforms allow citizens to access government services online, making it easier and faster for them to obtain information, apply for services, and interact with government agencies. These platforms can reduce the cost and time required to provide services, increase transparency and accountability, and enhance public participation in decision-making processes (United Nations, 2020). Such as the Government Portal of Public Services of Algeria.

Table 2: Some Algerian e-government services web sites

Online government portals sites	URL
Bank of Algeria	http://www.bank-of-algeria.dz/
Constitutional Council	http://www.conseilconstitutionnel-dz.org/
The Government Portal of Public Services of Algeria	https://bawabatic.dz/
Ministry of Energy & Mines	https://www.energy.gov.dz
Ministry of Education	https://www.education.gov.dz
Ministry of Culture	https://www.m-culture.gov.dz/
Ministry of Commerce	https://www.commerce.gov.dz

Source: elaborated by the researcher

2.2.Cloud computing: Cloud computing is becoming increasingly popular in Algeria, and many public organizations are adopting cloud-based solutions for storage and processing of data, because cloud providers provide administrators with controls to manage which applications their users can access and how employees can use each service (Toumi & Maza, 2022, p.34). Cloud computing refers to the provision of IT resources, including computing, storage, and databases, over the internet, with costs based on usage. Instead of buying and maintaining physical data centers, users can access these resources on an as-needed basis from a cloud service provider. To "move to the cloud" refers to the process of relocating a company's IT infrastructure, including servers, storage, and databases, to a data center that is operated and managed by a cloud computing service provider such as Oracle. This shift enables the company to access these resources over the internet, rather than maintaining them on-site. Cloud computing offers customers enhanced convenience, scalability, and adaptability, eliminating the need to invest in outdated IT systems and allowing them to concentrate on strategic activities. By using cloud computing, companies can access the computing resources they require without the need for significant upfront investment and pay only for what they utilize. This grants companies greater flexibility and enables them to focus their resources on more important tasks (Benhammou & Merah, 2022, p.672).

2.3.Mobile applications: Mobile applications have surpassed television as the primary means of communication in society, and excelling in terms of their adaptability and efficacy in accessing reliable information around the clock. They serve as a reliable source of real-time updates on diverse subjects, ensuring users remain informed at all times (Castill et al., 2023, p.1). Today, many public organizations in Algeria are developing mobile applications to provide citizens with access to government services and information on their smartphones and other mobile devices.

2.4.Information Systems: Public organizations are placing greater emphasis on professionalism, efficiency, and effectiveness in their operations. The new public and governance management is aiming at the information quality, through the implementation of measurement tools that allow a systematic monitoring of economic and financial performance while also incorporating principles of the private sector and non-governmental organizations. The information systems (IS) are social systems that involve the interaction of people and technology. An information system, including an Enterprise Resource Planning (ERP) system, is designed with a user interface to provide relevant information that can be utilized to support strategic planning, operational activities, management analysis, and decision-making processes across various levels within an organization. Approaches that center on the organization and its strategy contend that the application of IT can facilitate changes in processes and transform the organization, provided that it is aligned with institutional objectives and goals. These approaches are also relevant in the public sector, where the integration of systems and IT infrastructure with management processes is deemed crucial to achieving effective results. Such integration should align with the strategic vision of the organization (Oliveira et al., 2015, pp.67-68).

3. **Challenges of digitalization in Algerian public organizations:**

    Although many public sectors worldwide have successfully adopted Information and Communication Technologies (ICT) with great success, the Algerian public organizations face significant challenges in implementing these technologies. These challenges include:

    - **Weak infrastructure:** Algeria has established multiple undersea fiber optic cable connections with Europe, including a 450 Gbps cable connecting Annaba to Marseille, a second cable connecting Algiers to Palma with an 80 Gbps capacity, and an agreement with Alcatel to create a 100 Gbps cable linking Oran to

Valencia, indicating significant investment in expanding its fiber optic network; however, concerns have been raised about areas lacking coverage and diversion of resources, leading to suggestions of involving private investors for more efficient and effective expansion of internet infrastructure (Messiliti et al., 2019, p. 48).

- **The shortage of skilled ICT professionals and expertise:**

The migration of skilled Information and Communication Technology (ICT) professionals from North African nations to high-income European Union member countries, as highlighted in the World Bank's World Development Report 2021, is resulting in a brain drain in the region, primarily driven by economic factors such as wage gaps between high-income and low-income nations; moreover, the disparity in the share of formal employment of ICT graduates between high-income and low-income/middle low-income countries indicates a substantial difference in the demand for ICT professionals (North Africa Hit by Brain Drain of ICT Graduates, 2021).

Thus, it should be noted that talented ICT professionals in low-income and middle low-income countries may be leaving to seek better job opportunities in countries where the digital sector is more advanced, and where there is a higher demand for their skills. This is a concern because it can lead to a loss of talent in these countries and hinder their development in the digital sector (The Future of Jobs and Skills in the Middle East and North Africa Preparing the Region for the Fourth Industrial Revolution Executive Briefing, 2017).

Figure 9: Human capital optimization in MENA
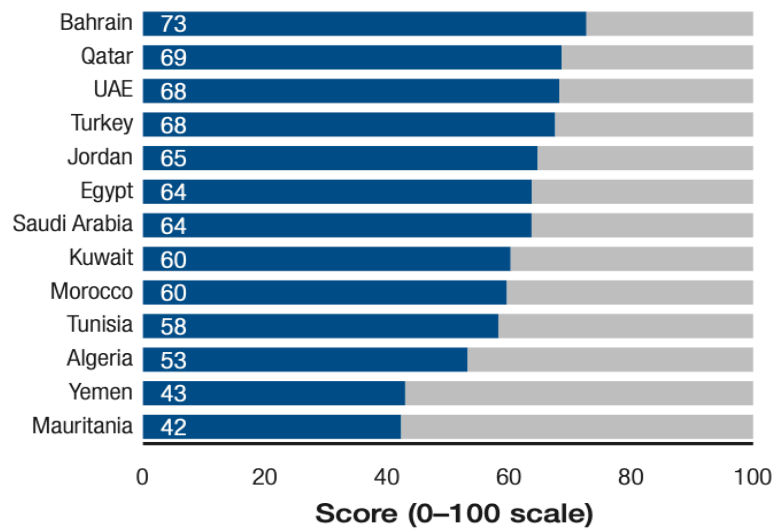
Source: World Economic Forum, Human Capital Index 2016.

The current level of human capital optimization in Algeria is a cause for concern, as it stands

at a mere 53% as shown in Figure 8. This indicates a significant gap between the country's

potential and its actual level of human capital development, which may have adverse effects

on the quality of the available workforce.

- **Digital divide:** The digital divide, characterized by disparities in access to and

    usage of information and communication technologies (ICTs), poses challenges

    for the implementation of ICTs in Algerian public organizations, particularly due

    to limitations in access to reliable and affordable electricity and the relatively high

    costs of broadband services in the region (International Institute for the

    Mediterranean, 2021, p.139). Around 59.6% of the Algerian population is

    connected to the internet, but the preference for cash on delivery in e-commerce

    transactions remains high, with only 4.6% of the population engaging in online

    purchases or bill payments; however, there has been a significant increase in the

    use of online payment systems, with a compound annual growth rate of 224.81%

over the past five years, as evidenced by over 638,000 transactions in 2020,

totaling a volume of 5.4 billion DZD (Digital Arabia Network, 2021, p.12).

Digital divide can result in:

- Unequal access to ICT infrastructure and resources can hinder the effective
  implementation of ICTs within public organizations, as it limits the ability of
  employees to utilize digital tools and resources for their work, which can impact the
  efficiency and effectiveness of public organizations

- Algerian public organizations may rely on digital platforms and systems to
  disseminate information, provide services, and engage with citizens. However, certain
  individuals residing in underserved or marginalized regions may encounter difficulties
  in accessing crucial information and services provided by these organizations due to
  their limited access to information and communication technologies (ICTs). Which
  will result in increased exclusion and marginalization among these populations.

Algeria must expedite network deployment and proactively tackle the issue of limited

connectivity, both in terms of availability and affordability.

- **The lack of clear policies and guidelines for the implementation of digital
  systems in public organizations:**

  Adopting ICTs within public agencies should take into consideration several

  requirements, including the existence of regulations and legal texts that facilitate

  the process of digitalization. Algeria faces a challenge in the lack of clear policies

  and guidelines for the implementation of digital systems in public organizations

  (Fertas, 2016, 320). However, it's important to prioritize the development and

  enactment of legal texts that support the integration of digital technologies in

public administration. A supportive legal and regulatory environment can help ensure that digitalization initiatives are implemented effectively, efficiently, and in compliance with relevant laws and regulations.

- **Security issues:** Privacy concerns pose a significant challenge in the implementation of ICTs in public organizations as citizens expect their personal data to be secure and confidential, necessitating the establishment of comprehensive privacy frameworks and robust security measures to build trust and confidence among citizens and protect their sensitive information (Gat and Boulouiz, 2023, pp.745-746).

Section 03: The effect of digitalization on the performance of public organizations

Measuring the effects of digitalization on the performance of public organizations can be complex, as it involves assessing both tangible and intangible factors. It can be done at various levels, including:

- o Society: This entails assessing digitalization's overall impact on society, such as its contribution to social welfare, quality of life, and inclusiveness. Some indicators that can also be used to measure the impact of digitalization on society include digital literacy, access to digital services, e-participation, and digital divide.

- o Public organizations level: This includes assessing the effect of digitalization on public institutions, such as its influence on efficiency, effectiveness, and service quality. Process automation, e-service delivery, citizen satisfaction, and staff digital skills are some metrics that may be used to assess the effect of digitalization on public organizations.

- o The government level: this involves measuring the effect of digitalization on government, such as its influence on transparency, accountability, and governance. Some metrics that may be used to assess the influence of digitalization on government may include: open data, e-government services, online budget transparency, and digital democracy.

1. **The importance of digitalization in public organizations:**

   In 2014, the OECD Public Governance Committee issued a recommendation on digital government strategies, providing guidance on policies to promote the adoption of digital technologies in the public sector. The document outlines 12 fundamental principles that are essential for the effective development and implementation of digital government strategies (OECD Public Governance Committee, 2014). These principles, presented in table 3 are used to assess progress in implementing digital government and serve as the basis for the Digital Government Index developed by the

OECD. This index is a measure of progress made by governments towards

digitalization.

Table 3: Use of digital technologies in the public sector: Why and how?

Principle	Why (underlying reasons)	How (policies and practices)
Ensure openness, transparency and inclusiveness	Declining trust in government	Establish an« open by default» standard regarding government data
Encourage engagement and participation in policymaking	Rising demands for better quality of public services	Develop consultation instruments
Create a data-driven culture	ICTs have exponentially increased societies capacity to produce, store, process and share data	Develop data analytic s skills to improve effectiveness of governments' activities
Protect privacy and ensure security	Face risks and incidents deriving from security breaches	Develop a risk assessment framework
Secure leadership	Political support is critical for the digital transformation agenda	Develop channels of crowdsource input, gather feedback and foster participation
Ensure coherent use of digital technology across policy areas	Policy coherence is facilitated by coordination mechanisms	Define a single strategic approach to the procurement of key digital instruments
Establish effective organization and governance frameworks to coordinate	Face the risks of poor coordination	Creation of a unit with the mandate to coordinate the digital government strategy
Strengthen international cooperation	Context of growing interdependence; ICT expertise unevenly distributed across borders	Participate in the development of cross-border services and knowledge-sharing infrastructure
Develop clear business cases	Need to justify public investments and prove the impact of ICT initiatives	Create a unit responsible for the oversight of ICT projects
Reinforce ICT project management capabilities	ICT projects are becoming increasingly large in scope and budget size; the public sector workforce needs skills	Develop an effective monitoring mechanism to identify gaps in terms of digital literacy; develop historical data on ICT project performance
Procure digital technologies	Make ICT procurement and contracting rules compatible with current trends in technology	Develop a open database of previous supplier performance for ICT projects
Ensure the appropriate legal and regulatory framework	The digital transformation can be either facilitated or delayed by existing legal and regulatory framework	Establish key digital enablers for digital public services; develop mandatory online services taking steps to avoid new forms of digital exclusion

Source: Terlizzi, Andrea. (2021). The Digitalization of the Public Sector: A Systematic Literature Review. The Italian Journal of Public Policy. 16. 5-38. 10.1483/100372, p.18

2. Key benefits of implementing ICT in public organizations:

According to Terlizzi (2021, p.19), some optimists believe that digital government can significantly enhance all policy domains, and that the only cost associated with this improvement is the initial investment. Conversely, there are pessimists who argue that the use of digital technologies in governments can negatively impact decision-making processes, as the data interpretation and modeling may become oversimplified. However, there are also optimists who believe that the implementation of digital technologies does not automatically lead to better governance unless certain conditions are met. The key reasons in favor of government digitalization focus on increased efficiency, quality, effectiveness, accountability, and trust. The latter is closely tied to the notion of open government, which is defined as a process including "transparent, collaborative, and participatory activity by government and administrations". Citizens should be involved into decision-making processes with the use of ICTs to establish these conditions of openness, cooperation, and participation (the three pillars of open government). Terlizzi (2021, p.20) explains the advantages derived from ICTs to public organizations are mainly:

2.1. **Improved efficiency:** The use of ICTs, specifically applications that rely on the Internet, can result in significant cost savings for public organizations in various areas such as data and information collection, provision, transmission, and sharing. By leveraging these technologies, public organizations can streamline their processes, reduce manual labor and administrative work, and increase the accuracy and efficiency of their operations.

2.2. **Improved effectiveness:** The utilization of the networking potential of ICT has proven to be an effective means of sharing information and resources among a wide range of stakeholders who are geographically dispersed across various policy sectors. This approach has been shown to enhance the ability to achieve more effective policy outcomes. By leveraging the power of ICTs, different departments

can more easily collaborate and communicate with one another, resulting in greater productivity.

2.3. **Improved services quality:** ICTs provide the means to gather and analyze data related to user requirements and preferences, allowing public organizations to gain insights into the specific needs of citizens. With this information, public organizations can develop and provide customized services and solutions that better meet the needs and expectations of citizens. This in turn enhances the overall quality of services offered by public organizations and helps to improve citizen satisfaction and engagement with public services.

2.4. **Improved trust and accountability:** The use of ICTs in public sector organizations has the potential to enhance information flows and promote citizen engagement through methods such as crowdsourcing. This can lead to improved transparency and accountability, and ultimately, build trust between government and citizens as well as between different government agencies. By utilizing digital technologies, governments can create a more inclusive and participatory decision-making process, resulting in more effective and responsive policies that better serve the needs of citizens.

Conclusion:

In conclusion, the current state of digitalization in Algerian public organizations indicates a significant gap between the potential benefits of digital technologies and their actual implementation. Although there have been some efforts to modernize and digitalize processes, the pace of change in these organizations has been slow and uneven across different sectors and regions. However, the potential impact of digitalization on the performance of public organizations cannot be underestimated. By adopting digital technologies, public organizations can improve efficiency, transparency, and responsiveness, and better serve the needs of citizens. By doing so, they can unlock the full potential of digital technologies and achieve better outcomes for citizens and the society as a whole.

CHAPTER 03: EMPIRICAL RESEARCH ON THE EFFECT OF DIGITALIZATION ON THE NATIONAL PENSION FUND (CNR)

Chapter 03: Empirical research on the effect of digitalization on the National Pension Fund (CNR)

The utilization of ICT in public sector organizations has become overwhelmingly widespread, assessing its effect on their performances has emerged as a significant concern. So, evaluating its effects on performance requires undoubtedly careful examination, as it encompasses multiple dimensions such as efficiency, effectiveness, transparency, and citizen awareness and engagement.

The question that guided our study: What are the effects related to the various uses of ICT?

Policymakers and managers are increasingly recognizing the need to assess the outcomes of ICT adoption in public sector organizations to ensure that investments in technology yield desired results and contribute to the overall advancement of public services.

Section 01: CNR presentation

1.   **The National Pension Fund (CNR):**

The National Pension Fund (la Caisse Nationale des Retraites) is a public organization responsible for managing the retirement funds of Algerian citizens. It was established in 1983 and has since been providing pension benefits to retired Algerians.

1.1.   Historical overview:

The National Pension Fund was only introduced for all employees in 1953; before this date, some corporations already benefited from pension systems: these are civil servants and workers enjoying statuses similar to those of civil servants such as railway workers and employees of the government company "Electricité et Gaz d'Algérie ".

- In 1956: The National Retirement Fund for non-salaried (self-employed) workers in the industrial, commercial, craft, liberal and agricultural professions was instituted, but was

not implemented until 1958 and initially constituted the only branch of this particular system.

- In July 1983: the existing basic pension schemes and the supplementary pension scheme were terminated. Thus, the advent of the reform of July 1983 resulted in the merger of the existing professional-based systems into a unified one.

- In August 20th, 1985: The National Pension Fund (CNR) was created by decree N°: 85-223.

- In 1985: CNR was formed through the merger of seven (7) funds, and made responsible for managing the various pension systems existing before 1983, of a single national pension scheme, offering the same benefits to all workers regardless of their sector of activity:

- The CAAV (la Caisse Algérienne d'Assurance Vieillesse); in charge of the management of pensioners of the general system;

- The CGR (Le Centre de Gestion des Retraites); responsible for the management of civil servant pensioners;

- The CNMA (La Caisse Nationale de Mutualité Agricole); in charge of the management of pensioners of the agricultural system;

- The CSSM (La Caisse de Sécurité Sociale de Mines); responsible for the management of pensioners in the mining sector;

- The CASNOS (La Caisse des Assurances Sociales des Non Salariés); in charge of managing self-employed pensioners;

- The EPSGM (L'État de Protection Sociale des Gens de Mer); responsible for the management of retired seafarers;

- CAPAS; responsible for the management of SONELGAZ pensioners;

- The SNTF (La Société Nationale des Transports Ferroviaires) staff pension fund.

- In January 04th, 1992: it was repealed and replaced by decree N°: 92-07 including the legal status of social security funds, administrative, and financial organization forms of Social Security.

1.2.   Legal status:

The National Pension Fund is a public organization of an administrative nature, with specific management system governed by the laws applicable in this area. Decree N°:92-07 of January 4th, 1992 specifies in its article 2 that the fund has legal personality and financial autonomy.

1.3.   The CNR missions:

They are set by Article 9 of Decree N°: 92-07 of January 4th, 1992. They are as follows:

- Manage retirement pensions and allowances, as well as pensions and allowances for other entitled.

- Manage pensions and allowances paid under legislation prior to January 1st, 1984, until rights expire,

- Implement the provisions of international social security conventions and agreements,

- Ensure the information of pensioners and employers,

- Manage the aid and assistance fund in application of article 52 of Law N°: 83-12 of July 2nd, 1983 relating to retirement.

NOTE: Tasks related to affiliation and collection are carried out by the CNAS on behalf of the CNR.

Other Missions:

Listening cells:

A listening and communication unit has been set up in each CNR agency in the wilaya with the aim of dealing with the complaints of social security persons (active and retired). The

objectives of these listening cells as defined by the Ministry of Labor, Employment and Social Security (MTESS) consist of user satisfaction by:

- Contributing to the improvement of the quality of the services provided at the level of the structures of the sector.

- Humanizing of public services relationships with citizens.

- Restoring trust between citizens and public organizations.

The missions of the listening unit are:

- Welcoming users, listening to them and dealing with their complaints.

- Guide users, support them in their procedures.

- Inform them of their rights, their obligations

- Transmit to the main listening cell the statistics relating to the requests by mentioning the nature of these requests.

Home help:

As part of enhancing the quality of services and the humanization of relationships with retirees, the CNR, in collaboration with the services of the Ministry of Labor and Social Security, has launched since the 2nd half of the year 2003 towards certain categories of pensioners (in particular invalids and dependent handicapped), a so-called action of help and assistance at home. This action consists of relieving retirees of the constraints they encounter in carrying out a certain number of acts affecting their daily lives, in particular those relating to public services. Furthermore, as part of bringing the fund closer to its beneficiaries, numerous reception, information and orientation centers for retirees have been opened in major urban centers and areas far from certain agencies.

1.4. Organization:

1.4.1. Internal organization:

The organization of the CNR is based on broad decentralization which is only a typical form of a standardized delegation, since the agencies do not have legal authority and are not endowed with financial autonomy. The internal organization as provided for by the ministerial decree of April 16th, 1997, is as follows:

- Headquarters ensuring Central Services.

- Local CNR agencies in wilayas.

- Regional computing centers (10).

- Regional archive centers (3).

1.4.2. Local CNR agencies in wilayas:

The local wilaya agencies are responsible:

- For the provision of retirement service pensions in accordance with the laws and regulations.

- Carrying out the operations related to career records of the insured persons, requests for pensions treatment and the distribution of the pensions.

- For participating in the development of the individual career account for insured persons.

- For keeping accounts, to ensure the execution of financial operations and their coordination.

- For ensuring the day-to-day management of the material and human resources of the agency.

- For ensuring the recovery of the shares of contributions allocated to the retirement and early retirement branches, in liaison with the services of the national social insurance fund.

2.   The local CNR agency of El-Oued:

El-Oued local agency was created in 1986, and classified in the 1st category, it is attached to the Regional Center of Computing of Constantine and to the Regional Center of Archives Oum El-Bouaghi and has 04 reception and orientation centers at the daïras of Guemmar, Debila, El M'Ghair and Djamaa.

2.1.   Structure chart of El-Oued local agency:

The structure chart of the local agency of El-Oued features a hierarchical structure with the Director positioned at the top. The Director serves as the highest-ranking position, overseeing the overall operations and strategic direction of the organization. Directly linked to the Director are the Secretariat, the IT cell, litigation team, listening post and home help.

Below the Director, there are three Directorates, each representing a distinct area of responsibility within the organization; pensions and career records, financial operations and general administration . These Directorates are specialized departments that focus on specific functions, projects, or areas of expertise. They play a vital role in implementing organizational strategies and achieving set objectives. Within each Directorate, there are several Divisions. These Divisions further break down the responsibilities and functions of the Directorates into more specific units. Each Division is assigned specific tasks and objectives related to their respective areas of expertise.

The hierarchical structure visually represents the reporting lines and relationships within the organization. It illustrates the flow of authority and communication, with the Director overseeing the three Directorates, and each Directorate overseeing its respective Divisions.

Overall, the chart provides a clear representation of the organizational structure, showcasing the hierarchy, reporting relationships, and division of responsibilities among the 63 employees in the agency.

Figure 10: The organogram of the local agency of CNR of El-Oued

```
                      ┌─────────────────┐
                      │  Local agency   │
                      │    director     │
                      └────────┬────────┘
                               │          ┌──────────────────────┐
                               ├──────────│ - Secretariat.       │
                               │          │ - IT cell.           │
                               │          │ - Litigation team.   │
                               │          │ - Listening post.    │
                               │          │ - Home help.         │
                               │          └──────────────────────┘
        ┌──────────────────────┼──────────────────────────────┐
┌───────────────┐     ┌──────────────────┐          ┌─────────────────────────┐
│General         │     │Financial         │          │Pensions and Career      │
│Administration  │     │Operations        │          │Records Directorate      │
│Directorate     │     │Directorate       │          │                         │
└───────┬────────┘     └────────┬─────────┘          └────────────┬────────────┘
```

| Personal Division | General Materials Division | Accounting Division | Payment Authorization Division | Electronic Document Management | Reception and Orientation Centers | Pensions Division |

| C.A.O Guemar | C.A.O Debila | C.A.O El-M'Ghair | C.A.O Djamaa |

Source: the CNR local agency of El-Oued

3.   **The CNR local agency's KPIs (Key Performance Indicators):**

-        **Files processing time:** this KPI measures the time it takes for retirement benefit applications to be processed and paid out. It can help to evaluate the efficiency of the fund's administrative processes and ensure that retirement benefits are paid out in a timely manner (as soon as possible), This KPI can also be used to identify areas for improvement in the retirement benefit processing system.

-        **Pensions calculation accuracy:** this KPI assess the precision and reliability of the calculations, to ensure compliance with legal and regulatory requirements is crucial for achieving optimal effectiveness and efficiency when evaluating pension calculations.

-        **Error rate:** this KPI measures the percentage of percentage pension applications that contain errors or inaccuracies. A high error rate can result in increased costs due to the need to correct errors and reprocess applications. This KPI can help to identify areas for improvement at any level of the agency.

-        **Processing volume:** this KPI measures the volume of applications or inquiries that are processed within a given time period. This KPI can help to ensure that the retirement benefit processing system is operating efficiently.

-        **Administrative and processing costs:** this KPI can help to ensure that the fund is operating efficiently and effectively, with a focus on reducing costs and maximizing returns, it includes: operating expenses, staffing costs, cost per transaction.

-        **Awareness rate:** this KPI measures the percentage of the population who are aware of the national retirement fund's services and the benefits they offer. This can help to identify areas for improvement in communication and outreach efforts to increase awareness of the fund's services.

-        **Users' satisfaction:** this KPI measures the level of satisfaction among retirees with the services provided by the National Retirement Fund, and their interactions with its

agencies. This KPI can be determined through surveys. It can assist in identifying

opportunities for improvement at the level of agencies.

Section 02: Evaluation of ICT tools in CNR

In recent years, CNR has undergone a digital shift to improve its services and operations. It has introduced new technologies such as online portals, mobile applications, and information systems to enhance the pension application process and reduce waiting times.

1. ICT tools used in the CNR local agency:

1.1.   CNR online portal: citizens can access this portal through the website: www.cnr.dz, it provides information about CNR's services, including the Algerian retirement system, retirement benefits, pension payments, and many other related services, here are some of the key features of the portal:

- Home page: The home page provides an overview of the CNR's services and features links to various sections of the website.

- Understanding retirement: this section provides insights about retirement in Algeria, including the pension system, eligibility requirements for retirement benefits, the required documents for the file constitution, downloadable printouts (application forms, work certificates...), and detailed explanation of the retirement application process.

- Services section: This section provides detailed information about the CNR's services, including how to apply for retirement benefits, pension calculation, payment schedules…etc. It also provides updates on the latest news and developments related to the CNR and retirement benefits in Algeria, and regularly conducted satisfaction surveys. As well as answers to frequently asked questions about retirement in Algeria.

1.2.   e-Retraite: The e-Retraite solution is available through the CNR online portal or the mobile app (تقاعدي), providing retirees with a secure and personalized space that they can access from the comfort of their own homes.

Important features:

- **Employee's personal account (CIS):** it is an online service that is dedicated to social security insured persons who are employees. It allows them to anticipate the reconstruction of their career history prior to submitting their retirement applications, and to justify the unstated periods during which they may have worked, by providing any necessary information, such as their employer details, and presenting any necessary justifications, in order to preserve all their retirement rights. These documents will be reviewed by the local CNR agency in the insured person's place of residence in order to complete their career record.

  The review of any justifications provided by the insured person will lead to the correction of any invalid entries and the completion of their career record. The insured persons can view updates on their career records and them it if desired. The information that feeds the CIS account is obtained from the national database of annual salary declarations submitted by employers to the CNAS, and it should be noted that this database suffers from two major shortcomings, which are: the absence of declaration submissions by some employers and the lack of relevant information on employees; notably the social security number and date of birth.

- **Application tracking:** it allows to follow the progress of specific requests, such as complaints, retirement applications, or updates on career record completion. It allows individuals to stay informed about the status of their requests and ensures that the relevant authorities are accountable for timely processing and completion of these requests.

- **Local agencies or CAOs nearby:** it allows users to locate the nearest local agency or CAO. This is useful for retirees, their relatives or soon-to-be retirees who may need to visit these agencies or centers for assistance with their retirement benefits or other related issues.

- **rFace:** When updating their file, the retiree must provide supporting documents, including a life certificate, in order to continue receiving their pension. It is difficult for the elderly to do that task sometimes. Facial recognition is still an ongoing project which aims to automatically recognize retirees through their face (via smartphone) by applying facial detection techniques (eye spacing, nose ridges, lip corners, ears, chin, etc.). The solution addresses the numerous difficulties faced by retirees and is intended for those with smartphones.

1.3.   Automatic Retirement Processing System (STAR): it is an information system designed to automate the processing of pension requests and payment of retirement benefits. It includes a variety of features and capabilities designed to automate the process of managing retirement applications and benefits, and used by different departments within the CNR, whereas each one has access to features relevant to its tasks. It is designed to efficiently manage and exploit data of retirement applicants and beneficiaries, including their age, employment history, salary, marital and health status, in order to process and calculate retirement pensions in accordance with the laws and regulations.

1.4.   Traceability of retirement file system (TDR): this information system is used to track the retirement file from the point of creation to the point of distributing retirement benefits. It provides a clear record of all changes made to the retirement file over time, including updates to personal information, added documents, changes to employment status, contributions, and documents withdrawals. It can also track the processing time of the retirement file at each department involved in the process. This feature helps to identify any bottlenecks or delays in the processing of the file, which can then be addressed.

2.   Evaluating the benefits resulting from ICT tools implementation:

The utilization of Information and Communication Technology (ICT) tools within the agency provides numerous benefits, including:

2.1.   Reduced file processing time: By using ICT tools, the National Pension Fund can speed up the processing of applications, reducing the time it takes for retirees and beneficiaries to receive their benefits; by providing all necessary information (about retirement eligibility requirements, documents needed and the fund's services) and printouts through the online portal, individuals can ensure that their application is complete and accurate, reducing the likelihood of missing information or errors that could delay or prevent approval. This can lead to faster and more efficient processing times, which in turn can increase the effectiveness of the institution in reaching its intended recipients. Additionally, the ability to access the necessary information and documentation online reduces the need for individuals to physically visit the CNR agencies to get more information, which can further improve the effectiveness of the process by reducing the time and resources required for in-person interactions, local agencies are less busy with external communication and can focus on other important tasks related to retirement processing and administration.

STAR has significantly reduced file processing time by:

-    Automating the calculation process, the system can quickly and accurately calculate the retirement benefits, taking into account various factors such as years of service, salary, marital status and retirement age. This can help to improve the accuracy and reliability of the retirement processing system, reducing the likelihood of errors in the final calculations.

-    Eliminating the need for manual data entry and processing, which can be time-consuming and error-prone. Instead, the system can automatically extract relevant data from various sources, such as online government databases or scanned documents.

- The system can automate the review and approval process, ensuring that all necessary documents are included and that the retirement application meets all eligibility criteria. This significantly reduces the time it takes for an application to be reviewed and approved, as the system can quickly identify missing or incomplete information.

- The system can streamline communication between different departments involved in the retirement processing, such as HR, finance, and the pension fund administrators. By providing a centralized platform for all relevant information and documents, the system can ensure that everyone has access to the necessary information and can collaborate efficiently. **TDR** helps to identify and address any delays in the processing of the file, by tracking the processing time at each department, the system can also help to ensure that the retirement file is processed within the established timelines and that individuals receive their retirement benefits on time.

CIS is particularly beneficial for those who are still actively working and intend to retire soon, it helps to minimize the time it takes to process their retirement application while ensuring that they receive all the benefits they are entitled to by knowing how their work history will be assessed, and detecting missing working periods, they can address them before submitting retirement applications.

2.2.   Higher accuracy and reduced error rate: STAR as it includes various calculating tools to ensure accurate and consistent results, it can significantly reduce the error rate of file processing. Unlike manual processing, which is prone to human errors, such as typos and incorrect data entry. The system can perform various checks and validations to ensure that the information entered into the system is correct, complete, and accurate. For example, the system can verify the applicant's information against their records and detect any inconsistencies or errors. It can also detect missing information and prompt the user to provide the required information.

TDR on the other hand, can greatly reduce the error rate of file processing by ensuring that all relevant information is recorded and tracked throughout the retirement process. This type of system can provide a clear record of all actions taken on a retirement file, including when it was received, which staff members worked on it, and when it was completed. By providing this level of detail, the system can help to identify any errors or mistakes that may have occurred during the processing of the file, allowing them to be quickly corrected. TDR also have a positive impact on employee responsibility and accountability. With a such system in place, each step of the retirement file processing is tracked, and it became easier to identify who is responsible for any errors that occur. This accountability helps to reduce the likelihood of repeated errors because employees are more likely to take greater care and be more diligent when they know that their work is being evaluated, monitored and can be easily traced back to them.

CIS helps current workers (soon-to-be retirees) to address and provide justifications for missing work periods before submitting their retirement files, so the income they will receive is be accurately calculated.

2.3.   Increased processing volume: STAR has significantly increased the processing volume of retirement applications. Enabling the CNR local agencies to quickly process large volumes of applications without the need for extensive manual intervention, this allows more applications to be processed in a shorter period of time, which can help reduce the backlog of retirement applications and improve overall processing volume.

TDR provides a clear overview of the current status of each file, and allows management to allocate resources to where they are needed most. This can help to avoid situations where staff are overwhelmed by a backlog of files in a particular area, while other areas remain underutilized. All to optimize processing volume and ensure that all files are processed in a timely manner.

2.4.   Reduced costs: the CNR online portal reduces administrative costs in several ways; by providing online information and documentation, the portal can reduce the need for face-to-face interactions and phone calls, which is time-consuming and expensive for the organization, this helped to reduce the cost of printing and mailing documents, and the costs associated with staff time, office space, and equipment needed to handle these interactions. implementing **STAR** required significant upfront investment in hardware, software, and training costs. Additionally, ongoing maintenance and updates also incur expenses. These costs may be offset by lowering the costs associated with labor and human error.

As mentioned before, the implementation of **TDR** has helped in reducing errors, and thus the costs of corrections and rework. Furthermore, the system provided greater transparency and accountability, enabling the agency to better monitor and manage its resources, which led to cost savings, and a reduction in wastes and inefficiencies.

2.5.   Citizens' satisfactions: since the launch of the CNR online portal, it had a significant positive impact on citizens' satisfaction with the services provided by the National Retirement Fund. By providing a user-friendly and efficient platform for citizens to access full information about how the retirement system in Algeria works, how to submit the application… etc. The online portal improved the overall user's experience, because it decreased the need to physically visit the CNR agencies, which can be time-consuming and inconvenient, especially for the elderly. With the decrease in foot traffic to CNR agencies, the staff can have more time to process retirement files and respond to inquiries from citizens in a timely and efficient manner. This, in turn, can improve the overall quality of services provided by CNR and increase citizens' satisfaction with local agencies in their states and the retirement system overall. This is leading to a higher level of trust in the organization. Additionally, the portal provides updated and relevant information to the citizens (retirees and current workers) regarding new services, changes and important developments in the

retirement system, and other updates to be better equipped to make informed decisions about their retirement plans.

STAR has also impacted citizens' satisfaction. As it made retirement applications faster, more accurate, reducing wait times and errors. Citizens who have filed for retirement are able to receive their benefits sooner, and are less likely to experience delays or issues, which can improve their financial stability and overall satisfaction among citizens.

On the other hand, **TDR**, as it provides real-time updates about the progress of their retirement files, citizens are able to track their applications and are immediately informed about needed pieces or justifications and they would be able to receive their benefits accurately and in time. The system also allowed better communication and interaction between citizens and the pension fund, which led to increased transparency and satisfaction with the overall experience.

E-retraite offers a more convenient and efficient way for retirees to manage their retirement benefits, which can reduce the burden on retirees and their relatives and improve their overall experience. By allowing retirees to access their retirement benefits information and manage their account online, they can avoid the need to visit physical offices and spend less time waiting in line. Additionally, the ability to track the progress of retirement applications, complaints and receive updates on career reconstruction completion can also provide greater transparency and improve the trust retirees have in the system.

2.6.   Citizens' awareness: the CNR online portal has increased citizens' awareness regarding retirement planning and benefits. By providing easy access to information related to retirement, such as retirement eligibility, pension calculation, updates in the retirement system, and required documents, the portal improved citizens' awareness and understanding of the retirement system, and increased transparency and accountability. Surveys are

conducted regularly on the portal to assess citizens' satisfaction about the fund and its local agencies, as well as their awareness about the services provided.

2.7.   Benchmarking: is the process of comparing an organization's performance to that of its peers (external benchmark), or comparing departments within the organization, to identify areas where it can improve its operations and outcomes. Conducting frequent surveys on retirees' satisfaction through the CNR online portal can greatly benefit the fund in benchmarking the performance of different agencies across various states of the country. By gathering feedback from retirees and assessing their level of satisfaction, the fund can gain valuable insights into the strengths and weaknesses of each agency. This information can be used to identify best practices, areas for improvement, and areas where specific agencies excel. Through benchmarking, the fund can promote a culture of continuous improvement and ensure that all agencies are striving to provide the highest level of service and satisfaction to retirees, and all beneficiaries.

Through **STAR**, the fund can collect data on various metrics such as pension application processing time, pension payment accuracy, and users' complaints. This data can then be used to benchmark the performance of each local agency against agencies in other wilayas and identify areas where improvement is needed. For example, if one local agency has a significantly longer pension application processing time than its peers, this could indicate a need to streamline its processes or allocate additional resources to improve its efficiency. Similarly, if one local agency has a higher rate of pension payment errors than its peers, this could indicate a need to improve staff training or implement new quality control measures.

As **TDR** tracks the retirement file from the point of creation to the point of retirement benefits distribution, and documents every modification done on the files, it also tracks the processing time at each department, this information is used to set performance benchmarks for each department to evaluate their effectiveness in processing retirement files.

$\Rightarrow$ The use of ICTs resulted in greater effectiveness and increased efficiency within the agency, by streamlining processes and reducing the processing time. This can help to ensure that retirement benefits are processed in a timely manner and that individuals receive their retirement benefits on time.

Section 03: Questionnaire analysis

After completing the qualitative approach and describing the various digital tools used within the agency. The current emphasis lies on conducting a quantitative study that utilizes a targeted questionnaire administered to employees to gain quantitative data on their perspectives and experiences regarding the effect of digitalization on performance.

1. The preliminary steps for the survey:

In order to achieve a quantitative approach, there are necessary steps that should be followed, which are:

- Clarifying the objectives of the survey.

- Selecting the survey sample.

- Choosing the survey method.

1.1. The objective of the survey:

The reasons behind the use of the survey are to consolidate or decline the hypotheses set at the beginning of the research. These objectives can be summarized through the following points:

- To gather information on the use of digitalization tools, mechanisms, and processes in public organizations.

- To determine the existence and extent of the gap between the current state and the desired level of digitalization.

- To identify and assess the barriers, limitations, and obstacles encountered by employees when adopting and utilizing digital technologies and processes in their work.

1.2. Selecting the survey sample:

Due to the nature of the research topic, it was beneficial to target both managers and employees of the agency as they are considered the primary sources of information and

valuable insights. We chose a sample of 45 participants. The inclusion of managers allows for insights into strategic decision-making, while employees provide valuable feedback on their experiences and challenges faced during the digitalization process.

The questionnaire was designed to be concise, consisting of a limited number of questions, in order to ensure efficiency and ease of completion for the participants. This approach took into account the potential challenges associated with technological familiarity and ensured that the questionnaire was accessible and manageable for participants of various age groups. The focus was placed on obtaining valuable insights from the employees while respecting their time and ensuring their comfort in providing accurate and meaningful responses.

1.3.   The survey method:

The collected answers will be analyzed using the method of **"frequency analysis"**. The method involves organizing the responses to a specific question into distinct categories or modalities, and then counting and presenting the number of responses corresponding to each category. This allows for the visualization of response distribution and helps identify trends or patterns. Frequency tabulation is often used to summarize and present data in the form of tables or graphs, making it easier to interpret.

2.   Questionnaire results:

The benefits of digitalization

Question 1: According to you, what performance indicators have you observed since the

implementation of digitalization?

Table 4: Performance indicators affected by the implementation of digitalization

Performance indicators	Number	Percentage
Reduced processing time.	36	80%
Optimized use of available resources (money, time, etc.)	14	31,11%
Improved services quality.	13	28,88%

Figure 11: Performance indicators affected by the implementation of digitalization
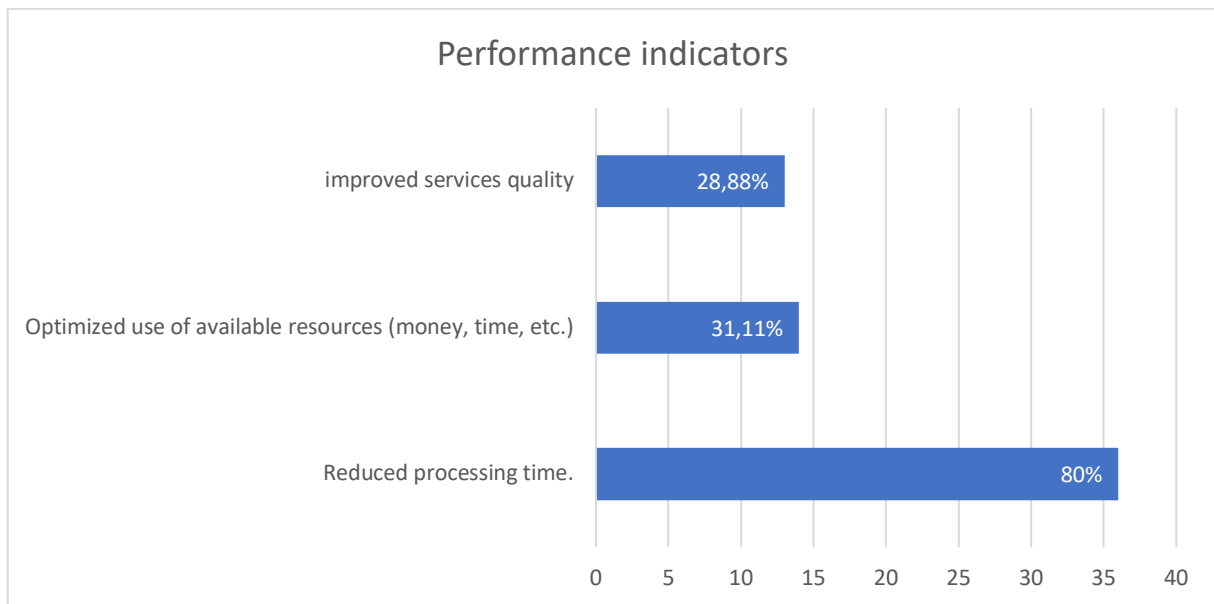
Source: elaborated based on table 4

The data reflects the positive effects of digitalization on reducing processing time (80%),

optimizing resource utilization (31,11%), and improving service quality (28,88%). These

findings highlight the importance of digitalization in enhancing operational efficiency and

delivering better services to stakeholders.

Question 2: In which specific areas have you observed the most significant benefits of digitalization for the performance of the agency?

Table 5: Areas with the most significant benefits of digitalization for the performance.

Areas	Number	Percentage
Managing retirees' records and information.	28	62,22%
Pensions requests processing.	30	66,7%
Communication and interaction with beneficiaries.	4	8,9%

Figure 12: Areas with the most significant benefits of digitalization for the performance.
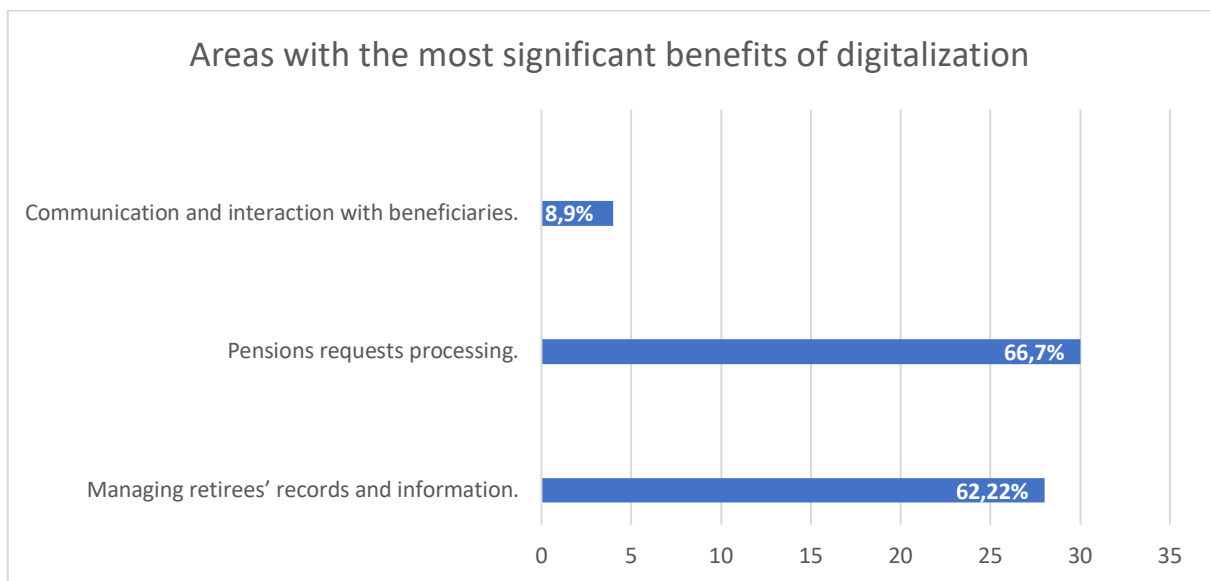
Source: elaborated based on table 5

The data highlights the positive impact of digitalization on managing retirees' records (62,22%) and processing pension requests (66,7%), and suggests the potential for further improvement in communication and interaction with beneficiaries through digital means. Efforts should be made to bridge the digital divide and ensure that beneficiaries can fully benefit from the potential advantages of digital tools while respecting their comfort levels and providing alternative means of communication where necessary.

Question 3: How has digitalization affected your daily tasks and responsibilities within the agency?

Table 6: Digitalization effects on daily tasks and responsibilities.

Effects	Number	Percentage
It has significantly streamlined processes and made tasks more efficient.	25	56%
It has introduced new tools and systems that require training and adaptation.	20	44%
It had no significant impact on my daily tasks.	0	0%

Figure 13: Digitalization effects on daily tasks and responsibilities.
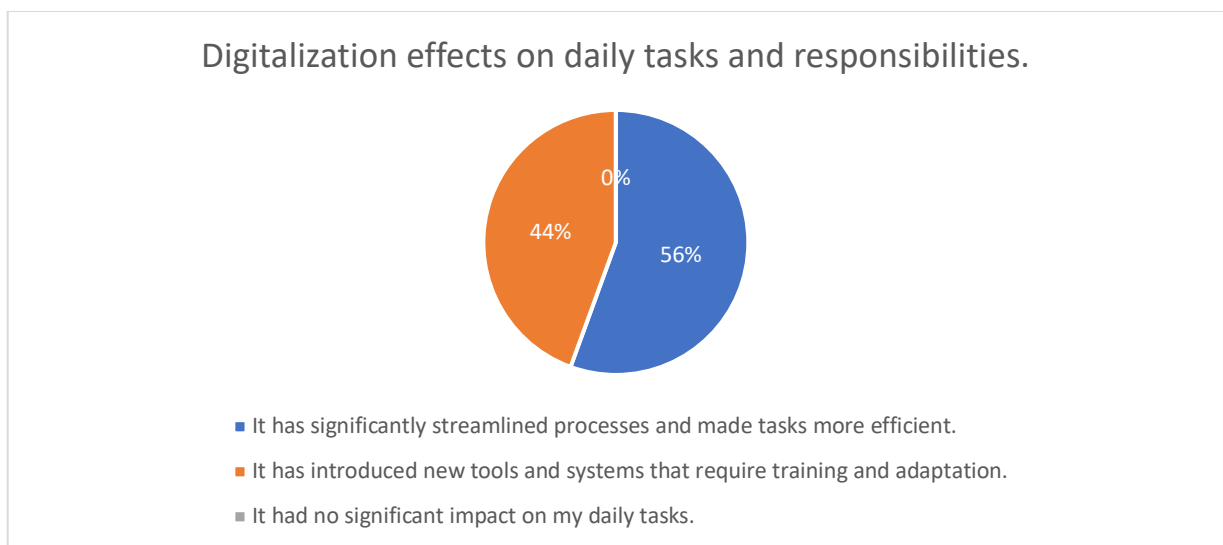
Source: elaborated based on table 6

The data reflects a generally positive perception of the effects of digitalization in terms of streamlining processes (56%) and introducing new tools and systems (44%). It emphasizes the importance of providing appropriate training and support to ensure a smooth transition and successful adoption of digital technologies within the organization.

Question 4: How do you evaluate the effect of digitalization on the following parameters:

Table 7: Evaluation of performance parameters

	Not at all important at	Somehow important	Moderately important	Important	Very important
Costs reduction (paper…)	57,5%	25,5%	10%	7%	0%
Employees productivity	2,5%	5%	5%	65%	32,5%
Processed files volume	0%	5%	6,5%	25%	63,5%
Improved decision making	2,5%	5%	67,5%	17,5%	7,5%
Improved internal communication	40,5%	20%	20,5%	19%	0%
Reduced complaints volume	2%	7%	51%	28%	12%

Figure 14: Evaluation of performance parameters
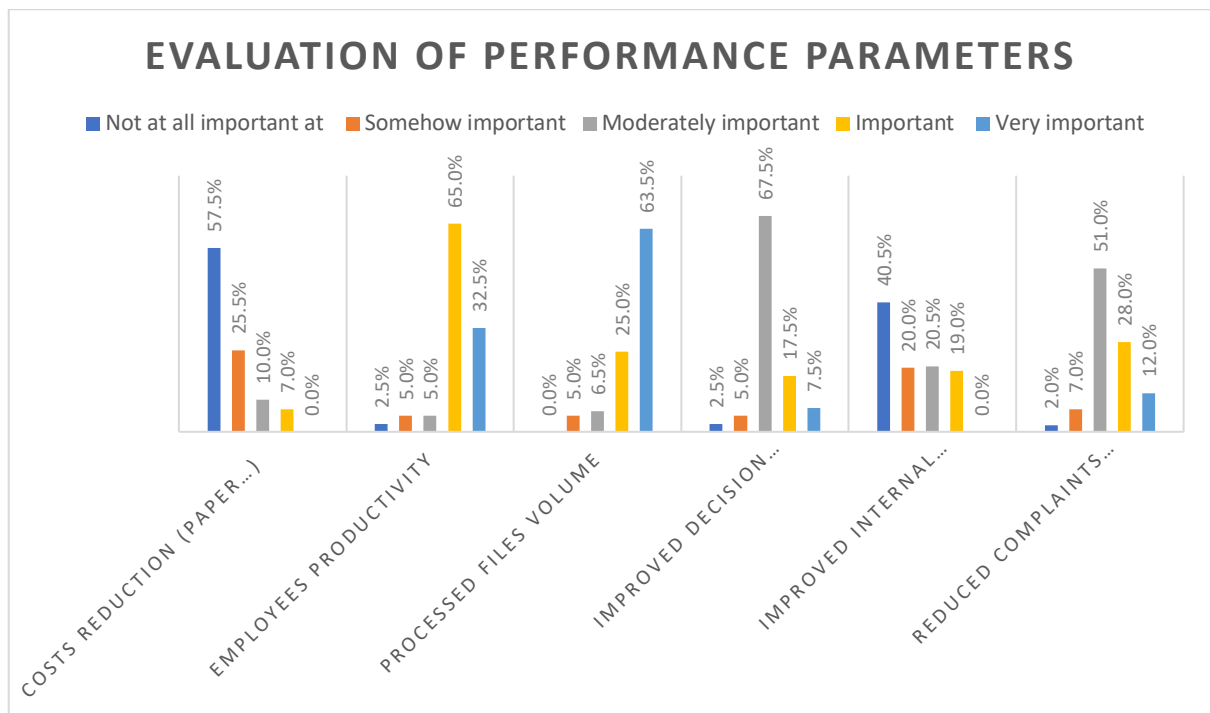
Source: elaborated based on table 7

This histogram represents the degree of importance of digitalization on some performance parameters. It can be observed that processed files volume has been referenced the most as very important among all the parameters, followed by employees' overall productivity. On the other hand, we notice that the respondents do not consider the effect on costs reduction and internal communication as very high.

Challenges facing the integration of ICTs

Question 5: What are the challenges or difficulties that you have encountered in adapting to various digitalization tools in the agency?

- The collective responses received have been synthesized into the following set of recommendations:

- Need for ICT specialists: The effective use of digitalization tools may require specialized technical skills that may not be present within the existing team, necessitating training or hiring of new talent.

- Some employees may have been hesitant or reluctant to adopt new processes and abandon traditional working methods.

- The introduction of new digitalization tools can lead to a significant increase in the volume of data to be managed, requiring additional efforts to organize, store, and process this information.

- The lack of training for employees combined with the multitude of digitalization tools, the agency becomes overly dependent on a few individuals who possess the necessary skills, creating a risk of knowledge gaps and limited scalability.

Question 6: Did you receive sufficient training and support to effectively use digital tools and systems in your work?

Table 8: The need for more training and support to effectively use digital tools and systems.

Sufficient trainings were delivered	Number	Percentage
Yes	11	24%
No	16	36%
Some aspects of the digital tools require additional explanations and guidance.	18	40%

Figure 15: The need for more training and support to effectively use digital tools and systems
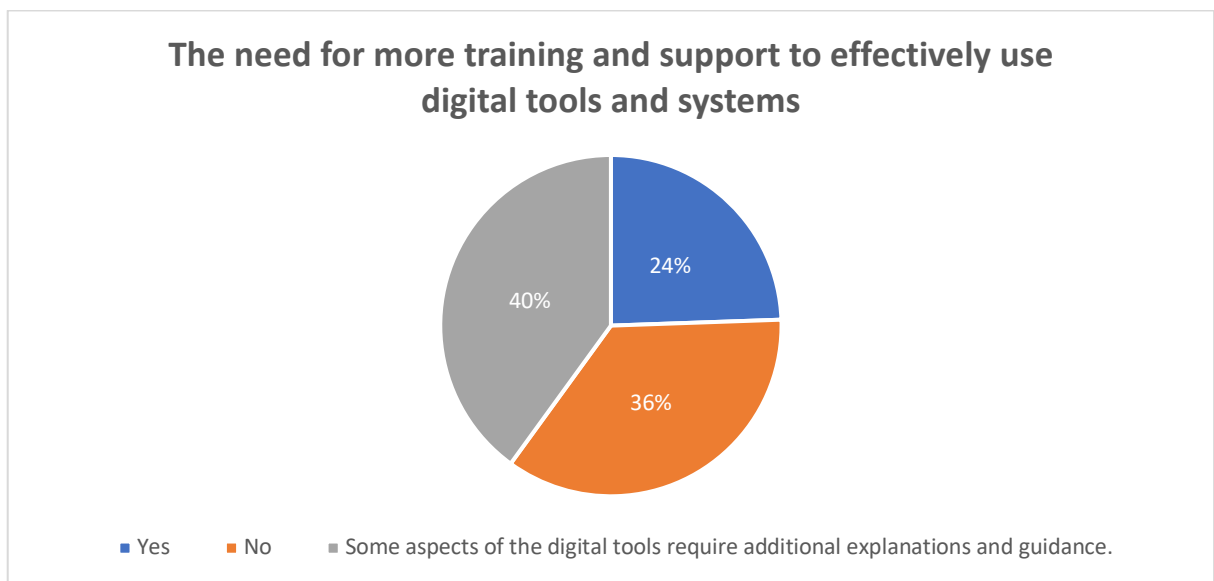
Source : elaborated based on table 8

Mixed perception regarding the delivery of sufficient trainings related to digital tools, only 24% reported that sufficient trainings were delivered, indicating that some employees have received the necessary training to effectively utilize the digital tools. on the other hand, 40% of employees mentioned that some aspects of the digital tools require additional explanations and guidance. This suggests that while trainings may have been provided, there might be

specific areas or features of the digital tools that employees still require further support and

clarification on.

Question 7: What is your evaluation for the following elements:

Table 9: ICT evaluation

	Not at all important	Somehow important	Moderately important	Important	Very important
To what extent you think ICT improved the relationship between the agency and the beneficiaries	7%	41%	25%	15%	12%
Have the different digital tools improved your time management skills	1,5%	2.5%	11%	40%	45%
Did ICT tools facilitate access to information	0%	0%	2.5%	54.5%	43%
Did ICT tools help you in acquiring new skills	30%	50%	13%	4%	3%
Do ICT tools help you to attain your objectives	2.5%	0%	10%	57.5%	30%

Figure 16: ICT evaluation
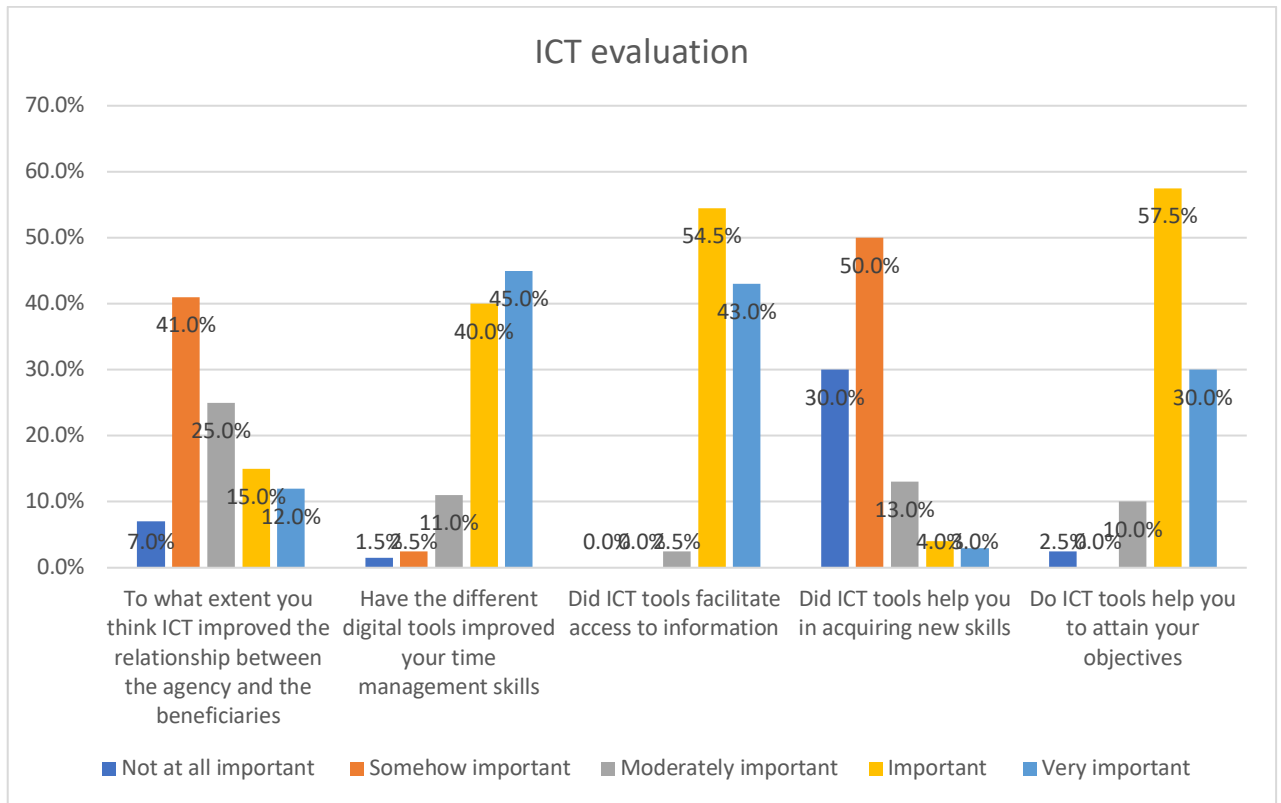
Source: elaborated based on table 9

This histogram represents the degree of importance of digitalization on some performance

parameters. It can be observed that time management and access to information are the most

elements that were improved through ICT tools utilization, followed by employees' overall

productivity. On the other hand, we notice that the respondents consider the effect on

acquiring new skills as very low.

Evaluation

Question 8: How do you measure the effectiveness of the digitalization initiatives implemented in the agency?

Table 10: Measuring the effectiveness of the digitalization initiatives

Measuring the effectiveness of the digitalization initiatives	Number	Percentage
Analyzing (KPIs)	19	42%
Measuring the satisfaction of beneficiaries	17	38%
Comparing the results before and after digitalization.	9	20%

Figure 17: Measuring the effectiveness of the digitalization initiatives
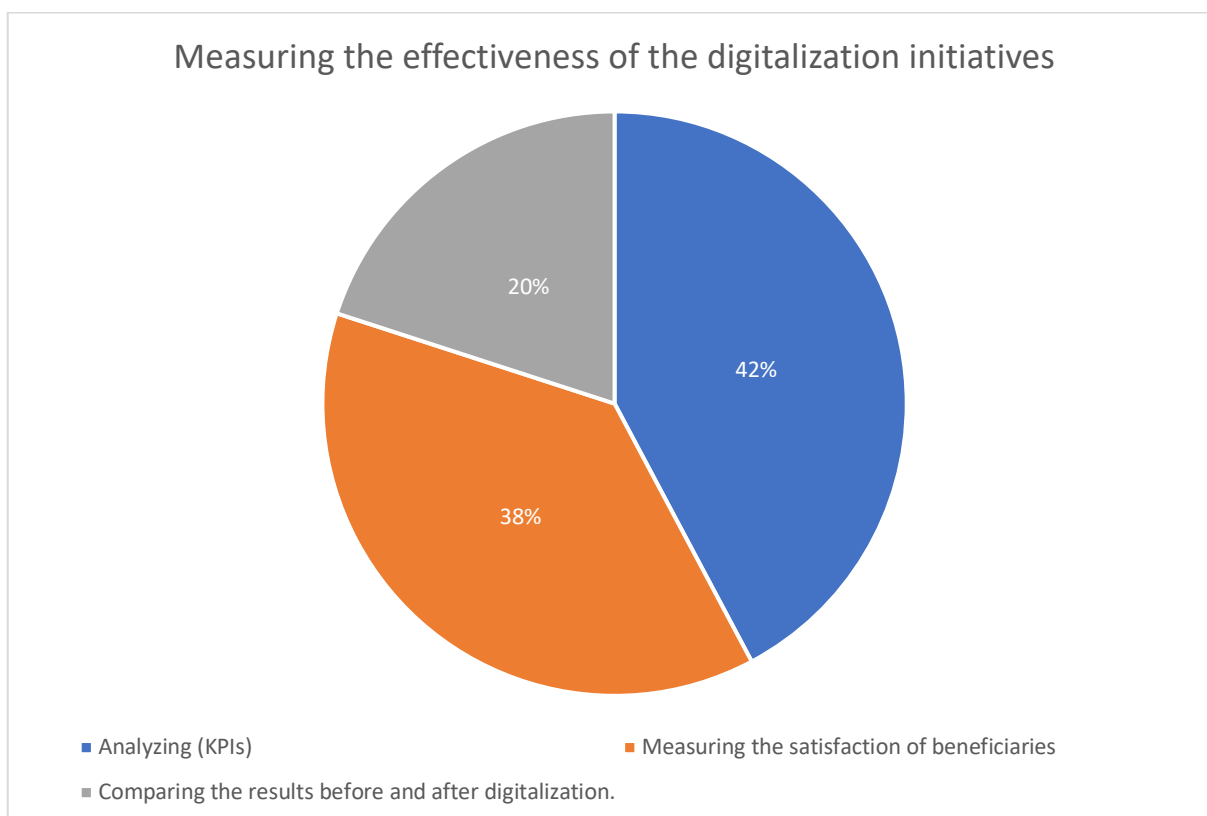
Source: elaborated based on table 10

The results show that a substantial number of respondents acknowledged the significance of measuring the effectiveness of digitalization initiatives. The majority of respondents

considered analyzing key performance indicators (KPIs) and measuring beneficiary satisfaction as essential measurement methods.

Question 9: How has digitalization affected communication and collaboration among employees within the agency?

Table 11: Effects of digitalization on collaboration among employees

Effects on collaboration	Number	Percentage
Improvement in communication and collaboration among teams.	6	13%
Increase in transparency and information sharing.	20	45%
No significant effect on communication within the agency.	19	42%

Figure 18: Effects of digitalization on collaboration among employees
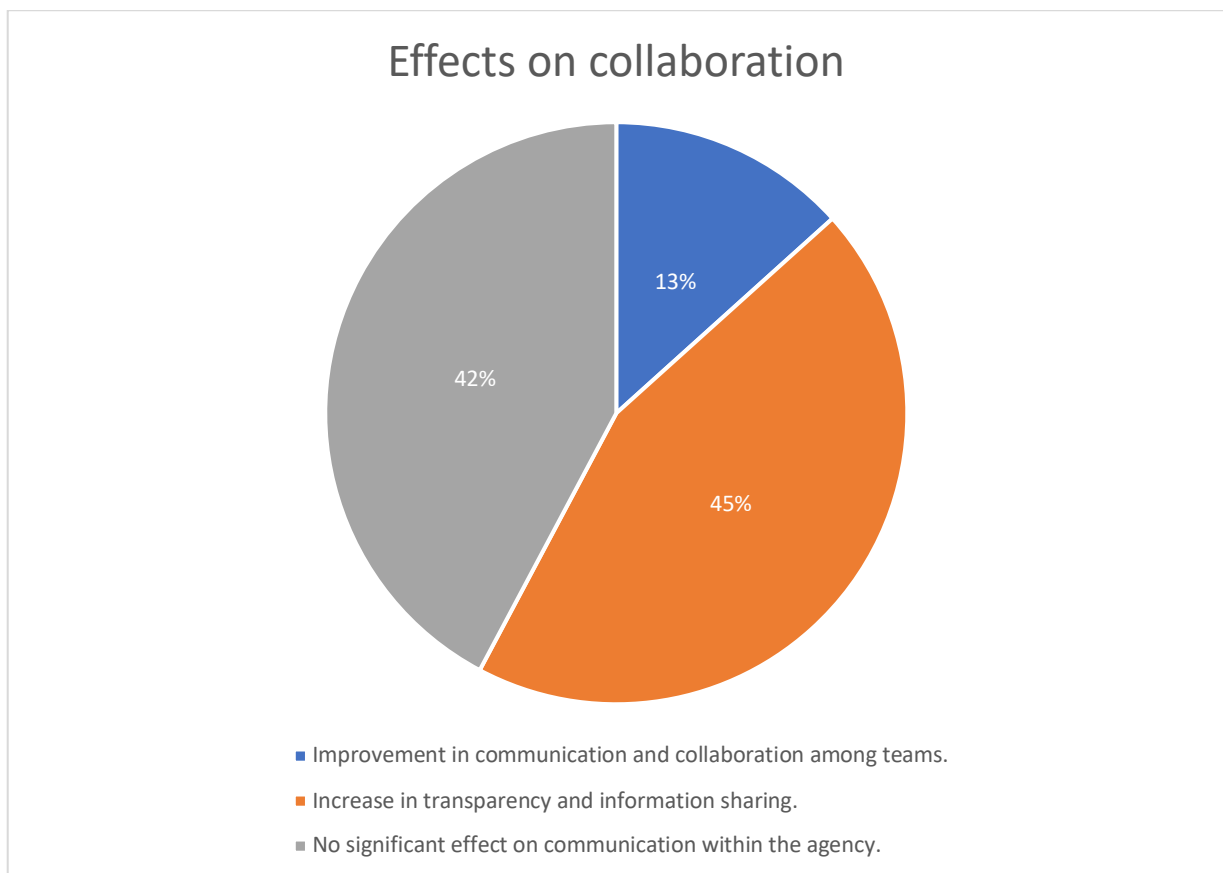
Source: elaborated based on table 11

The data indicates a positive trend towards improved collaboration through digitalization, particularly in terms of transparency, and information sharing. It suggests that the agency should continue to leverage digital tools and explore ways to maximize the benefits of digitalization in promoting effective collaboration among its employees.

Recommendations and suggestions

Question 10: According to you, in which areas of the agency's operations do you think greater digitalization could be beneficial?

Table 12: Operations within the agency that need further digitalization

Operations within the agency	Number
Data analysis	30
Interaction with beneficiaries	10
Archives and documents management	20

Figure 19: Operations within the agency that need further digitalization
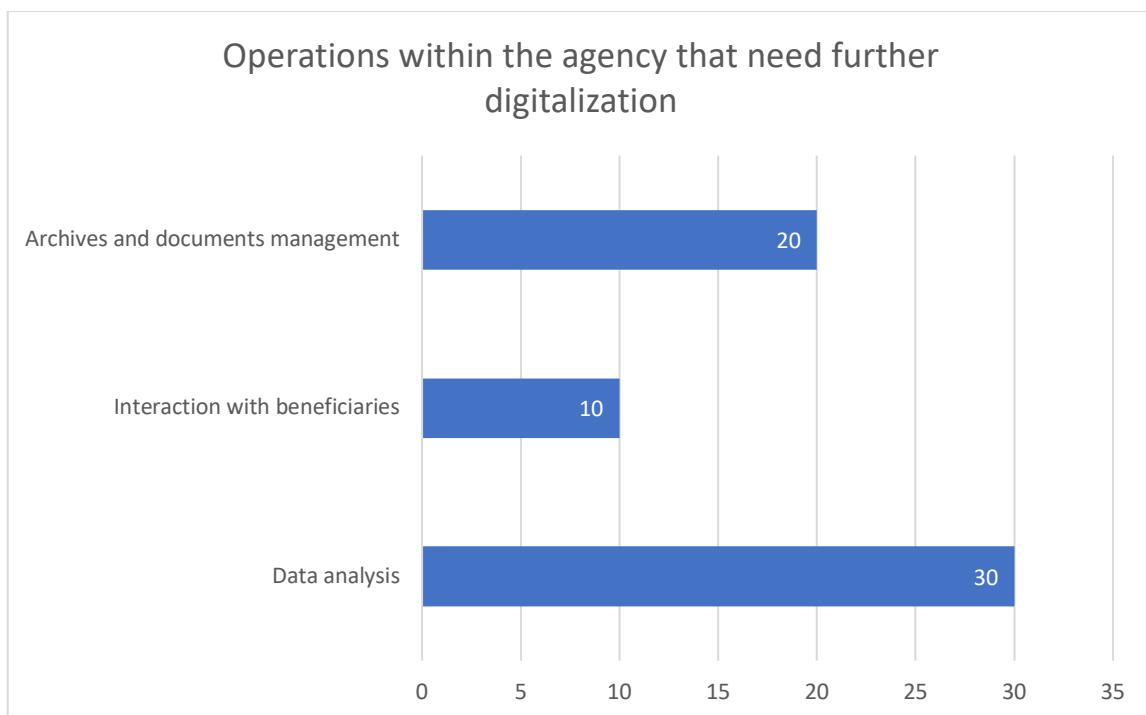
Source: elaborated based on table 12

The results indicate that there is a perceived potential for digitalization to bring various benefits to the agency's operations, specifically in data analysis, followed by archives/documents management, and lastly the interaction with beneficiaries.

Question 11: How do you think the agency could better support employees in adopting and using digitalization tools?

Table 13: How to support employees in adopting and using digital tools

Solutions	Number
Provide technical assistance and ongoing support to address issues related to digitalization	42
Organize regular training sessions on new technologies and digital tools	39
Encourage collaboration and sharing of best practices among employees	8

Figure 20: How to support employees in adopting and using digital tools
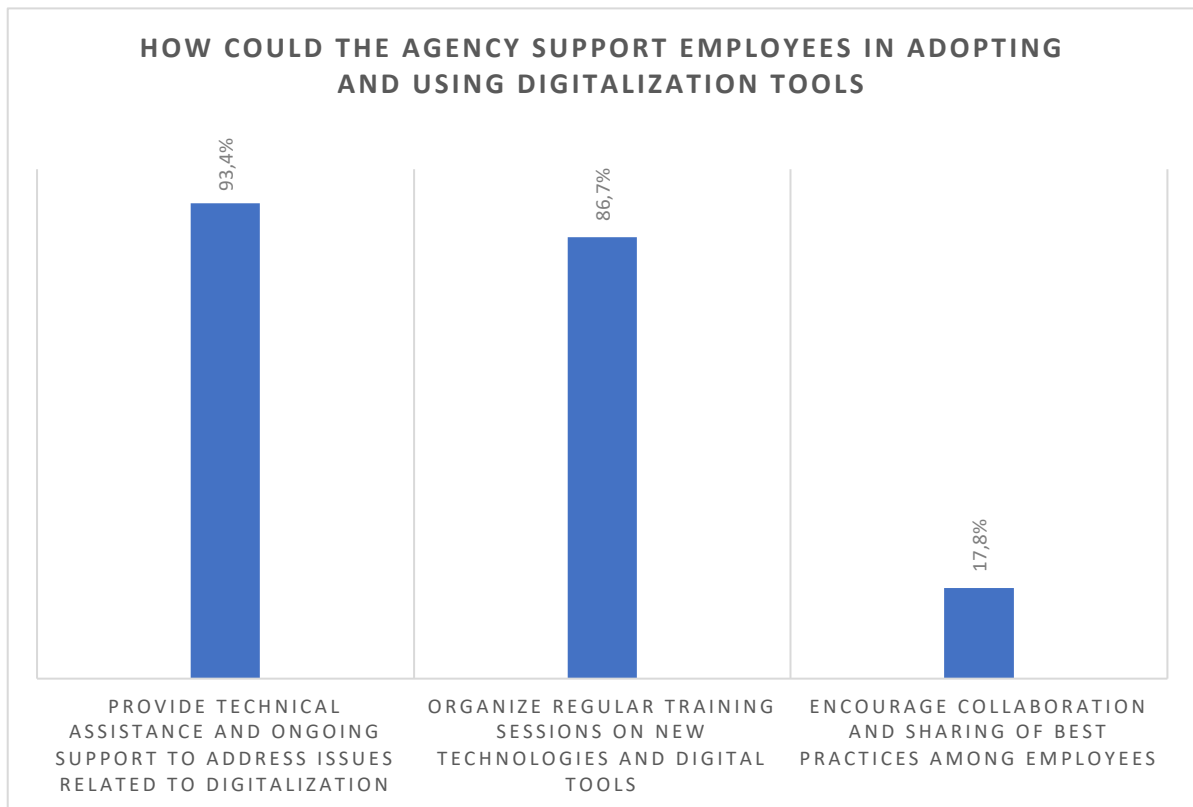
Source: elaborated based on table 13

The data highlights the importance of providing technical assistance and ongoing support to address issues related to digitalization, as indicated by the highest number of responses (93,4%). Additionally, organizing regular training sessions on new technologies and digital tools is another solution that received significant recognition (86,7%). However, it is worth noting that a smaller number of respondents (17,8%) mentioned the need to encourage collaboration and sharing of best practices among employees. This implies that fostering a culture of collaboration and knowledge sharing is essential for maximizing the benefits of digitalization.

Question 12: Do you have any specific recommendations to further improve digitalization within the agency?

- The collective responses received have been synthesized into the following set of recommendations:

  - Perform a thorough assessment of the specific digitalization needs of the agency, to identify the areas that could benefit the most from technology and prioritize initiatives accordingly.

  - Create feedback channels to gather user experience with digitalization tools, which will help identify gaps, issues, or potential improvements and proactively address them.

  - Providing **regular training sessions** to employees in order to enhance their knowledge and skills in utilizing digital tools and technologies.

3. Findings and recommendations:

The questionnaire used in this study proved to be a valuable tool for gathering insights and perspectives from employees within the agency. The questions were carefully designed to address the research objectives and hypotheses, focusing on the effect of digitalization on

performance and the challenges faced by employees in the process. The concise nature of the questionnaire, allowed for efficient data collection and minimized participant burden.

The results obtained from the questionnaire provided significant insights into the perceptions and experiences of employees regarding the effect of digitalization on various aspects of the agency's operations. The data revealed a positive trend, indicating that digitalization has led to improved performance, streamlined processes, and optimized resource utilization. It also shed light on the challenges faced by employees, such as the need for specialized skills and the resistance to adopting new processes.

Despite significant progress in adopting digital technologies and processes, the agency still heavily relies on paper-based documentation and archiving systems, particularly in pension-related operations. To enhance efficiency, accessibility, and information security, it is essential for the agency to transition to online platforms and digital archiving. This shift would not only improve processing speed, accuracy, and data accessibility but also provide enhanced information security measures. By reducing the reliance on physical paperwork, the agency can streamline processes, reduce manual handling of documents, and ensure easier and more secure access to information.

However, it is important to acknowledge certain limitations of the questionnaire and its results. Firstly, the sample size might be limited, which could affect the generalizability of the findings. It is recommended to consider expanding the sample size in future research to ensure a more representative sample. Additionally, the self-report nature of the questionnaire may introduce response bias, as participants may provide socially desirable answers or may not accurately recall their experiences. Combining the questionnaire data with observation, provided a more comprehensive understanding of the effect of digitalization.

Overall, despite these limitations, the questionnaire and its results have provided valuable insights into the digitalization efforts within the agency. The findings have identified

areas of strength and areas that require further attention, allowing for informed

recommendations to enhance digitalization processes, address challenges, and maximize the

benefits of digital transformation within the agency of the National Pension Fund.

Conclusion:

In conclusion, this chapter delved into the empirical research conducted on the effect of digitalization on performance in the local agency of the national pension fund (CNR). Through a comprehensive analysis of the data collected, several key findings emerged.

Digitalization has definitely streamlined processes, reduced processing time, and made tasks more efficient, leading to improved performance within the agency. The introduction of new tools and systems has also presented opportunities for optimizing the use of available resources, such as money and time. However, it was also observed that the implementation of digitalization initiatives posed certain challenges. Some employees expressed the need for additional training and adaptation to effectively utilize the new digital tools and systems. This highlights the importance of providing sufficient training and ongoing support as well as fostering a collaborative environment to address challenges and fully exploit the benefits of digitalization.

In conclusion, this thesis has explored the importance of digitalization in public organizations, with a particular focus on the local agency of the national pension fund. Throughout the study, various concepts such as performance, digitalization, and the challenges faced by public organizations in adopting digital processes were examined in detail.

The research findings have highlighted the crucial role of digitalization in enhancing the performance of public organizations. It was revealed that performance is closely linked to the degree of achievement of objectives and the quality of services provided. Furthermore, the study emphasized the gap between the current state of digitalization and the desired level of implementation and utilization of digital technologies and processes. It underscored the need for public organizations to make concerted efforts to bridge this gap and keep pace with technological advancements.

The empirical analysis conducted in this thesis provided valuable insights into the implementation of digitalization principles and methods within the local agency. The use of a mixed-methods approach, combining qualitative and quantitative research methods, allowed for a comprehensive understanding of the agency's digitalization journey. The data collected through questionnaires and other research instruments shed light on employees' perspectives and experiences regarding the impact of digitalization on performance.

Based on the research findings, several recommendations can be made to further improve digitalization within the agency. These include conducting a thorough assessment of specific digitalization needs, creating feedback channels for continuous improvement, addressing technical challenges, providing training and support for staff, and promoting a culture of digital collaboration.

Overall, this thesis emphasizes the significance of digitalization in public organizations and its potential to drive performance improvement. It highlights the importance of aligning digitalization efforts with organizational objectives, addressing challenges, and fostering a supportive environment for successful digital transformation. By embracing digitalization and implementing the recommended strategies, the local agency of the national pension fund can enhance its operational efficiency, service quality, and overall performance, ultimately better serving its beneficiaries in the digital age.

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Table of contents

The effect of digitalization on public organizations performance (The CNR local agency of El Oued)

As part of my Master's Degree in Organization and Business Management, I have developed a questionnaire to gather your valuable insights on the impact of digitalization on the performance of the local CNR agency in El Oued. Your participation is important for the advancement of my research and the production of a comprehensive analysis. I would like to emphasize the importance of your honesty and the specificity of your responses. I have ensured that the questionnaire is clear, concise, and easy to complete. Your participation should not take much time. Your anonymous and confidential responses will be handled with the utmost care.

I sincerely thank you for taking the time to complete this questionnaire. Your contribution is invaluable and highly appreciated.

The benefits of digitalization

1- According to you, what performance indicators have you observed since the implementation of digitalization?
☐ Reduced processing time.
☐ Optimized use of available resources (money, time, etc.)
☐ Improved services quality.

2- In which specific areas have you observed the most significant benefits of digitalization for the performance of the agency?
☐ Managing retirees' records and information.
☐ Pensions requests processing.
☐ Communication and interaction with beneficiaries.

3- How has digitalization affected your daily tasks and responsibilities within the agency?
○ It has significantly streamlined processes and made tasks more efficient.

○ It has introduced new tools and systems that require training and adaptation.

○ It had no significant impact on my daily tasks.

4- How do you evaluate the effect of digitalization on the following parameters:

	Not at all important	Somehow important	Moderately important	Important	Very important
Costs reduction (paper…)					
Employees productivity					
Processed files volume					
Improved decision making					
Improved internal communication					
Reduced complaints volume					

Challenges facing the integration of ICTs

5- What are the challenges or difficulties that you have encountered in adapting to various digitalization tools in the agency?

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6- Did you receive sufficient training and support to effectively use digital tools and systems in your work?

○ Yes, the training provided was comprehensive and useful.

○ No, additional training is required to fully benefit from the digital tools.

○ Some aspects of the digital tools require additional explanations and guidance.

7- What is your evaluation for the following elements:

	Not at all important	Somehow important	Moderately important	Important	Very important
To what extent you think ICT improved the relationship between the agency and the beneficiaries					
Have the different digital tools improved your time management skills					
Did ICT tools facilitate access to information					
Did ICT tools help you in acquiring new skills					
Do ICT tools help you to attain your objectives					

Evaluation

8- How do you measure the effectiveness of the digitalization initiatives implemented in the agency?
○ Analyzing key performance indicators (KPIs).

    ○ Measuring the satisfaction of beneficiaries.
    ○ Comparing the results before and after digitalization.

9- How has digitalization affected communication and collaboration among employees within the agency?
    ○ Improvement in communication and collaboration among teams.
    ○ Increase in transparency and information sharing.
    ○ No significant effect on communication within the agency.

Recommendations and suggestions

10-   According to you, in which areas of the agency's operations do you think greater digitalization could be beneficial?
    ☐ Data analysis.
    ☐ Interaction with beneficiaries.
    ☐ Archives and documents management.

11-   How do you think the agency could better support employees in adopting and using digitalization tools?
    ☐ Provide technical assistance and ongoing support to address issues related to digitalization.
    ☐ Organize regular training sessions on new technologies and digital tools.
    ☐ Encourage collaboration and sharing of best practices among employees.

12-   Do you have any specific recommendations to further improve digitalization within the agency?

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Thank you for your cooperation.