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E-GOVERNMENT

Impact of the digitalization of public service work processes on employee performance

Case Study: CASNOS-Skikda

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ABSTRACT

Our study aims to examine how digitalizing work processes affects employee performance at CASNOS-Skikda. The theoretical chapter includes a literature review and a conceptual framework. The methodology section outlines the organizational setting and explains the quantitative approach, which uses an online survey to collect and analyze data from staff members. By utilizing a structured questionnaire, the study gathers insights into the employees' perspectives on the impact of digital tools on their daily tasks and overall job satisfaction. The findings indicate that the implementation of digital tools significantly increases work efficiency, employee satisfaction, and overall performance. Furthermore, the research identifies specific digital practices that enhance productivity and employee morale. This study aims to provide practical guidance for other public sector entities undergoing similar digital transformations by analyzing the CASNOS-Skikda case, its impact on employees, and the subsequent sustainability and performance of the organization. The analysis includes a detailed examination of the long-term benefits and potential challenges of digitalization in the public sector.

Key words: public service, digitalization, performance, e-government.

RÉSUMÉ

Cette étude vise à examiner comment la numérisation des processus de travail du affecte la performance des employés à CASNOS-Skikda. Le chapitre théorique comprend une revue de la littérature et un cadre conceptuel. La section méthodologique détaille le cadre organisationnel et explique l'approche quantitative, qui utilise un questionnaire en ligne pour collecter et analyser les données des membres du personnel. L'étude montre que les outils numériques augmentent considérablement l'efficacité du travail, la satisfaction des employés et les performances globales. Cette recherche vise à offrir des conseils pratiques aux autres entités du secteur public qui subissent des transformations numériques similaires en analysant le cas de CASNOS-Skikda, son impact sur les employés, ainsi que la durabilité et les performances ultérieures de l'organisation.

Mots clés: service public, digitalisation, performance, e-gouvernement.

الملخـص

تهدف دراستنا لمعرفة كيفية تأثير رقمنة إجراءات العمل على أداء الموظفين في الصندوق الوطني للضمان الاجتماعي لغير الأجراء–سكيكدة– CASNOS (Skikda). تجمع الدراسة وجهات نظر الموظفين حول تأثير البرامج الرقمية التي تساعدهم على أداء مهامهم اليومية والذي ينعكس بشكل إيجابي على رضائهم الوظيفي بشكل عام.

تم الاعتماد في دراستنا على المنهج الكمي باستخدام استبانة تم توزيعها عبر البريد الالكتروني للعاملين بالمؤسسة محل الدراسة والذي بلغ عددهم 60، تم استرداد 60 استبانة تم تحليلها بالاعتماد على برنامج الحزم الاحصائية SPSS v21.

تشير النتائج إلى أن تطبيق البرامج الرقمية يساهم بشكل كبير بالرفع من كفاءة العمل ورضا الموظفين. علاوة على ذلك، تحدد دراستنا الممارسات الرقمية التي تعزز من الإنتاجية والأداء العام للموظفين. بالاضافة الى تقديم الإرشادات العملية الذي تساعد مختلف القطاعات التي تشهد تحولات رقمية مشابهة لحالة CASNOS–Skikda وتأثيرها على الموظفين.

الكلمات المفتاحية: الخدمة العامة، الرقمنة، الأداء، الحكومة الإلكترونية.

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LIST OF ABBREVIATIONS AND ACRONYMS

C.A.V.I.C.O: Caisse d'Assurance Vieillesse des Commerçants et Industriels d'Algérie (for Oranie region)

C.A.V.I.C: Caisse d'Assurance Vieillesse des Commerçants et Industriels d'Algérie (for Constantine region)

C.A.V.N.O.S: Caisse d'Assurance Vieillesse des Non-Salariés

C.S.S.F: Caisse de Sécurité Sociale des Fonctionnaires

C.S.S.M: Caisse de Sécurité Sociale des Mineurs

CASNOS: Caisse Nationale des Non-Salariés

EAS: Enterprise Application Software

E-Governance: Electronic Governance

ERP: Enterprise Resource Planning

ICT: Information and Communication Technology

NPM: Node Package Manager

OECD: Organisation de coopération et de développement économiques

SPSS: Statistical Package for the Social Sciences

INTRODUCTION

Introduction

The current era is characterized by the digitalization of public services, which is having a profound impact on the way governments and organizations operate globally. Digitization is the act of converting information and processes from a physical format to a digital format, which allows for more efficient and easily accessible service delivery. The integration of information and communication technology (ICT) in public services has a profound impact, as it greatly improves the effectiveness, efficiency, and accessibility of services offered to the general population.

Public services refer to a wide array of vital services provided by the government, which are supported by taxation and intended to benefit society. These services encompass essential utilities such as water, electricity, and gas, as well as vital sectors like education, healthcare, policing, and transportation. Public service entities can enhance their operational efficiency, decrease expenses, and enhance the quality and accessibility of their services to citizens by using digital platforms.

The process of digitizing public services involves using sophisticated technology like cloud computing, big data analytics, and artificial intelligence. These technologies empower public sector organizations to efficiently handle and oversee large volumes of data, permit instantaneous communication, and deliver tailored services to citizens. For example, e-governance platforms enable citizens to conveniently access a range of government services through the internet, eliminating the need for in-person visits to government offices and so saving time and resources.

The process of digitization has a substantial influence on the performance of employees in public sector organizations. One of the main advantages is the improvement in production. Digital tools and platforms have the capability to automate repetitive processes, hence decreasing the amount of time and energy needed to accomplish them. This automation enables employees to concentrate on more intricate and strategic tasks, resulting in enhanced efficiency and productivity.

In addition, digitalization promotes enhanced communication and collaboration among employees. Digital platforms facilitate real-time communication, document sharing, and collaborative work settings, thereby promoting teamwork and information exchange. This

enhanced communication can result in expedited decision-making, increased ingenuity in problem solving, and a more unified organizational culture.

Digitalization has a significant impact on employee satisfaction. Utilizing sophisticated digital tools and technologies can enhance employees' productivity and alleviate work-related stress. Intuitive digital interfaces and automated procedures can decrease the probability of errors and the necessity for repetitive manual tasks, hence enhancing the overall work environment. In addition, digitalization can offer employees the chance to continuously learn and upgrade their skills, hence increasing job satisfaction and improving prospects for career growth.

Nevertheless, the shift towards a digital workplace also poses difficulties for employees. An important obstacle is the requirement for proficiency in digital skills and continuous training. Proficiency in utilizing new technologies and systems is a prerequisite for employees, necessitating ongoing learning and adjustment. Organizations should allocate resources to training programs in order to ensure that their workforce possesses the requisite skills to effectively utilize digital tools.

Another obstacle lies in the possibility of heightened work demands and elevated performance expectations. The presence of digital technologies might result in heightened performance standards, requiring staff to accomplish jobs with greater speed and efficiency. If not well managed, this heightened pressure can lead to stress and burnout. Organizations need to find a balance between utilizing digital tools to improve performance and ensuring that employees retain a good work-life balance.

The digitalization of public services offers significant potential for better employee performance through increased efficiency, improved communication, and heightened job satisfaction. Nevertheless, it is necessary to confront obstacles associated with digital literacy, training, and effectively managing job expectations. Through skillful navigation of these obstacles, public service organizations can fully exploit the capabilities of digital transformation to establish a work environment that is more streamlined, productive, and satisfying for their staff.

Research problem and questions

Recent research conducted by **(Parker, Thompson, & Green, 2022)** has shown that the implementation of digital technology in public services has had a substantial influence on the performance of employees in different businesses. This digital transformation brings about a significant change in the way public sector organizations operate. The process entails not only the assimilation of novel technologies but also a fundamental reorganization of workflows and job responsibilities. These changes can be intricate and frequently arise from a vague comprehension of digital operations.

The digitalization of public services involves transforming conventional procedures into digital formats, hence enabling more effective and easily accessible delivery of services. This process often entails internal reconfiguration and the restructuring of activities, motivated by a desire to optimize operations and improve the quality of service. The intricacy of this procedure can generate ambiguities and difficulties for personnel, as they acclimate to novel technology and workflows.

Organizational change, propelled by digitalization, refers to the shift from conventional approaches to more sophisticated digital processes. Initially, this transformation affects the human aspects of the organization before modifying its operations, processes, and components. Employees are need to adapt to this transition, which frequently interrupts established routines and introduces new performance standards. The individuals most impacted by these modifications are the personnel who are responsible for executing and functioning within novel digital frameworks.

The National Social Security Fund for Non-salaried Workers (CASNOS) in Algeria serves as a pertinent example of digitization's influence on public service organizations. CASNOS has embraced digital transformation to improve its administrative efficiency and service delivery. By integrating advanced ICT systems, CASNOS aims to modernize its operations, enhance communication, and streamline processes. This transition has significantly affected employee performance, necessitating continuous training and adaptation to new digital tools and systems.

Problem Statement

In our research, we aim to understand the factors driving these digital changes in public service organizations and their impact on employee performance. Specifically, we investigate the challenges employees face during this transition, the benefits of digitization, and its effects on organizational efficiency, culture, and strategy. This study leads us to formulate the following research question:

To what extent is the digitalization of public service work processes affecting the performance of employees within the public sector?

Research Questions

To enhance our comprehension of the topic matter and explore its various components and attributes, we present the following research questions:

- **How does the extent of employees' knowledge and understanding of e-management systems affect their job performance?**
- **In what ways does the digitization of work processes influence the efficiency and time required for task completion?**
- **How does the implementation of digital tools and systems impact employee performance and productivity?**
- **What are the main challenges and obstacles employees face during the digitalization process, and how do these challenges affect their performance?**

Significance of the study

The transition to digital public services is a significant global trend in the public sector, and it is relevant in Algeria. This research addresses a timely topic and meets a growing need to understand how the digitization of public services affects employee productivity in a government institution such as CASNOS.

The findings of this study will provide valuable insights for policymakers and practitioners involved in the digital transformation of public services. Understanding how digitalization impacts employee performance can inform the development of strategies and policies aimed at maximizing the benefits of digitalization while mitigating. By examining the impact of digitalization on employee performance, the study can identify areas where efficiency gains can be achieved within government institutions. This can lead to improved service delivery, reduced administrative burden, and better resource allocation.

In addition, the study contributes to the existing body of knowledge on digital transformation in public services. By providing empirical evidence on the relationship between digitalization and employee performance, the study can enrich academic discourse and inform future research in this area.

Overall, the significance of the study lies in its potential to inform policy and practice, improve organizational efficiency, enhance employee well-being, optimize resource allocation, and contribute to the broader academic understanding of digital transformation in public services.

Methodology

The study used a quantitative methodology to evaluate the influence of digitalization on staff performance inside CASNOS. The main method of data collecting involves distributing a questionnaire to employees, which gather quantitative indicators such as productivity rates, mistake rates, time management efficiency, and job completion. This data is collected following the adoption of digital tools and systems.

The gathered data is examined utilizing statistical techniques to detect patterns and connections between digitalization and alterations in employee performance, with a particular emphasis on crucial performance metrics such as productivity, efficiency, job satisfaction, and engagement levels. An examination of post-digitalization enables a comprehensive understanding of the immediate and lasting impacts of digital transformation.

This quantitative methodology offers a precise and data-driven comprehension of how digitalization affects employee performance, so helping to the comprehensive evaluation of its influence in public sector organizations.

Structure of the dissertation

The structure of this dissertation consists of three chapters.
The first chapter, Theoretical Framework, is divided into two sections. The first section, Literature Review**,** is organized into multiple sections. The first section offers an overview of digitization and its impact on public services. The second section delves into theoretical frameworks and models relevant to digital transformation. The third section reviews case studies and empirical evidence related to the subject. The second section, Conceptual Framework, outlines the study's theoretical foundations and highlights the key concepts and variables relevant to the research.

The second chapter**,** Data and Methods, is also divided into two sections. The first section**,** Organizational Context, provides a detailed overview of CASNOS and the environment in which the study was conducted. The second section, Methodological Framework (Quantitative Approach), describes the steps and methods used to collect and analyze quantitative data, focusing on the use of questionnaires to gather performance metrics from employees.

The third chapter, Results and Discussion**,** presents and interprets the findings of the study. It includes descriptive statistics, comparative analysis of performance data after digitalization, and a discussion of the implications of these results for employee performance and organizational efficiency at CASNOS.

The dissertation concludes with sections on References and Appendices, which include questionnaire samples, additional data tables, and supplementary materials. This structured approach ensures a thorough and systematic exploration of the impact of digitalization on employee performance within CASNOS.

CHAPTER 1: THEORETICAL FRAMEWORK

The purpose of this chapter is to provide an overview of the literature that highlights earlier studies on the impact of employee performance and the digitalization of public services. It will also look at how digital transformation helps modernize companies in the public sector. The review will cover a wide range of subjects, ideas, and theories about digitalization and worker performance, including the advantages and disadvantages of digitalization, worker flexibility, and output. It will also examine various digital transformation strategies and their significance for enhancing the provision of public services

Section 1. Literature review

This section provides a literature review that summarizes previous research on the digitalization of public services and its impact on employee performance. Our review is organized into three sections. The first section, The Digitalization of Public Services, delves into the process and importance of digital transformation within public sector organizations, including the implementation of e-management systems and their advantages. The second section, Employees' Performance, investigates the factors that affect employee performance in the context of digitalization, with a focus on productivity, adaptability, and job satisfaction. The third section, Impact of Digitalization on Employees, examines the effects of digitalization on employees, highlighting both the positive impacts and the challenges they encounter. Together, these sections offer a comprehensive understanding of how digitalization affects public services and employee performance.

1.1. The digitalization of public services

In his study, **Hadj Kaci (2022)** provides an in-depth analysis of Algeria’s digital transformation environment, focusing on the challenges in digitalization public administrations and the economy. The essay offers a comprehensive examination of various aspects of this transition, highlighting key issues, proposing potential solutions, and discussing broader implications. It details the achievements to date, identifies major obstacles encountered, and outlines strategic measures to overcome these hurdles for successful digitalization initiatives in Algeria.

Hadj Kaci sets specific goals for digital transformation, including a target of 10% growth in e-commerce and a 22% increase in overall digitalization by 2025. The paper underscores the importance of sectors like healthcare and education in the digital transformation process and provides projections for increased digitalization across various industries by 2025. By presenting a detailed roadmap, the study emphasizes the critical role of these sectors and offers insights into the expected advancements and the strategies needed to achieve these digital transformation objectives.

In his study, **Bouzazi (2021)** delves into the role of e-government in digitizing public administration, with a particular focus on the Algeria Electronic Project of 2013. The paper examines various facets of electronic governance and its substantial impact on the modernization of administrative processes in Algeria. It emphasizes the importance of e-governance in enhancing administrative efficiency and public service delivery. Bouzazi provides a comprehensive analysis of how electronic governance can transform administrative procedures, improve service delivery, and overall, advance Algerian public administration.

The study highlights the potential benefits of implementing e-governance strategies, such as improved interactions between citizens and government and the modernization of administrative procedures. It discusses the impact of e-government projects on administrative effectiveness and the quality of public services. Additionally, the paper sheds light on the opportunities and challenges associated with executing e-government initiatives like the 2013 Algeria Electronic Project. Bouzazi offers valuable insights into the specific strategies, tools, and policies that Algeria employs to implement e-government projects. By examining the details presented in the paper, readers can gain a better understanding of how electronic governance is transforming public administration practices and promoting digital government services in Algeria.

In his research paper, **Merouani (2021)** investigates the digitalization of information systems within public institutions, especially governmental entities. The study emphasizes the critical role of digitalization in fostering service innovations aligned with the e-government framework, creating a dynamic and interactive service environment between the government and its citizens.

Merouani highlights how digitalization facilitates online transactions and service innovation by bridging the digital divide, implementing digital business management strategies, and utilizing

technologies such as online services, ERP systems, and NPM initiatives. The paper underscores that transforming public institution information systems through software technologies, digital tools, media, networks, and communication platforms significantly aids in adopting service innovations and enhancing online transactions.

This digital evolution not only improves organizational development and operational efficiency in public services but also standardizes service delivery methods, enhancing citizen satisfaction with electronic services and yielding developmental benefits that comply with international standards. The study concludes that digitalization in public institutions markedly boosts operational effectiveness and efficiency, thereby improving the delivery of public services. This trend not only increases citizen satisfaction but also promotes developmental benefits that meet global standards. Key terms defining this study include digitalization, information systems, public organizations, creative services, and e-government.

In his comprehensive literature review, **Terlizzi (2021)** consolidates scholarly and non-academic research on digital government within public policy, administration, management, and welfare studies. The paper, titled "The Digitalization of the Public Sector: A Systematic Literature Review," covers conceptual definitions of public sector digitalization, the benefits of digital government policies, success and failure factors, and the impacts of digital government. It identifies gaps in current literature and underscores the role of policy sciences in advancing our understanding of contemporary digitalization strategies and their societal and governmental implications.

Terlizzi's review methodically examined 130 records, including academic papers, book chapters, novels, and non-academic publications from influential international organizations like the World Bank and OECD. Employing the PRISMA approach, the study gathered and analyzed pertinent materials on public sector digitalization, exploring a diverse array of digital tools used by governments for detection (e.g., online web facilities) and implementation (e.g., legal databases). The review highlights the evolution of policy design in the digital age through tools such as open data, big data, social media, robotics, and artificial intelligence.

Moreover, the paper delves into the transformative impacts of digitalization on governments, public administration, and society over time. It examines how organizational culture influences ICT adoption and illustrates the paradigm shifts in Digital Era Governance catalyzed by

advancements in information technology. The assessment emphasizes the potential of digital technologies to revolutionize public service delivery and governance processes.

In conclusion, Terlizzi's systematic literature review offers a comprehensive overview of the current state of digitalization in the public sector, stressing the need for further research to enhance our understanding of the intricate interplay between technology, governance, and societal outcomes.

In their comprehensive analysis titled "The Benefits of Utilizing E-Government Based Public Services," **Iqbal et al., (2020)** examine the significant impact of electronic government (e-government) on contemporary public administration. This insightful study explores how e-government revolutionizes traditional public service delivery by enhancing accessibility, operational efficiency, and transparency within governance.

The authors highlight that e-government provides innovative solutions to the challenges of conventional public service delivery, such as long wait times, geographical limitations, and restricted availability during standard business hours. By leveraging advanced technologies like web portals, mobile applications, and cloud computing solutions, governments can facilitate seamless interactions between citizens and their administrations, significantly improving user experience and increasing citizen satisfaction and engagement.

Adopting e-government strategies enables governments to streamline complex administrative procedures, reducing bureaucracy and boosting productivity. For example, online application systems for permits, licenses, or tax filings allow users to complete tasks from any location at any time, eliminating the need for physical visits to government offices. Moreover, automating routine tasks with artificial intelligence and machine learning algorithms minimizes human error and enhances accuracy, ensuring timely and efficient service delivery.

E-government also promotes greater transparency and accountability within government agencies. Real-time data sharing capabilities provide citizens with direct insights into the operations of their local, state, or federal governments. Open data policies further encourage collaboration between government entities and private sector innovators, fostering new opportunities for problem-solving and driving economic growth.

Overall, the adoption of e-government-based public services represents a shift toward more responsive, inclusive, and effective governance models. As governments continue to embrace

digital transformation, they will be better positioned to meet the evolving needs of their constituents while addressing global challenges such as climate change, poverty alleviation, and social justice.

1.2. Employees performance

The research study undertaken by **Saud Al-Bahri (2024)** seeks to examine the influence of leadership and motivation on the productivity of employees in the Oman Water Sector. The study focuses on comprehending the impact of leadership roles and motivational elements on employees' productivity within this particular sector. The study utilizes a quantitative research approach to examine the correlation between leadership responsibilities, motivation, and employees' productivity. It specifically investigates motivation as a mediator in the relationship between leadership and productivity.

The research design employed an exploratory approach with a quantitative study methodology. The study employed a questionnaire as a survey tool and utilized stratified random sampling to choose participants from the Oman Water Sector. The data gathering process involved the utilization of SPSS and Smart PLS software for the purpose of statistically analyzing and evaluating the measurement model and mediator variable. The research philosophy employed in this study is positivism, which focuses on generating generalizations that resemble laws by observing social reality.

The study's findings and discussion emphasized significant outcomes about the influence of leadership positions and motivation on employees' productivity. The study found that there are strong connections between leadership roles, motivation, and employees' productivity. This highlights the significance of leadership and motivational aspects in improving productivity within the Oman Water Sector. In addition, the study examined the consequences and contributions of the research, encompassing knowledge contributions, theoretical implications, and practical implications for water sector organizational management.

Ultimately, the research study offers useful insights on the importance of leadership positions and motivational elements in affecting the productivity of employees in the Oman Water Sector. The study enhances comprehension of the impact of leadership and motivation on productivity levels

by investigating the mediating role of motivation. It also provides suggestions for improving organizational performance in the water industry.

Chami (2023) examines the pivotal role of internal communication in enhancing organizational performance and fostering continuous improvement of human capital within an organization. The paper underscores how effective internal communication promotes unity among employees, facilitates the achievement of common goals, and maintains a positive work environment through efficient message transmission. The study specifically investigates the impact of internal communication practices on employee performance and the cultivation of a communication-oriented culture at NAFTAL, a significant governmental institution in the Algerian economy.

The primary objective of the research is to evaluate how internal communication practices influence employee performance and the social dynamics within public organizations like NAFTAL. By exploring the relationship between internal communication and employee performance, the study reveals that effective internal communication significantly enhances employee productivity, efficiency, and overall organizational performance. It emphasizes the importance of establishing robust internal communication guidelines to foster a culture of communication and improve organizational outcomes. The study underscores NAFTAL's efforts in implementing effective internal communication strategies as crucial for enhancing employee performance and fostering a conducive work environment that aligns with organizational objectives.

In summary, Chami's research highlights the critical importance of internal communication in enhancing employee performance, productivity, and overall organizational effectiveness. By cultivating proficient communication strategies, organizations like NAFTAL can create a favorable work atmosphere that promotes employee engagement, satisfaction, and ultimately contributes to the organization's success and productivity.

The study conducted by **Chan et al (2023)** seeks to examine the influence of reward systems, leadership styles, and employee empowerment on organizational productivity, with a specific focus on the post-Covid-19 period. The study investigates the correlation between motivating factors and productivity, examining the impact of incentive, leadership styles, and employee empowerment on employees' performance.

The methodology utilized in this study entailed disseminating a standardized structured questionnaire using social media channels to 150 respondents who are employees making mandated contributions under Malaysia's labor legislation. The data gathering process employed non-probability purposive sampling to specifically target employee respondents with relevant job experience.

The study was limited by the use of online questionnaires conducted through social media sites, which was necessitated by the restrictions imposed by the Covid-19 epidemic. This approach may experience restricted involvement from middle-aged participants who are not actively involved in social media. In order to improve future research, it was suggested that a combination of online and offline platforms be used to distribute questionnaires. This would allow for a wider range of employee perceptions to be captured.

The study revealed that employee performance is highly influenced by reward, particularly intrinsic rewards such as engaging tasks and autonomy. The need of regular incentives in driving increased involvement and productivity in the professional setting was emphasized. Leadership is a vital factor that influences motivation and the success of a business. Effective leadership styles have a favorable impact on the increase of employees' productivity. Employee empowerment has been identified as a crucial aspect that has a favorable impact on organizational commitment and emotional engagement, ultimately resulting in higher productivity. The study's research framework exhibited significant predictive efficacy in comprehending and foretelling productivity through the analysis of incentive, leadership, and employee empowerment.

Ultimately, the study highlights the significance of providing employees with both monetary and non-monetary incentives in order to maintain high levels of production. The study found that employee empowerment had the greatest influence on productivity, emphasizing the significance of giving employees the power to make decisions in order to improve their performance.

1.3. Impact of digitalization on employees

The research conducted by **Alobidyee et al (2022)** explores the significant impact of digital transformation on employee performance in the Greater Tafila Municipality in Jordan. The study characterizes digital transformation in municipalities as a complex process that involves technological, organizational, and cultural advancements. The goal is to meet the changing needs

of customers and improve the adaptability of employees by utilizing digital capabilities to create innovative service models, enhance user experiences, digitize operational processes, and increase operational performance. The study focuses on the dimensions of digitalization, which encompass machines, software, and networks. It emphasizes the crucial role of information and communication technology in driving progress and improving efficiency in the digital era.

The study utilized a research approach that encompassed a sample of 167 persons, with 160 valid questionnaires being examined. The results demonstrated a direct association between digital transformation and employee performance, underscoring the significance of digital technology in reconfiguring work procedures, promoting creativity, and enhancing efficiency. The study sample characteristics, data analysis, and hypothesis testing yielded useful information regarding the demographic mix of the participants, their work experience, and the extent of digital change within the municipality.

To summarize, the report provides suggestions for municipal administrations to improve their digital transformation efforts. These recommendations include empowering staff through training and skill development in digital technologies, as well as aligning performance management techniques with digital transformation plans. The study's thorough examination of the effect of digitalization on employee performance lays the foundation for future research in various industries and sectors, highlighting the transformative power of digital technology in promoting organizational success and efficiency.

A recent study conducted by **Sulistianingtiyas and Djastuti (2022)** seeks to examine the correlation between workplace digitization, employee attachment, and employee performance. The researchers employed quantitative methodologies, namely utilizing Partial Least Squares (PLS) analysis techniques, to empirically examine the hypothesis. The study population consists of 92 individuals. The data was gathered through the utilization of quantitative descriptive data collecting techniques, employing questionnaires as the primary means of data acquisition. The researchers employed the Unified Theory of Acceptance and Use of Technology (UTAUT) model to assess the level of digitalization in the workplace. They utilized the Adaptation of Individual Work Performance Questionnaire (IWPQ) to gauge employee performance, and a nine-item Utrecht Work Engagement Scale questionnaire to evaluate employee attachment.

The study's findings indicate that the implementation of digitalization in the workplace has a favorable and substantial impact on employee performance. This impact is facilitated by the level of employee engagement. The study additionally discovered that employee attachment serves as a mediator for the impact of digitalization in the workplace on employee performance. The researchers determined that the implementation of digital technology in the workplace could enhance performance by fostering innovative behavior, improving efficiency, and eventually leading to enhanced organizational competitiveness.

The study additionally discovered that employee attachment is a workplace attitude that motivates all members of the organization to consistently perform at their best, demonstrating dedication to the organization's objectives and principles. Employees that are completely engaged and passionate about their work will demonstrate a strong commitment to the future of their business and will be motivated to use their utmost efforts to ensure the success of the organization. Full connection to work and organization can lead to higher performance due to various variables, including the emergence of innovative behavior.

The managerial implication of this research is that implementing digitalization in the workplace leads to higher employee performance expectations, which in turn increases work productivity. It also fosters positive employee attitudes towards technology usage, enhances employee self-efficacy in completing tasks, and encourages employees to take initiative, update their skills, and come up with creative solutions. Additionally, it promotes active employee participation, exposes them to new challenges, and enables them to engage in an integrated and sustainable way of thinking. This, in turn, cultivates a sense of passion, determination, and dedication towards their work.

The study also discovered that the implementation of digital technology in the workplace presents fresh obstacles in enhancing employee involvement, prompting organizational processes to become more intricate, requiring rapid adaptation to technological advancements, fostering new cost-reducing initiatives, and boosting company profitability. Individual work habits in a digital work environment affect efficiency and overall performance. This study investigates the spread of digitization through surveys, focusing on the benefits and challenges of transitioning to digitalization in practice, as well as its impact on performance. Amidst the ongoing technological advancements, early adopters have recognized the advantages of digitalization in the future. However, the actual implementation process is still in its early stages.

To summarize, the study determined that the implementation of digital technology in the workplace has a beneficial and noteworthy impact on employee performance, with employee engagement playing a role as an intermediary factor. The managerial implication of this research is that implementing digitization in the workplace leads to higher employee performance expectations, which in turn increases work productivity. It also promotes positive employee attitudes towards technology usage, enhances employee self-efficacy in completing tasks, and encourages employees to take initiative, update their skills, and come up with creative solutions. Additionally, it fosters active participation, exposes employees to new challenges, and enables them to engage in an integrated and sustainable way of thinking. This, in turn, cultivates a sense of passion, determination, and dedication towards their work.

The research conducted by **Guzmán-Ortiz et al (2020)** investigates the influence of digital transformation on the individual work performance in the insurance industry of Peru. The objective of the study was to examine and ascertain the impact of digital transformation on the individual job performance of insurance companies in Peru. The issue at hand was to the necessity of comprehending the impact of digital transformation on many facets of job performance, such as task performance, contextual performance, and unproductive conduct in the workplace. The study utilized a deductive inferential scientific method at an explanatory level, employing a non-experimental design among four insurance companies operating in distinct regions of Peru.

The structural equations analysis demonstrated substantial correlations between variables related to digital transformation and specific characteristics of individual work performance. The implementation of digital transformation in customer service positively influenced both task performance and contextual performance, but had no impact on counterproductive behavior. Collaborator capacities (CC) had a considerable impact on task performance and contextual performance, but did not have any effect on counterproductive conduct. Processes driven by digital transformation had a notable impact on both task performance and contextual performance, but no direct relationship was found with counterproductive conduct. However, the company model centered on digital transformation did not have any effects on task performance, contextual performance, or counterproductive behaviors.

The study found that customer service experience, collaboration skills, and processes driven by digital transformation have a positive impact on the performance and contextual performance of

workers in insurance organizations in Peru. The text highlighted the significance of digital tools, the ability of employees to adjust to digital settings, and the beneficial effects of processes on job performance. Nevertheless, it also emphasized an adverse correlation between the business strategy centered on digital transformation and the specific aspects of individual job performance. The study suggested conducting additional research to investigate the impact of digitization on intangible service companies in the insurance industry. This research would offer significant insights to organizations seeking to improve their performance through digital transformation efforts.

Section 2. Conceptual framework

This study's conceptual framework examines a number of important ideas about the digitalization of public services and how it affects worker performance. It starts by looking at how crucial e-management systems are to the modernization of public services. Next, the framework takes into account a number of variables that affect worker performance, including task knowledge, work speed, error rates, productivity, monitoring, creativity, training, and involvement in decision-making. It also lists the advantages of digitization along with the problems and barriers that must be solved. The framework also highlights that for digital transformation to be successful, there must be enough resources, management support, and community benefits delivered. Ultimately, it provides a thorough understanding of the digitization process and its effects on employee performance by highlighting important success drivers and implementation difficulties.

I. Digitalization

Digitalization is thought to be the most important technology trend that is affecting both business and society. Companies are constantly being pushed to use digital tools and change their business models to fit the new world. (Reis, Amorim, Melão, Cohen, & Rodrigues, 2019)**.**

1. Origins and definition

1.1. Origins

The German engineer Konrad Zuse made the Z1 in 1937. It was a computer that did math using binary numbers, which are made up of ones and zeros. Zuse was a pioneer because he came up with this amazing new idea that laid the groundwork for almost all computer systems we use today. Every major digital computer system that came after the Z1 was built on Zuse's binary system. Zuse's invention not only changed the world of technology, but it also gave us the word "digitization." (Frenzel , Muench , Bruckner, & Veit, 2021).

The true catalysts of the digital revolution were the advancements made in internet technology during the late 1960s. Originally, it was created to cater to the requirements of educational and military establishments, but quickly evolved into a worldwide network, linking computers and individuals throughout the planet. This fact revolutionized the methods of communication and commercial practices (Leiner, et al., 2009)**.**

To summarize, the early 20th century marked the inception of digitalization due to the groundbreaking advancements in computing. This transformation was further enhanced by the advent of the internet, personal computers, the World Wide Web, and the mobile revolution, which have had a profound impact on our society, greatly expanding our opportunities for living, working, and communicating (Friedman, 2005)**.**

1.2. Definition

The concept of Digitalization has garnered substantial attention in both academic and practical settings. Although the existing literature indicates that it is challenging to establish a unified and universally accepted definition of the notion of digitalization, this difficulty is not unique and is commonly encountered in other social sciences, particularly in the field of administration. (Alobidyeen, Al-Shabatat, Al-Edainat, & Al-Shabatat, 2022).

Digitalization refers to the conversion of analogue data into digital format, leading to improved commercial interactions between customers and companies, ultimately contributing to the economic and social progress. This process entails the translation of diverse forms of data into digital formats, resulting in enhanced interactions and prospects for innovation, investment, and the establishment of new enterprises and employment opportunities. (Reis, Amorim, Melão, Cohen, & Rodrigues, 2019)**.**

According to (Kutnjak, Pihir, & Furjan, 2019) Digitalization is a multifaceted and rigors process that necessitates the dedication of the entire company to utilize various resources, including human, technological, physical, organizational, and financial resources. It involves implementing digital tools throughout the organization, with a particular emphasis on people and business processes, all while undergoing a transformation of the business model.

(Legner, Eymann, Hess, & Ahlemann, 2017) Say that digitalization describes socio-technical conditions of the adoption and use of digital technologies – also with a focus on their societal, organizational, and individual impact.

(El Sawy, Amsinck, Kræmmergaard, & Vinther, 2016) Said that digitalization is the process of transforming the structure, processes, people skills and culture of the entire organization so it can use digital technologies to create and offer products, services and experiences that customers, employees and partners find valuable.

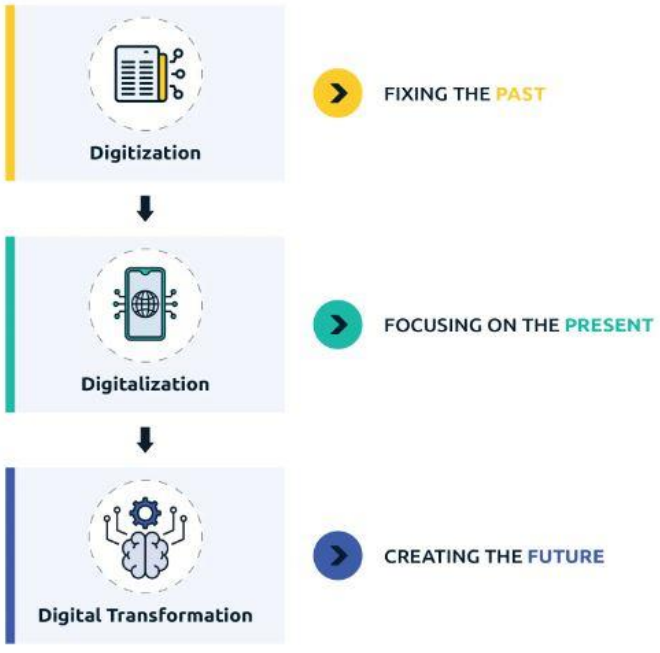
From the multiple definitions supplied, digitalization may be defined as the utilization of digital technologies to alter the functioning of various processes. This includes converting physical papers into digital files and employing computers to enhance task efficiency. It enhances the functioning of enterprises and society by generating innovative methods to establish connections and enhance operational processes (Parviainen, Tihinen, Kääriäinen, & Teppola, 2017).

2. Difference between digitalization, digitization and digital transformation

Within the current dynamic digital environment, the phrases digitization, digitalization, and digital transformation are frequently employed interchangeably. Nevertheless, every notion possesses unique definitions and consequences for enterprises and organizations. Comprehending the distinctions between these words is crucial for properly utilizing digital technology. (Doyle, 2024).

Gaining knowledge of the distinction between these terminologies is crucial as it can enhance your comprehension of several facets of the digital realm. Having a clear understanding of the distinction between digitization and digitalization enables one to efficiently utilize computer technology for product creation. Alternatively, comprehending the distinction between digitalization and digital transformation enables one to grasp the ways in which a firm is modifying its business model. (Oentoro, 2024).

Figure 1: digitization vs digitalization vs digital transformation



Source: https://digitalleadership.com/blog/digitization-vs-digitalization/

Let us begin by defining the phrase digitization. Digitization is the process of converting physical items or qualities into a digital form. As an example, we use a scanner to convert a physical paper

document into a digital format, such as a PDF file. To clarify, digitization refers to the process of transforming a non-digital entity into a digital form or object. Computerized systems can subsequently utilize it for diverse applications. (Sen Gupta, 2020).

Digitalization is the key to achieving a more lucrative and streamlined business. It streamlines actions that were previously performed manually, such as utilizing a software application to produce reports instead of relying on spreadsheets or paper-based procedures. Additionally, it can entail utilizing digital devices to accomplish tasks that were formerly performed offline (Kimachia, 2023).

Digital transformation involves a significant shift in an organization's operations, culture, workflow, and technology, enabling the emergence of new business models and income sources. The goal is to leverage digital technologies for a more efficient and productive company, leading to reduced expenses, enhanced excellence, and increased earnings. (Doyle, 2024)**.** The objective of digital transformation is to leverage digital technologies in order to establish a more streamlined and productive company. This can result in reduced expenses, enhanced excellence, and heightened earnings (Oentoro, 2024).

Figure 2: The Differences between Digitization, Digitalization, and Digital Transformation

Source: https://www.yokogawa.com/library/resources/white-papers/the-differences-between-digitization-digitalization-and-digital-transformation-in-manufacturing/

These three processes all share a common foundation in leveraging technology to improve productivity, efficiency, and decision-making. Here is how (Oentoro, 2024)**:**

- **Tech-Driven:** Tech is the cornerstone. Technological advancements drive all three, whether it is converting analog to digital data or revamping business models.
- **Productivity and Efficiency:** The ultimate goal of each process is to improve productivity and efficiency.
- **Leveraging Data:** All three processes utilize data to drive decisions and actions.

While all three processes leverage technology, they differ in scope, affect level, and end goals, specifically (Verhoef, et al., 2021):

- **Scope:** Digitization focuses on data conversion. Digitalization is about improving processes with digital solutions, while digital transformation is leveraging tech for a total organizational overhaul.
- **Impact Level:** Often, digitization is a task-level change. Digitalization affects operations processes, whereas digital transformation is a strategic shift.
- **End Goal:** Digitization aims to make data more accessible. Meanwhile, digitalization targets operational efficiency. Digital transformation, on the other hand, aims at complete organizational transformation.

To summarize, digitization refers to the act of transforming analog data into a digital version. On the other hand, digitalization involves enhancing processes via the use of digital technologies. Lastly, digital transformation entails integrating technology into all elements of a business in order to fundamentally alter operations. Comprehending the distinctions among these phrases is essential for firms to efficiently traverse the digital environment and accomplish their strategic goals (Gartner, 2020)**.**

3. The tools of digitalization

Digitalization tools refer to technological solutions that aim to improve and simplify many facets of business operations, customer engagements, and internal procedures. These tools are essential

for firms aiming to incorporate advanced technology into all areas of their business in order to enhance procedures, operations, and customer experience (Davies, 2024)**.**

- **Servers**

Servers are powerful computing systems that provide resources, services, and capabilities to other devices or people within a network. They offer scalability, high processing power, stability, and improved collaboration, making them essential components in organizations (Stallings, 2018).

- **Enterprise software**

Enterprise software, also known as enterprise application software (EAS), is computer software designed to manage various business aspects, such as accounting, sales, marketing, human resources, data analysis, and project management. It automates processes, increases operational efficiency, promotes employee communication, and aids informed decision-making. EAS can be universal or customized to meet specific industry needs, promoting competitiveness and efficiency (Davenport, 1998).

- **Websites**

A website is a collection of web pages accessible via the internet, hosted on web servers, and used for various functions like information dissemination, advertising, communication, and transactions. They are essential for establishing online presence and serving as the primary platform for internet engagement (Krug, 2014).

- **Mobile applications**

Mobile applications are software programs designed for smartphones and tablets, offering customized features, services, or experiences. They can be downloaded and installed from app stores like Apple App Store for iOS and Google Play Store for Android (Goyal, 2013).

4. Advantages of digitalization

Digitalization offers numerous benefits to businesses and individuals alike. Some of the key advantages include (Olçum & Gülova, 2023)**:**

- **Enhanced Operational Efficiency:** Digital tools streamline workflows, automate repetitive tasks, and provide real-time insights, allowing employees to focus on high-value activities and boost overall productivity.
- **Enhanced Customer Experience**: Digital channels provide new ways to interact with customers, personalize experiences, and deliver value, leading to increased customer satisfaction and loyalty.
- **Data-Driven Decision Making**: Digital technologies generate vast amounts of data, which can be analyzed to gain insights into customer behavior, market trends, and operational performance, enabling assessments that are more accurate and improved overall performance.
- **Cost Savings**: Implementing digital technologies streamlines processes, reduces manual interventions, and enhances efficiency, resulting in significant cost savings.
- **Increased Innovation:** Digital technologies enable businesses to experiment with new products, services, and business models, and to respond quickly to changing market conditions, fostering innovation and agility.
- **Employee Empowerment**: Digital transformation empowers employees by providing them with advanced tools and technologies that enhance collaboration, communication, and productivity, leading to increased job satisfaction and employee engagement.
- **Better Resource Management**: Digital technologies optimize resource utilization, minimize operational expenses, and enable organizations to allocate resources more strategically, contributing to improved financial health.
- **Enhanced Cybersecurity**: Digital technologies facilitate real-time monitoring and analysis, enabling proactive risk management strategies and reducing vulnerabilities, thereby enhancing cybersecurity.
- **Accessibility to Information**: Digitalization has made it easier for people to access information, which has opened up new opportunities for education, communication, and business.
- **New Job Opportunities**: Digitalization has created new job roles, such as internet technology specialists, and has enabled remote work, providing more flexibility and opportunities for people.

- **Increased Commercial Competition**: Digitalization has increased commercial competition, giving consumers more options to choose from and allowing them to make decisions that are more informed.
- **Streamlined Processes**: Digitalization can help businesses streamline their processes, reduce errors, and improve overall efficiency.
- **Increased Revenue**: Digitalization can help businesses increase revenue by providing new channels for sales, improving customer engagement, and enhancing the overall customer experience.
- **Better Adaptability**: Digitalization has made it easier for businesses to adapt to changes in the market and customer needs, enabling them to stay competitive and responsive.

Digitization offers numerous benefits such as increased production, efficiency, innovation, and improved customer experiences, making it a fashionable choice and a crucial response to modern demands (Benga & Elhamma, 2024)**.**

5. Challenges of digitalization

Enterprises and organizations encounter significant barriers in their efforts to achieve improved performance and optimal utilization of digital technology and big data, hindering the achievement of intended outcomes. These difficulties demonstrate the complexities involved in the digital transformation process and the interaction between external factors and internal dynamics inside businesses. (Hassani & Boubegra , 2023)**.**

Some of the key challenges are (Tangi, Janssen, Benedetti, & Noci, 2020):

- **Legacy Systems and Infrastructure:** Many organizations still rely on legacy systems and outdated infrastructure that are not compatible with modern digital solutions. Migrating away from these systems can be complex and costly.
- **Resistance to Change:** Resistance from employees who are comfortable with existing processes and systems can impede digital transformation efforts. Convincing them to embrace new technologies and ways of working requires effective change management strategies.

- **Skill Gaps:** Digital transformation often requires new skill sets such as data analytics, cybersecurity, and software development. Organizations may struggle to recruit or upskill employees to fill these roles.
- **Data Management and Privacy:** Managing large volumes of data generated by digital technologies and ensuring compliance with data privacy regulations (such as GDPR or CCPA) is a significant challenge. Data breaches can result in financial losses and damage to reputation.
- **Cybersecurity Risks:** With increased reliance on digital systems comes increased exposure to cybersecurity threats. Organizations must invest in robust cybersecurity measures to protect against data breaches, ransomware attacks, and other cyber threats.
- **Integration Complexity:** Integrating new digital technologies with existing systems and processes can be complex and time-consuming. Interoperability issues may arise when trying to connect disparate systems, leading to inefficiencies and data silos.
- **Cultural Shift:** Digital transformation often requires a cultural shift towards innovation, collaboration, and agility. Organizational culture rooted in hierarchy and bureaucracy may resist such changes, hindering progress.
- **Cost and ROI:** Digital transformation initiatives require significant upfront investment in technology, training, and infrastructure. Calculating and realizing return on investment (ROI) can be challenging, especially in the short term.

To overcome these problems, it is essential to engage in meticulous strategic planning, demonstrate strong executive leadership, foster collaboration across different functions, and demonstrate a readiness to adjust to changing technology and market dynamics.

II. Public services

The concept of public service was first established throughout the latter half of the 19th century. Wagner, a distinguished scholar of the German School of Social Policy, maintained the conviction that government finance plays a pivotal role in society. Government finance should not only encompass responsibilities related to national sovereignty, such as national defense and diplomacy, but should also actively contribute to the development of social culture and the promotion of public

welfare. Moreover, Wagner further highlighted the beneficial role of government money. In response to the economic crisis of the 1930s, the government's involvement increased based on the ideas of Keynesianism, and the significance of public service was more acknowledged (Liu, 2022)**.**

Public services are vital in our everyday lives, covering a diverse array of critical services delivered by government agencies or private organizations, typically with government funding or supervision. These services are specifically tailored to cater to the requirements of citizens, guaranteeing their welfare, security, and overall standard of living. The significance of public services cannot be exaggerated, as they have a crucial function in upholding social order, fostering economic development, and tackling social problems (Bovaird & Löffler , 2009)**.**

1. **Definition**

Multiple researchers have examined this topic with the aim of establishing a comprehensive definition. French administrative law acknowledges that a technical service is normally delivered through a well-structured organization to meet public needs. The article asserts that it is essential to uphold the ideals of equality, continuity, and adaptation in order to advance the public interest (Attab , Arar , & Ben Chaa , 2023)**.**

French administrative law typically requires the establishment of a technical service to effectively meet the demands of the public. The article asserts that in order to achieve the public interest, it is imperative to uphold the principles of equality, continuity, and adaptation (Attab , Arar , & Ben Chaa , 2023)**.**

Public service refers to the delivery of services by a government or organization to fulfill the unique needs of the community or society. These services are generally intended to benefit the entire population and are frequently funded by taxation. Public services refer to a variety of vital provisions to the general population, such as the distribution of water, electricity, and gas. Moreover, they comprise essential services such as education, healthcare, law enforcement, and

transportation. Public service can also refer to the act of assisting the public through government, non-profit labor, or other activities focused on the community (Denhardt & Denhardt, 2015).

These definitions allow us to accurately delineate public service as a varied collection of objective activities delivered to residents by the government or other authorized entities. The basis of this effort is rooted in the acknowledgment of the communal well-being of all individuals, as its objective is pertinent to the entire populace rather than a particular social faction. Furthermore, the state has the responsibility for any deficiencies in the delivery of services (Bovaird & Löffler , 2009)**.**

2. Principales of Public service

The principles of public services act as fundamental principles that support the ethical behavior, functioning, and provision of services within the public sector. These values are fundamental for ensuring accountability, openness, fairness, and efficacy in meeting the public's requirements. Although the specific rules may differ based on the circumstance and jurisdiction, there are some fundamental concepts that remain consistent (Petit, 2005)**:**

- **Public Interest:** Public services are conducted in the interest of the public good, prioritizing the well-being and welfare of society as a whole over individual or private interests. Decisions and actions are guided by the principle of maximizing benefits for the greatest number of people.
- **Fairness and Equity:** Public services are delivered impartially, without discrimination or favoritism, and based on principles of fairness, equity, and justice. Services should be accessible to all members of society, regardless of their socio-economic status, ethnicity, gender, or other characteristics.
- **Continuity:** The importance of public services implies a principle of continuity. The continuity of public services is the embodiment of the continuity of the State, and can be seen as a corollary of the principle of equality, since a break in service could introduce discrimination between those who benefit from it and those who are deprived of it.
- **Innovation and Adaptability:** Public services embrace innovation, creativity, and adaptability to respond to evolving societal needs, technological advancements, and

environmental challenges. This involves fostering a culture of learning, experimentation, and continuous improvement to deliver better outcomes and services.

- **Accessibility:** Accessibility and simplicity are the prerequisites for user-focused services. Simplifying and clarifying administrative procedures is a key factor in improving relations between public services and their users.
- **Neutrality:** neutrality guarantees free access to public services for all, without discrimination. Closely linked to the nature of the republican state and its role as guardian of republican values guardian of republican values, neutrality must be an integral part of the day-to-day activity of public services.
- **Transparency:** Transparency entails openness, clarity, and accessibility in the decision-making processes, operations, and information related to public services. This includes providing clear and understandable information to the public, disclosing relevant data and documents, and facilitating public scrutiny and participation.

These principles function as the moral and operational structure that guides the behavior and decision-making of public officials and organizations. They ensure that public services are executed with integrity, accountability, and a commitment to meeting the demands of the public (Petit, 2005)**.**

3. Types of Public services

Population services are vital operations carried out by governmental entities or groups supported by the government with the purpose of benefiting the general population. These services are generally accessible within a given legal jurisdiction and encompass a diverse array of activities that cater to the various requirements of individuals. Public services can be classified into various categories (Attab , Arar , & Ben Chaa , 2023):

- **Regarding the nature of the service:**

- **The administrative services:** They are the services provided by the public administration or the administrative public facilities at the local or decentralized level, such as the civil status facilities.

- **Industrial and commercial services:** They include the services that the commercial and industrial public institutions provide, such as the Water Company and the Electricity and Gas Company.
- **Cultural and social services:** They are the services provided by the public institutions of the social and cultural nature, such as the compulsory education and the healthcare services.

- **Regarding the nature of the provided services:**

- **Individual services:** They are the services the citizen gets without being in a group. In this line, he asks for their provision or works to get them.
- **Collective services:** They are the services the individual gets within a group without asking for, such as the street lighting.

- **Regarding the nature of the consumption :**

- **Services with compulsory consumption:** such as education.
- **Services with optional consumption:** such as railroad transportation.

- **Regarding the cost of the service :**

- **Free service:** It requires no costs because the government pays for it, such as vaccination campaigns, public security, and street lighting.
- **Paid services:** The benefiter pays the costs, such as the electricity, phone, and drinkable water bills.
- **Subsidized services:** The benefiter pays a part of the services while the rest is paid by the state, such as the public transportation and the social housing.

- **The local public services:** This includes civil status services, electronic office, water and electricity, and sanitation services.

4. Quality of public service

The quality fluctuates from one setting to another and from one person to another. Due to the substantial influence of service quality on a company's business outcomes, managers, researchers, and practitioners have focused on this subject in recent decades (Parasuraman, Zeithaml, & Berry, 1985).

According to (O'Neill & Palmer, 2003)**,** Services are intangible items that cannot be possessed. Based on the definitions provided by different authorities, it is evident that they all emphasize the fact that service is fundamentally intangible. This implies that a service lacks physical visibility yet is perceptible to the customer.

Nevertheless, it is commonly acknowledged that the public sector encounters specific challenges when it comes to assessing service quality. The public is concerned about this issue since they are the taxpayers who subsidize these public organizations. Consequently, they expect to receive high-quality services in exchange (Abdullah, F, 2006)**.**

Moreover, profit is not the ultimate goal of these public sectors as they play different roles such as facilitator, pacesetter and socio-economic developer (Agus, Barker, & Kandampully, 2007).

According to (Gowan, 2001) Service provision in the public sector is characterized by a higher level of complexity compared to other sectors. It involves not only addressing the acknowledged demands of the public, but also identifying and addressing unexpressed needs, establishing priorities, allocating resources, publicly justifying decisions, and providing accountability for the actions taken.

The quality of public services is an essential component of governance, since it has a direct impact on the well-being of residents and the overall efficiency of the government. Public services comprise a diverse array of activities, such as healthcare, education, transportation, and social services, among others. The quality of these services can be affected by multiple aspects, such as the effectiveness of service provision, the degree of citizen contentment, and the transparency and responsibility of government entities (Pollitt & Bouckaert, 2017)**.**

III. Digitalization of Public services

E-government, also known as digital government, entails utilizing digital technology to improve the provision of government services, streamline administrative procedures, and promote transparency, efficiency, and citizen participation. Digitalization revolutionizes conventional

bureaucratic structures into more adaptable, reactive, and user-focused types of governance (United Nations, 2020).

1. Origins and definition of e-government

1.1.Origins of e-government

The name e-Government (e-Gov) originated in the late 1990s, although the use of computers in government organizations may be traced back to the early days of computer history. The phrase e-Government, similar to e-Commerce, emerged during the Internet boom and first referred to the utilization of the Internet to provide government information and services to citizens (Grönlund & Horan, 2004)**.**

In the late 1990s, the widespread adoption of information technologies by governments facilitated the establishment of e-Governance worldwide. With the emergence of the World Wide Web (WWW), there was a significant increase in the usage of the internet and mobile devices by a broad population. Individuals now have increasing expectations for governments and corporate entities to provide a greater amount of information and services online, in order to enhance their civic, professional, and personal lives (Heeks, 2001).

While the phrase "e-government" gained popularity around 2000, the development of this phenomenon actually started in the mid-1980s. The emergence of e-government can be attributed to the interaction of three main sets of elements, each of which has independently evolved: Information and Communication Technology (ICT), principles of managing organizations, and the act of overseeing administrative tasks (Brown, 2005)**.**

1.2.definition of e-government

One often-used approach to understanding e-government is to categorize it into three realms of electronically facilitated interactions. Government-to-government interactions focus on utilizing technologies to improve the internal effectiveness of governmental bureaucracies. This includes automating mundane processes and facilitating the quick exchange of information among different

departments and agencies. Government-to-business transactions commonly utilize the Internet to minimize the expenses incurred by the government while purchasing and selling goods and services from companies. Government-to-citizen interactions encompass the utilization of the Internet to offer public services and conduct transactions online. This also includes enhancing the design and delivery of services by integrating prompt electronic feedback mechanisms, such as instant polls, web surveys, and email.(Chadwick, 2016)**.**

(Yildiz, 2007) Defined e-government as "utilizing the Internet and the World-Wide-Web for delivering government information and services to citizens".

(Enquist, B.,, Edvardsson, B., & Petros Sebhatu, S. , 2007) Introduced e-government as "the use of information and communication technologies (ICTs) in public administrations, combined with organizational change and new skills, in order to improve public services and democratic processes and to strengthen support for public policies.

(Sang, Valcke, van Braak, & Tondeur, 2010) Introduced e-government as an activity of using ICT in general and usage of Internet in order to have improved and better government.

"Use of information technologies by government agencies that have the ability to interact with citizens, businesses, and other arms of government" is how the World Bank defined e-government in 2008.

2. Types and characteristics of e-government

1.1.Types of e-government

The types of electronic government can be classified into eight categories as follows (Fang, 2022):

- **Government-to-citizens (G2C):** Accelerate the process of making public services available online, namely by providing information and communication services electronically;

- **Citizens-to-Government (C2G):** Accelerate the process of making public services available online, specifically by implementing electronic platforms for information exchange and communication services;
- **Government-to-Business (G2B):** Take charge of e-transaction projects, including e-procurement and the establishment of an e-marketplace for government procurement. Also, carry out government bids electronically for the interchange of information and products.
- **Business-to-Government (B2G):** Take charge of e-transaction projects like e-procurement and the establishment of an e-marketplace for government purchases. Additionally, carry out government bids electronically for the sale of products and services;
- **Government-to-Employees (G2E):** Implement strategies to streamline public service administration and enhance internal communication among government personnel, aiming to digitize application processes and transition to an electronic office environment.
- **Government-to-Government (G2G):** Facilitate interdepartmental collaboration and online communication on the government's extensive database to enhance operational efficiency and effectiveness. Additionally, it encompasses the internal transfer of both information and products.
- **Government-Non-Profit (G2N):** The government disseminates information and facilitates communication to non-profit groups, political parties, social organizations, and the legislature, among others.
- **Non-profit-to-government (N2G):** Facilitating the transfer of information and fostering communication among government entities, non-profit organizations, political parties, social organizations, and the Legislative Assembly.

1.2.Caracteristics of e-government

Some of the features of e-government are as follows (Fang, 2022):

Table 1: Characteristics of e-government types

Type	Informations	Online communication	Transaction

G2C & C2G	Requests for information from a company or citizen about taxes, business licenses, registries, laws, political agendas, administrative responsibilities, etc.	Information requests and discussions concerning administrative processes and products; communication with politicians, authorities, etc.	Online service provision and display of results; electronic voting, online solution provision and online participation, etc.
G2B & B2G	Requests for information from a company or citizen concerning taxes, business licenses registries, laws, commercial programs commercial policy, administrative responsibilities, etc.	Information requests and discussions concerning administrative processes for companies and products; communication with politicians, authorities, etc.	Online service delivery and display of results results; electronic transactions for accounting, e-auditing, e-procurement, e-shopping, etc.
G2G	Information exchange between different authorities and different hierarchical levels, concerning administrative acts and laws, policy-making data, projects or programs, basic	Information is exchanged between different authorities and hierarchical levels; discussion forums; communication in negotiation and decision-making; interaction concerning administrative acts	Inter-organizational workflow and data exchange, online policy and solution exchange, information and knowledge management, etc.

	information on decisions, etc.	and laws, projects or programs, etc.	
N2G & G2N	Exchange of information on administrative administrative acts, administrative policy, data, registers, laws, political programs basic information on decisions, etc.	Information is exchanged between different organizations and agencies; discussion forums ; communication in negotiation and and decision-making; interaction concerning administrative acts	Intra-organizational workflow and exchange of policies and solutions, data, information and knowledge management, etc.
G2E	Exchange of information on work and performance performance, personnel policy, data and opinions for the management and development of government employees, etc.	Information is exchanged between different departments or individuals; discussion forums ; communication in negotiation and interaction around works and performances, etc.	Interpersonal workflow and exchange of personnel policies and solutions, data management data, information and knowledge management, online participation, etc.

Source : Zhiyuan Fang, 2002, p8-9

3. E-service vs traditional service

E-service and traditional service are two separate methodologies for providing public services to individuals. The main distinction between the two rests in the medium employed to provide the

service, with e-service being delivered electronically and conventional service being delivered through physical channels (West, 2004).

3.1. Traditional services

Traditional services are those that are delivered through physical channels, such as:

- **In-person interactions**: Individuals visit government offices or agencies in order to avail themselves of services, submit applications, or obtain information.
- **Phone and mail:** Citizens communicate with government entities by telephone or postal mail to seek information, submit applications, or obtain services.
- **Physical documents:** Citizens obtain physical papers, such as forms, permits, or certificates, either by mail or through face-to-face contacts.

Traditional services often have limitations, such as:

- **Geographical constraints:** Individuals may be required to physically visit a specific place in order to obtain services, which can be both time-consuming and expensive.
- **Limited accessibility:** Citizens with impairments or individuals residing in rural places may encounter difficulties in accessing conventional services.
- **Inefficient processes:** Conventional services often exhibit slowdown and excessive bureaucracy resulting in delays and inefficiency.

3.2. E-Service:

E-services, on the other hand, are delivered electronically through digital channels, such as:

- **Online portals:** Individuals can conveniently obtain government services and information by utilizing online portals, which are accessible from any location with an internet connection.
- **Mobile apps:** Individuals utilize mobile applications to access government services, submit applications, or get information.
- **Email and online forms:** Individuals send applications, inquiries, or feedback by means of email or online forms.

E-services offer several advantages over traditional services, including:

- **Convenience:** Citizens can conveniently access e-services from any location and at any time.
- **Increased accessibility:** E-services have the ability to access a broader demographic, encompassing individuals with disabilities or residing in geographically isolated regions.
- **Efficient processes:** E-services have the capability to automate numerous activities, hence minimizing the requirement for manual intervention and enhancing efficiency.
- **Cost savings:** E-services have the potential to decrease the requirement for material infrastructure and staff, leading to financial savings for governments.

4. Success factors for e-government

The achievement of e-government objectives holds significant importance for governments across the globe, especially in developing nations where the execution of such initiatives may be delayed by constrained financial and communication resources. In order to increase transparency, citizen engagement, and the effective and efficient delivery of public services, e-government success factors are crucial (Ndou, 2004).

Researchers from several fields have become interested in the emerging e-government trend in recent years. A group of academics discovered multiple deficiencies in the execution of e-government. Within developing nations, a significant 35% of e-government initiatives experience complete failure, while 50% encounter partial failure, leaving only a mere 15% that may be deemed successful. These many attempts have demonstrated distinct crucial criteria for the establishment of e-government. (Hakim, 2022)**.**

Several studies have identified critical success factors (CSFs) for e-government implementation. These factors can be categorized into three elements of success (Iqbal, 2020):

- **Support**

To implement E-Government, the government must possess political will, instead of to simply following trends or opposing initiatives. Support is action rather than just words, and it is vital to the effective development of e-government.

- **Capacity**

Local governments have the capacity or authority to actualize the corresponding "dreams" of electronic government. The government must possess the following three items in relation to these elements:

- Availability of sufficient resources to carry out various E-Government initiatives, especially those related to financial resources.
- Availability of adequate information technology infrastructure, this is 50% of the keys to the successful implementation of E-Government.
- Availability of competent human resources the expertise needed to make E-Government adoption appropriate with the principle of the expected benefits.

- **Value**

The initial and subsequent components represent the governmental perspective as the supply side service provider. The efficacy of diverse E-Government initiatives is compromised if the implementation of the concept fails to benefit either party. What determines whether the community and those with an interest (demand side) rather than the government itself derive benefits from the existence of E-Government in this instance?

As a result, the government must exercise caution when selecting priority categories of e-government applications that must be developed first in order to ensure that they provide the community with substantial benefits (value).

5. Obstacles an difficulties

According to (Alshehri & Drew, 2010) there are several challenges and barriers that can delay progress of e-government implementation. The variety and complexity of e-government initiatives

implies the existence of a wide range of challenges and barriers to its implementation and management:

Table 2: E-GOVERNMENT BARRIERS

Category	Barriers
Technical	ICT Infrastructure Privacy Security
Organizational	Top management support Resistance to change to electronic ways Collaboration Lack of Qualified Personnel and Training
Social	Digital Divide Culture
Financial	High Cost

Source: Alshehri M, Drew S, Implementation of e-Government: Advantages and Challenges, 2010

- **Technical Barriers**

The implementation of e-government is accompanied by technological obstacles, such as an absence of infrastructure and standards that are standardized across departments and organizations. Additionally, security and privacy pose significant barriers to citizen adoption of e-government. Unless accompanied by technological advancements, procedural transparency, and possibly independent auditing, the government's assurance will be insufficient.

- **ICT Infrastructure:** In developing nations, the digital divide restricts the installation of essential ICT infrastructure required for the implementation of e-government. Citizens must be ICT literate in order to utilize e-government services. Governments and the private sector must work in collaboration to bridge the divide and establish modern infrastructure. It is crucial to address this infrastructure deficit, given that specific e-government applications necessitate significant investments in the IT infrastructure of the nation.
- **Privacy:** Implementing e-government necessitates an emphasis on security and privacy in order to foster confidence and safeguard individual privacy. User authentication and

encryption are essential, as is constant vigilance against cyber threats. Effective security requires educating users on security procedures, establishing specialized security personnel, and implementing robust infrastructure encryption systems.

- **Security:** One of the primary obstacles encountered during the implementation of e-government initiatives is security. Numerous investigations have identified security as a significant barrier. Security encompasses the safeguarding of information systems, assets, and the regulation of information access. Establishing trust between citizens and the government is of utmost importance. The primary impediment to the advancement of e-government is security concerns. Ensuring that security policies and standards align with the expectations of the public is crucial in tackling these concerns.

- **Organizational Barriers**

The implementation of e-government presents not only technical but also organizational obstacles. Organizational obstacles consist of a lack of skilled personnel and training, opposition to transitioning to electronic methods, and backing from upper management.

- **Top management support:** Successful deployment of e-government necessitates the endorsement and active involvement of senior management, as they pledge to adopt and fully embrace e-government systems and applications. Leadership plays a vital role in driving creative projects, making assistance essential for the development of e-government. This support includes acquiring resources, providing training, and facilitating cooperation among partners and users.
- **Resistance to change to electronic ways**: The transition from manual to electronic labor methods, or e-government, creates a new, sophisticated environment. However, many workers worry about losing their jobs and their authority. Employees must recognize the value of resistance, retrain, and acquire new abilities in order to decrease it. Leaders in e-government need to pinpoint the sources of resistance and create strategies to deal with them.
- **Collaboration:** In order to establish an effective e-government system, it is crucial to encourage teamwork and cooperation among all parties involved in the implementation process. Collaboration between the public and private sectors is necessary to provide the government with additional resources, plans, abilities, and experiences that it may not

possess otherwise. The government should actively encourage involvement from all sectors in the advancement and execution of e-government.

- **Lack of qualified personnel and training**: The absence of information and communication technology (ICT) skills is a substantial barrier to the implementation of e-government, particularly in developing nations. Effective execution necessitates persons who are skilled and capable. Training and educational activities play a significant role in enhancing e-government programs. Training is vital for all governments in order to fully realize the economic benefits of ICT, especially as new practices, technologies, and competing models develop.

- **Social Barriers**

Social problems primarily concern the extent to which they are accessible and relevant to a wide range of persons. This suggests that the interface should be easily usable by all users.

There are diverse categories of individuals inside the government. Social barriers involve a range of issues, such as the digital divide, cultural diversity, educational discrepancies, and income inequity. This section will illustrate the initial two criteria inside this domain.

- **Digital Divide:** E-government entails the transition from manual to electronic labor processes, resulting in the establishment of a novel and sophisticated setting. Nevertheless, numerous individuals experience apprehension around potential job termination and a decrease in authority. In order to minimize resistance, it is imperative for employees to comprehend the significance of resistance, undergo retraining, and cultivate their skills. E-government leaders must identify the sources of opposition and establish strategies to effectively address them.
- **Culture:** The primary obstacles to the implementation of e-government are cultural rather than technical in nature. Culture, which encompasses shared values, beliefs, and assumptions, influences the adoption and utilization of novel technologies. Adoption of e-government in developed nations may be hindered by social structure, education, language, religion, economic philosophy, and political philosophy, among other variables.

- **Financial Barriers**

A lack of financial support poses substantial challenges to the implementation of e-government in numerous nations. Governments face challenges in financing e-government programs due to the substantial expenses associated with computer systems, implementation, and maintenance. In addition, fiscal constraints impede the capacity of government agencies to implement technological advancements such as online service provision and democratic dissemination. In addition to training and education, the total cost of systems, hardware, maintenance, software, and maintenance hinders the adoption of e-government technologies.

IV. Employee's performance

Performance is an extensively researched and important term in the field of management and human resources. Performance and its variety are influenced by different factors at both the individual and organizational level, making it a significant and complicated relationship (Alobidyeen, Al-Shabatat, Al-Edainat, & Al-Shabatat, 2022)**.**

The performance of employees plays a vital role in achieving corporate goals (Werdhiastutie, Suhariadi, & Partiwi, 2020)**.** Individuals that are highly productive and efficient have the ability to improve a company's productivity and the quality of its products or services. Additionally, they have the potential to enhance both consumer and employee happiness (Nadya , Ali , & Zaamil , 2022) and help establish a positive reputation for the organization.

Employee performance can be assessed by examining their job outcomes, productivity, production, proactiveness, and work manner (Berger, D., , Brügmann, G., , & Pernicka, E, 2019)**.**

Inadequate employee performance may result in financial losses for the company, whereas effective employee performance contributes to the accomplishment of organizational objectives (Sitopu, Y. B., , Sitinjak, K. A., , & Marpaung, F. K., 2021)**.**

1. Definition of employee's performance

Employee performance refers to how well an individual executes their job duties and responsibilities. It encompasses various aspects such as efficiency, quality, and effectiveness of their work. This definition encompasses both the tangible outputs and the intangible aspects like communication, teamwork, and overall behavior within the workplace (Sonnentag & Frese, 2002).

The term "performance" refers to the execution of a task or the completion of an activity. In the context of administrative work, performance involves carrying out the obligations and duties assigned to an employee (Muchhal, S., & Solkhe, A., 2017).

Employee performance refers to the degree to which an employee is capable of fulfilling their obligations and responsibilities in a competent and efficient manner (Darvishmotevali, M., & Ali, F., 2020)**.**

(Franco, Bennett, & Kanfer, 2002) defined performance as being dependent on internal motivation, although the presence of internal elements, such as requisite abilities, intellectual capacity, and resources, definitely influence it. Employers are obligated to ensure that they provide suitable working circumstances to ensure that employees fulfill the required performance criteria.
It is clear from the above that there are multiple interpretations of work performance. Some individuals interpret it as being intricately linked to the nature of one's occupation, while others consider it to be a behavioral characteristic, and yet others perceive it as the level of exertion put forth. Many view it as the result of much research and analysis undertaken in this field, including both practical and theoretical studies (Campbell, 1990).

2. Dimensions of Performance

Scholars broadly recognize the different aspects of the performance idea and the essential characteristics of performance that we focused on. Researchers conducted a study on task performance, contextual performance, and counterproductive behavior, focusing on repeated performance (Alobidyeen, Al-Shabatat, Al-Edainat, & Al-Shabatat, 2022)**.**

- **Task performance**

Task performance encompasses the specific actions and behaviors that contribute to the technical components and operations of an organization. These operations can have a direct impact on the organization's technological process or provide indirect support for the maintenance and servicing of the organization's technical needs. Furthermore, it is categorized into three distinct categories:

- Carry out regular activities including employee reactions to familiar work requirements that arise naturally, regularly, or reliably.
- Execute adaptive tasks, encompassing employee reactions to work demands that are unusual, unconventional, or at the very least, unexpected.
- Engage in creative activities, wherein the employee generates original and valuable concepts or inventions for their work.

- **Contextual performance**

Organizational citizenship is another term used to refer to this concept. Behavior refers to acts that affect the psychological and social components of the work environment, rather than directly supporting the technical operations of the business. This dimension encompasses a range of actions and conduct:

- Demonstrating unwavering excitement and dedication to successfully completing a work involves investing time, being consistently present, and exerting additional effort in the job.
- Engaging in non-official job tasks, such as providing constructive recommendations to enhance the organization's work, through volunteering.
- Collaborate with others and offer the necessary support, including working together with colleagues, clients, and other individuals.
- Conforming to the established norms and processes of the organization, including compliance with regulatory requirements, showing respect for hierarchical structures, and demonstrating dedication to the business's values and policies.

- **Counterproductive behavior**

Counterproductive conduct refers to intentional actions taken by employees that hinder the achievement of company goals or objectives. Examples encompass the act of disclosing classified

information, committing theft, wasting resources, consuming illicit substances, disseminating rumors, and engaging in harassment.

3. Factors that influence employees performance

There are certain elements individually and collectively effect on the performance of employees in a positive or negative way (Le Tran, 2002).

- **Training**

Training is a methodical and well-organized endeavor that results in enhanced expertise, understanding, and proficiency necessary for efficient job execution. Training has been proven to improve performance for both people and businesses by favorably influencing employee performance through the development of knowledge, skills, abilities, competencies, and behavior (Rue, L.W., & Byars, L.L., 1992)**.**

Training can be utilized as a proactive approach to develop and enhance skills and expertise, hence reducing the likelihood of difficulties. Additionally, it can serve as an effective approach to address any shortcomings in skills or job performance among employees (Aboazoum, Nimran, & Musadieq, 2015).

- **Motivation**

Motivation is the desire or urge to engage in an activity that is influenced by the capacity to fulfil specific needs (Bateman & Snell, 2007)**.**

It is crucial to make efforts to motivate and inspire employees in order to achieve the goals of the organizations. Motivated employees exhibit traits such as self-satisfaction, self-fulfillment, and dedication, which are thought to lead to superior work quality and adherence to organizational policies. Consequently, this results in enhanced productivity and a strategic edge for the firm (Rue, L.W., & Byars, L.L., 1992)**.**

- **Leadership**

Leadership is the process by which a person in a position of authority directs, guides, and influences the actions and performance of others with the aim of accomplishing specific objectives

within a given situation. Leadership refers to the ability of a supervisor to encourage and ignite excitement and confidence in their subordinates, so motivating them to work. Leadership is the capacity to exercise influence over a collective in order to accomplish a particular goal. Leaders must develop a proactive and future-oriented vision and motivate individuals within the organization to work towards reaching that objective and improving performance. (Iqbal, N., , Anwar, S., & Haider, N., 2015)**.**

- **Organizational Culture**

Organizational culture refers to the collective and often unspoken attitudes that are widely shared among members of an organization. There are two primary assumptions that are widely accepted: beliefs and values.

Beliefs are mental constructs that are created and reinforced via individual experiences, functioning as assumptions about the nature of reality. Values are abstract representations of ideas that are seen morally commendable and deserving of active pursuit. A corporate culture is formed when a company shares common perspectives and principles (Azhar, 2003).

- **Working Environment**

The concept of the workplace is assessed by analyzing employees' perception of their immediate surroundings in relation to fulfilling their internal, external, and social needs, as well as their motivation to remain with the organization (Bateman & Snell, 2011). Establishing and sustaining a positive working environment has numerous benefits, including heightened productivity, more employee contentment, higher staff retention, a competitive advantage, larger financial gains, enhanced security, and general well-being.

4. Performance Appraisal

Performance appraisal is a crucial process that assesses employees to improve their performance and achieve organizational and individual objectives. It motivates employees to work harder for promotions and bonuses. Performance appraisal helps identify job-related issues and hinders productivity. In public administration, it demonstrates recognition of employees' efforts in their respective roles. Therefore, it is widely used in organizations (Nigro, Nigro, & Kellough, 2012)**.**

Evaluating the performance provides a multitude of benefits. Managers can employ this tool to create frameworks for evaluating, controlling, distributing resources, motivating, promoting, celebrating, and improving their strategic decision-making (Ysa & Sierra, 2019)**.**

- **performance appraisal methods**

Different techniques and approaches used in assessing employee performance (Dessler, 2020):

- **Management by Objectives (MBO):** Management by objectives (MBO) is an appraisal technique where managers and employees collaborate to develop, plan, organize, and communicate specific objectives, with regular discussions to monitor progress and assess the feasibility of achieving these targets.
- **360-Degree Feedback:** 360-degree feedback is a thorough performance assessment technique that evaluates an individual's performance by collecting feedback from multiple sources in their professional network, such as managers, coworkers, customers, and direct reports. This approach will not only eliminate bias in performance evaluations but also provide a clear understanding of an individual's proficiency.
- **Assessment Centre Method**: The assessment center concept, initially established by the German Army in 1930, offers employees a thorough comprehension of their perceived performance and its influence on their overall performance. This allows them to appraise their current performance and anticipate future work performance.
- **Behaviorally Anchored Rating Scale (BARS):** Behaviorally anchored rating scales (BARS) are an evaluation tool that combines qualitative and quantitative elements to assess employee performance. Each performance level is defined using particular behavioral examples that are linked to numerical ratings. These examples serve as benchmarks based on appropriate requirements for an individual's function and employment level.
- **Psychological Appraisals:** Psychological assessments are employed to analyze an employee's potential by examining seven crucial dimensions: interpersonal skills, cognitive aptitude, intellectual attributes, leadership capabilities, personality traits, emotional intelligence, and other pertinent qualities.
- **Human-Resource (Cost) Accounting Method:** The technique of human resource accounting assesses an employee's performance by measuring the financial worth they

contribute to the company. The calculation entails assessing the costs expended by a firm to retain an employee (cost to company) and comparing them to the financial benefits (contributions) calculated by the organization from that individual.

5. How Technology Can Help with Employee Performance?

Digitalization is a growing phenomenon that affects the strategies, frameworks, and operations of businesses, and has the capacity to improve performance. Many companies recognize the benefits and effects of positive performance (Truant, Broccardo, & Dana, 2021)**.**

Employee productivity is optimized when they are provided with suitable resources and are able to work at their preferred speed. The digital work environment enables telecommuting, facilitating the accessibility of materials from any location. Communication is the process of conveying messages to impact attitudes, ideas, or behavior. It can be achieved either directly or indirectly through spoken language or media (Hasbullah, Hatta, & Arifin, 2018)**.**

The digital work environment depends on the assumption that there would be minimum delays in communication activities. However, this leads to a harmful loop of too much communication and job fragmentation. Individuals involved in work environments that rely heavily on collaboration and mutual dependence necessitate clearly established guidelines to cultivate productive work routines. Individual conduct should be consistent with the established standards of the organization. Developing effective work habits is made easier by the internal structures of an organization (Vuori, V, Helander, N, & Okkonen, J, 2020)**.**

Conclusion of the chapter

In conclusion, this chapter has provided a comprehensive review of the literature on the digitalization of public services and its impact on employee performance. By examining various studies and theoretical perspectives, we have highlighted the significant role digital transformation plays in modernizing public sector organizations. The reviewed literature emphasizes the benefits and challenges of digitalization, including improvements in productivity, adaptability, and job satisfaction among employees. Additionally, we explored different models of digital transformation and their relevance in enhancing public service delivery. This foundational understanding sets the stage for further investigation into the specific effects of digitalization on public sector employees, guiding our subsequent research and analysis.

CHAPTER 2: DATA AND METHODS

The next chapter describes the Host Organization Presentation using data from various documents and information gathered from the organization itself. It also includes a methodological framework that focuses on quantitative studies, providing detailed information about the research procedures and the epistemological approach adopted for this study.

Section 1: Organizational Context

In this section, we present the field of investigation, which is the National Social Security Fund for Non-salaried Workers (C.A.S.N.O.S) in the state of Skikda.

I. CASNOS overview

The Non- salaried Social Security Fund was introduced in Algeria in 1958 as a mandatory system. Initially, it only provided retirement benefits. However, starting from 1975, the fund expanded its coverage to include additional social insurances such as sickness, maternity, disability, and death benefits. In 1983, the national social security system experienced a restructuring process, which led to the merger of wage earner and non-wage-earner social security into a unified system. The CASNOS, as it exists today, was established through Executive Decree 92/407 (January 1992) in response to significant economic changes that occurred in the country during that time. Its primary role is to ensure the social well-being of unpaid professional categories, such as traders, artisans, industrialists, farmers, and the self-employed.

This fund primarily oversees the administration of social insurance services, both in-kind and monetary, for those who do not receive wages. Additionally, it is responsible for managing pensions and benefits for individuals who have retired. In addition, it manages, conducts, and synchronizes medical monitoring, carries out preventive measures, disseminates health information, and administers the assistance and ambulance fund.

The CASNOS Fund has a Directorate General led by a Director General and supported by designated Central Directors. The Fund encompasses a network of governmental agencies,

locations, and offices spread across the entire country. Furthermore, the Fund heavily relies on information technology to advance its information systems.

The organization consistently aims to incorporate this technology into its diverse administrative procedures to effectively manage its resources, streamline its expenses, and enhance the services it offers to a broad spectrum of its participants.

The use of efficient and effective computerized information systems by these organizations would achieve their goals, as the interest in these systems has increased due to the crucial role they play in the development of organizations, as they provide all the appropriate information at the most appropriate times to the various levels of management.

This is to support all administrative tasks and functions in addition to improving and developing communication and information flow between these levels, all of which would reflect positively on their overall performance Invalid source specified..

1. History of CASNOS

The non-salaried workers' system in Algeria has been in existence since 1958. Originally, it functioned as a distinctive retirement plan until 1974. Since its inception, the program has undergone three significant stages:

1.1.1st Phase / January 01, 1958 to December 31, 1970

Starting from January 1, 1958, the previous decree established a mandatory pension program for individuals engaged in industrial or commercial occupations.
In order to achieve this objective, three regional funds were established, specifically:

- C.A.V.I.C.A. for Algiers;
- C.A.V.I.C.O. for the Oranie region;
- C.A.V.I.C. for the Constantine region;

By ministerial decree of March 08, 1963, the three regional funds were merged into a single fund C.A.V.C.I.A "Caisse d'Assurance Vieillesse des Commerçants et Industriels d'Algérie" with head office in Algiers.

1.2.2nd Phase / January 01, 1971 to December 31, 1973

Promulgation of Decree N°70/116 of August 1, 1970 on the administrative organization of social security bodies.

The organization of the non-agricultural social security scheme encompasses the government servants' scheme, the mining scheme, and the scheme for non-agricultural non-salaried workers. This organization comprises the following entities:

- La Caisse Nationale de Sécurité Sociale ;
- Les Caisses Régionales de Sécurité Sociale ;
- La Caisse d'Assurance Vieillesse des Non-Salariés (C.A.V.N.O.S.) ;
- La Caisse de Sécurité sociale des Fonctionnaires (C.S.S.F.) ;
- La Caisse de Sécurité Sociale des Mineurs (C.S.S.M.).

This was followed by the promulgation of Decree N°70/215 on 15/12/1970, creating and organizing the "Caisse d'Assurance Vieillesse des Non-Salariés du secteur agricole".

The scheme was reorganized under the provisions of Ordinance 070/89 of 15/12/70, the date of entry into force of the scheme, which is known as "C.A.V.N.O.S", with its head office in Algiers. The mandatory program was initially established exclusively for the advantage of traders and industrialists, and then expanded to include members of the liberal professions and craftsmen.

The decree of 04/01/1971 sets out and defines the list of individuals who may be subject to the scheme.

As of 01/01/1971, the C.A.V.C.I.A and the C.R.P.I were dissolved, as was the Algerian Bars Fund and the scheme for non-salaried workers was taken over by the new C.A.V.N.O.S Fund as of the same date.

Ordinance N°74-87 of 17/09/1974 extends social security to non-salaried workers who are excluded from the scope of other risks concerning salaried workers.

This was followed by the creation of the permanent allowance on the social fund (A.P.F.S.) by letter N°2907/SS/SDR/IB dated 18/11/1978 for the benefit of affiliates who did not meet the 15-year contribution requirement for an old-age pension.

1.3.3rd Phase / 1983 Law

Under the legislation in force on December 31, 1983, there were eight (08) social security schemes. These laws were promulgated on July 2, 1983 and came into force on January 1, 1984. However, in the absence of implementing regulations and given the legal vacuum, two application circulars were issued, the first in May 1984, amended and supplemented by the second circular in May 1985. These two circulars were amended and supplemented by the general circular on the application of social security laws dated November 10, 1991.

The "Caisse Nationale de Sécurité Sociale des Non-Salariés" (CASNOS), created by Executive Decree 92/07 of January 4, 1992, is responsible for the social protection of non-salaried professional categories including, among others, industrial merchants, farmers, craftsmen and members of the liberal professions. The funds in charge of managing the risks provided for under social security laws have legal personality and financial autonomy. They are deemed merchants and are governed by the laws and regulations in force. They are public companies under the supervision of the Ministry of Labor, Employment and Social Security.

2. CASNOS' missions

The fund's mission is to:

- Managing benefits in kind and in cash from social insurance schemes for the non-salaried;
- Managing pensions and retirement benefits for self-employed workers;
- Manage pensions and allowances paid under the legislation in effect prior to January 1, 1984, until the beneficiaries' rights are extinguished;
- To ensure the collection, control and litigation of contributions intended to finance the benefits provided for in the preceding paragraphs;

- Manage, where applicable, benefits due to beneficiaries of international social security conventions and agreements;
- Organizing, coordinating and exercising medical control;
- Undertake actions in the form of health and social projects, as provided for in article 92 of the aforementioned law no. 83-11 of July 2, 1983, on the recommendation of the fund's Board of Directors;
- Undertake preventive, educational and health information initiatives following
- proposal of the Board of Directors;
- Manage the assistance and relief fund provided for in article 90 of law no. 83-11 of July 2nd 1983;
- Conclude, in coordination with the social security funds concerned, the agreements provided for in article 60 of the aforementioned law no. 83-11 of July 2, 1983;
- Register insured beneficiaries;
- Keep beneficiaries informed;
- Refund expenses incurred in the operation of the various commissions or courts called upon to rule on disputes arising from decisions rendered by the fund;
- Conclude agreements with social security funds to establish the conditions under which collection control and litigation services may be set up, as provided for in Article 11 of Executive Decree no. 92-07 of January 4, 1992.

The fund's General Administration is responsible for:

- Responsible for carrying out the fund's financial and accounting tasks, as well as overseeing the coordination of decentralized financial structures;
- Management of human and material resources and assets;
- Coordinate operations relating to the movement of contributions and litigation
- carried out by the decentralized structures in accordance with the conditions
- and regulations in effect;
- Monitor the fund's activities, carry out audits and ensure compliance with applicable legislation and regulations;
- Organization, statistics, IT and information for self-employed participants;
- Coordinate medical activities;

- Assess the financial impact of any new social security legislation or regulations.

Regional agencies: Coordinate the activities of one or more provinces.
State branches: Handle all operations relating to the collection of contributions and disputes, and the management of social insurance benefits and retirement pensions.

3. CASNOS' objectives

- Modernization of management based on the principle of versatility;
- Improving collection performance;
- Simplified affiliation formalities;
- Simplifying collection procedures;
- Broadening the base of affiliates;
- Extending social security coverage;
- Improving the quality of services provided;
- Improving public service.

4. The organization of CASNOS

C.A.S.N.O.S is organized on the model of a central structure relayed by state agencies grouping together one or more antennas, which are themselves relayed by local counters (Ministerial Order N°17 of 15/01/2015 on the internal organization of the C.A.S.N.O.S.).

CASNOS is present throughout the national territory as follows: 49 state agencies, to which are attached local branches and counters.

Figure 3: CASNOS logo

Source: www.casnos.dz.com

II. Host organization

In this section, we present the host establishment where we carried out our internship: CASNOS-SKIKDA Agency.

1. Presentation of CASNOS-SKIKDA Agency

The Skikda agency is located in the state town center and it has 02 proximity offices. The number of employees is 60, divided according to their tasks within the organization.

The primary objective of the CASNOS SKIKDA agency is to oversee the execution of social benefits for individuals within its state networks. This involves the collection of contributions and the distribution of payments, it manages and organizes work at the level of its state networks and organizes its administrative and financial activity. It also manages retirement pensions and pays employee salaries.

2. CASNOS-SKIKDA Agency organization

The agency's organizational structure is as follows (Look Appendix A):

2.1.Human Resources Department

It is in charge of:

- Ensure administrative follow-up of personnel;
- Manage personnel movements: recruitment, assignment, job titles, etc;
- Prepare all documents related to personnel management in compliance with the regulations in effect as stipulated in the collective agreement;
- Participate in the employee recruitment and integration process;
- Payroll management.

2.2.Finance & Accounting Department

It is responsible for monitoring and organizing the agency's financial and accounting management, drawing up the fund's annual budget, as well as managing administration and resources such as: Collections, unpaid cheques, under the conditions laid down by the legislation and regulations.

2.3.Data center

They ensure the smooth running of the company's computer network (maintenance and updating of various software programs).

2.4.Medical Inspection Department

Who are responsible for carrying out medical checks on all insured persons who present themselves for refunds, raising doubts and validating medical treatment, as well as approving the issue of CHIFA cards with a reimbursement rate of 80% or 100% for the chronically ill, or for obtaining medical equipment.

2.5.The Sub-Directorate for Collection, Litigation and Control

It is responsible for monitoring and organizing the registration of new contributors, monitoring their collection in accordance with the laws in effect, checking and verifying their payment

declarations, and prosecuting them in the event of non-payment. To this purpose, the sub directorate has three departments:

- Collections and Litigation Department;
- Registration and Affiliation Service;
- Tax inspection office.

2.6.The Benefits sub-department

This sub-directorate is responsible for monitoring and organizing the management of social insurance benefits and retirement pensions for non-salaried workers and for managing the interests of the insured until the beneficiary's rights are extinguished. To this end, the Sub-Directorate has three departments:

- Social Insurance Benefits Department;
- Retirement Benefits Service;
- Social Security Administration Service.

2.7.General Resources Department

2.8.Citizen reception, listening and orientation unit

3. Information Systems Components of CASNOS-SKIKDA

The Fund's information systems include the following software: Windows operating systems and office programs for printers and other accessories. The Fund also relies on three main programs:

- SYSCAS, which is used to facilitate the operations of the Fund's Sub-Directorate for Collections, Disputes and Monitoring.
- PASCM for the management of the Sub-Directorate of Performance and Medical Control.
- SYSERET for the management of pension files.

The general system also contains application programs that purchase data for the organization, such as payroll, accounting, control and follow-up programs. The Fund uses server-managed

databases, which are a collection of linked data organized in a way that suits the needs and requirements of users. It relies on a range of media for communication and data transfer such as fiber optics, Intranets, Outlook, fax, telephone and traditional media used to transfer information and data. The system also relies on individuals who are the primary resource for operating and controlling the other components, entering data, running programs and managing information systems.

4. CASNOS e-services

To meet the demands of the new millennium. CASNOS has been digitizing its services and updating them in recent years with the advent of ICT.
With this in mind, the strategic directions adopted for the modernization of the sector aim to:

- Improve and modernize the performance of the CASNOS public service;
- Provide remote services ;
- Simplify procedures for citizens ;
- Making "e-government" a reality.

The social security sector being one of the first to be affected by the modernization movement in Algeria, it has introduced considerable changes on the procedural side by lightening CASNOS procedures on the one hand, and improving the quality of services offered to citizens on the other.

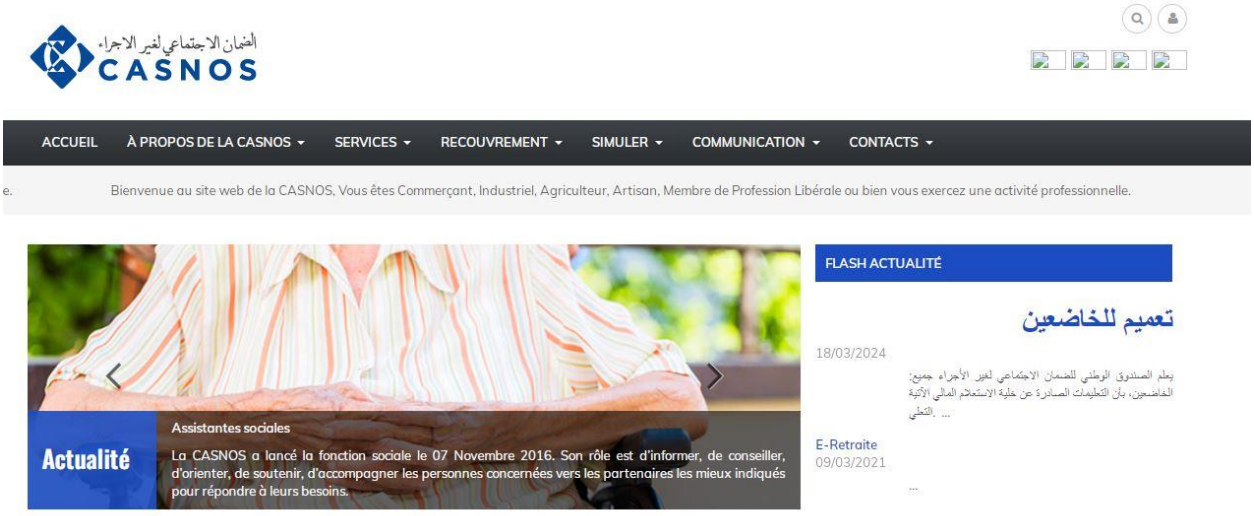
In 2013 and with the national "e-Algeria" strategy, CASNOS launched a platform whose mission is to inform, advise, guide, support and accompany the people concerned, to respond to their needs and requests, to help them with their concerns and to ensure the reliability of information.

In terms of providing a modern public service to users, CASNOS aims to make information available to citizens and reduce administrative complexity in order to simplify their procedures through:

4.1.Website (www.casnos.com.dz)

This site provides information on all aspects of CASNOS's activities, making reliable and regularly updated information available to all users.

Figure 4: CASNOS Website



Source: https://casnos.com.dz/

4.2.The "DAMANCOM" space

This is a dedicated space for insured members of the CASNOS. The main goal of this program is to achieve digital transformation by providing users with consistent access without the need for physical travel. It is a method of streamlining conventional work processes and significantly reducing time consumption.

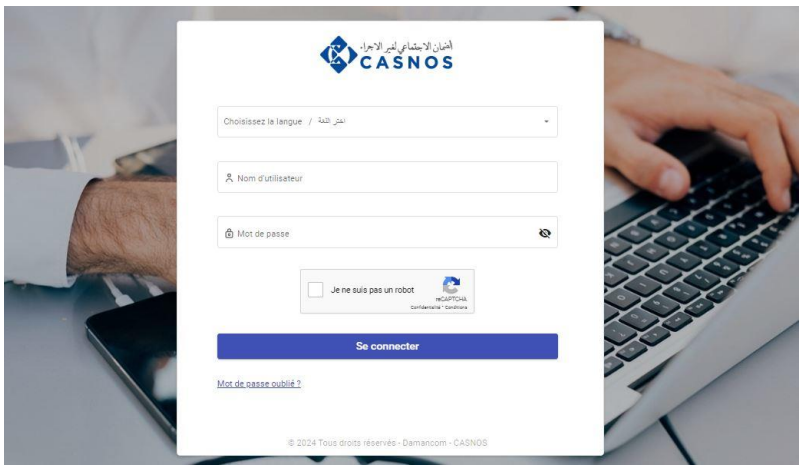
Figure 5: DAMANCOM portal

Source : https://damancom.casnos.dz/

- **Insured Space**

The insured person can connect to his personal space "Damancom" the following link: damancom.casnos.dz, then log in using their affiliation number and password.

Figure 6: Insured Space



Source: https://damancom.casnos.dz/auth

Once logged in, the insured person can consult his or her situation with the fund, and carry out a number of operations:

- Simulations
- View status
- Business statement
- Statement of contribution base
- Ordering documents
- Electronic payment
- E-Retirement

- **Pharmacist Space**

CASNOS's new electronic service for approved pharmacies, provided via the DAMANCOM portal, is designed to dematerialize and facilitate the current process, and to provide a clear overview at all times. This service offers pharmacies the possibility of filing medical slips online, sending requests for a priori medical opinions, downloading updates, etc.

After logging in, the portal's main interface provided a menu for accessing the various different functionalities:

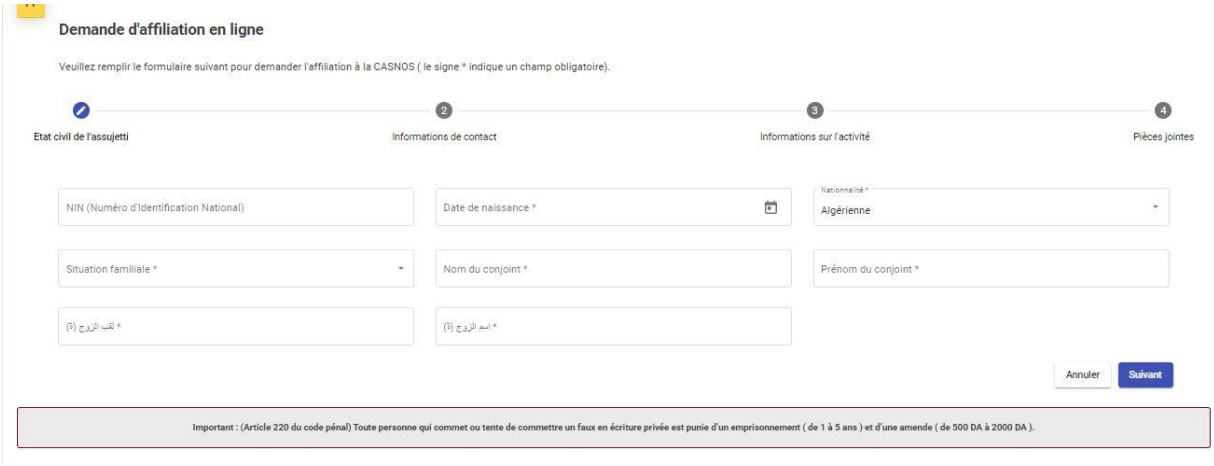
- Consultation of the insured's consumption history;
- Follow-up on pharmaceutical slips;
- Submission of slips;
- Submission of requests for a priori medical opinion;
- Downloading updates.

- **Online affiliation request**

CASNOS has introduced a new paperless online affiliation request tool to streamline the process of digitizing administrative operations related to the enrollment of new self-employed personnel. This effort targets individual who are obligated to pay social security contributions, as well as the entire community of self-employed people, namely those involved in project development, small enterprises, craftsmen, and individuals in simple trades. The objective is to provide these

individuals with access to social security coverage provided by the fund. The "Damancom" area provides access to the system. If a user is not already affiliated, they can initiate the affiliation request.

Figure 7: Online affiliation request



Source: https://damancom.casnos.dz/affiliation

Section 2: Methodological Framework (Quantitative Approach)

In this chapter, we will discuss the epistemological stance that frames our research, as well as the methodological approach adopted, followed by the data collection instruments.

1. Epistemological approach

The study of epistemology looks at what knowledge is and how much we can know Invalid source specified.**.** The epistemological paradigm is the first phase of research, since all research includes an epistemological paradigm. For this reason, it is necessary to place our research project within an epistemological framework. This choice will have consequences for our methodological choices.

As a result, our research is part of the positivist epistemological paradigm, which proceeds through hypothetic-deductive reasoning from the general to the particular with a quantitative approach.

Our inclusion in this paradigm is imposed by the nature of our problem, which seeks to describe, measure and study the impact of the digitization of public services on employee performance.

2. Methodological Approach

Our research employs a quantitative approach, focusing on the use of an online survey to gather data. This method allows us to collect numerical data that can be statistically analyzed to identify trends and patterns regarding the impact of digitalization on employee performance in public services.

Quantitative research is based on the measurement and quantification of variables, allowing for precise data collection and statistical analysis. This approach is commonly utilized in scientific research because it provides a rigorous and unbiased means to understand and explain phenomena. This type of research is based on the measurement of opinions through surveys and questionnaires Invalid source specified..

3. Data Collection Method

For our research, the collection of data and necessary information was based on different techniques and methods. We therefore used a quantitative approach based mainly on the following tools:

3.1.Literature search

Document review is a systematic procedure employed to get information by thoroughly examining preexisting papers. Using papers as a source of data is a very efficient and successful method, as they are easily handled and provide reliable information from the past. In addition to adding value to research efforts by offering additional research data, document review has evolved as a valuable approach for collecting quantitative research data.

3.2.Observation

It is a technique that allows us to gather verbal and, above all, non-verbal data. We relied on observation during our internship period to discover how the integration of ICT is affecting employees' performance. We then prepared a questionnaire destined to the employees of CASNOS-Skikda (Look Appendix B).

3.3.Measuring instrument (questionnaire)

"a questionnaire is "a general term to include all techniques of data collection in which each person is asked to respond to the same set of questions in a predetermined order" **(Vaus, 2002).**

We used a questionnaire as a measurement instrument in our study to collect data on the impact of degitalization on employees' perfomance. This measuring instrument, based on the circumstances, appears to be the most relevant to achieve the objective of our study.

3.3.1 Structure of the questionnaire

To investigate the impact of digitalization on employees' performance, our research employed a structured questionnaire divided into two main sections (Look Appendix B).

- **Section one: Demographic Information**

The first component of the questionnaire is specifically designed to collect demographic information from the participants. This encompasses inquiries regarding age, gender, and years of experience in the public sector. Gathering this data is essential for comprehending the varied backgrounds of the survey respondents and enables a detailed examination of how various demographic groups perceive and engage with information and communication technology in the workplace.

- **Section two:** It contains 26 questions devoted to the variables of the study and was divided into four axes:

- **Axe one: employees awareness of ICT tools used in workplace**

In the first axis, the focus is on the extent to which employees are aware of the e-management systems implemented in the organization. Respondents are asked to indicate their familiarity with the digital tools and techniques used in their workplace, their comprehensive knowledge of the services provided by all the e-management systems, and their regular use of digital tools and technologies in their job. Additionally, this axis assesses whether employees have received appropriate training and support to use these digital tools and whether they feel that digitization has improved their access to the resources and information needed to perform their job effectively. This part of the questionnaire aims to gauge employees' awareness and proficiency with e-management systems and identify areas where further training or support might be needed.

- **Axe two: digitization effect on work processes**

In the second axis, the focus shifts to the impact of digitization on work processes. Respondents are asked to evaluate how the introduction of digital tools has simplified administrative procedures, reduced the number of paper transactions, and facilitated communication between employees and different departments. Additionally, this section explores the extent to which digitization has contributed to saving material resources and reducing costs. This part of the questionnaire aims to understand the transformative effects of digital tools on business operations, highlighting improvements in efficiency, resource management, and internal communication.

- **Axe three: The impact of digitization on employee performance**

In this part, respondents are asked to assess how digitization has increased their knowledge of assigned tasks, contributed to the speed of work completion, and decreased the rate of errors in their work. Additionally, this section explores how digitization has enhanced employee productivity, facilitated the process of monitoring and follow-up, and stimulated creativity and self-development among employees. Furthermore, it examines the role of digitization in training employees on new tasks and promoting their participation in decision-making. This part of the questionnaire aims to understand the multifaceted effects of digital tools on individual performance, emphasizing improvements in knowledge, efficiency, accuracy, and engagement.

- **Axe four: Challenges and obstacles faced by employees**

In the final axis, respondents are asked to identify difficulties in using computers to perform required work and dealing with electronic systems. This section also examines the resistance and refusal by some employees to digitize work procedures, as well as the inadequacy of infrastructure to support the development of e-management systems. Additional challenges explored include the shortage of human resources specialized in developing and supporting e-management systems, technical issues or malfunctions related to tools and programs used, and concerns about data privacy or security. Finally, this section addresses feelings that digitization has led to a loss of personal touch or human contact in the delivery of public services. This part of the questionnaire aims to pinpoint specific barriers to effective digitization and identify areas needing improvement or additional support.

3.3.2. Measurement scales

The questionnaire uses a five-point Likert scale ranging from "strongly disagree" to "strongly agree". The five-point Likert scale is considered more accurate than the three-point scale.
We have chosen 5 degrees of Likert to give members a little more freedom to choose the degree of Likert they want.

4. Sample and survey methodology

4.1.Population and sampling

For our investigation, we will focus on all 60 employees of the CASNOS-Skikda agency.

4.2.Practical procedures for the survey

4.2.1. Survey period

We carried out a test of the questionnaire from 04/30/2024 to 05/01/2024. The test allowed us to correct and remove a few items that did not work. Data collection took place from 03/05/2024 to 07/05/2024.

4.2.2. Method of administration

We shared the questionnaire online via the Google Forms platform.

5. Data processing and analysis

After researching and collecting a range of information and data, we decided to analyze and process the data using EXCEL and SPSS (Statistical Package for the Social Sciences) software in the form of tables and graphs.

The statistical program called Statistical Package for the Social Sciences (spss21) was used, and we relied on the following statistical techniques:

- Percentages and frequencies to describe the sample;
- The stability coefficient α to know the stability of the questionnaire's paragraphs;
- Arithmetic mean to measure the degree of centrality of the answers;
- Standard deviation to measure the extent of consistency and non-dispersion of answers;
- Pearson's correlation coefficient to reveal the internal consistency, as well as the correlation between the two variables;
- Using the Kolmogorov-Smirnov (K-S) test: This test is used to find out whether the data follows a normal distribution or not;
- T Test to find out the effect between the two variables.

- **Measurement of questionnaire reliability**

Our questionnaire is checked and validated by the host organization's supervisor and our supervisor. We carried out a number of tests to measure its reliability**.**

Test of Cronbach's Alpha:

Table 3: Reliability stats

Cronbach's Alpha	**No. of elements**
,830	26

Source: Prepared by the student based on the results of the spss v21

The value of Cronbach's Alpha varies from zero to one. According to the table, the coefficient results gave a value of 0.853, which is closer to one than to zero, demonstrating the credibility and consistency of our questionnaire.

After ensuring the reliability of the questionnaire, we carried out the following tests:

- **Preliminary tests**

In the first part, and in order to meet the objectives of the quantitative study, we carried out a descriptive analysis, more precisely, the means to measure the nature of the degrees of consent of the Likert scale responses, and the standard deviation to measure the dispersion of these responses.

- **Hypothesis tests**

In order to confirm or refute the study's hypotheses, in other words, to assess the relationships between the variables, we applied multiple linear regression.

Conclusion of the chapter

This chapter details the rigorous methodology used to investigate the impact of digitalization on employee performance at CASNOS-Skikda. A structured questionnaire and statistical analysis were employed to ensure data reliability and validity. The chapter also provides an in-depth look at CASNOS-Skikda, highlighting its organizational structure, digital infrastructure, and the context within which digital tools are implemented. This comprehensive approach facilitated a thorough understanding of the organization's readiness for digital transformation. The methodological rigor and contextual analysis lay a solid foundation for the subsequent evaluation of digitalization effects. CASNOS-Skikda's experience offers valuable insights for similar organizations navigating digital transitions.

CHAPTER 3: RESULTS AND DISCUSSION

This chapter is devoted to analyzing data from the survey on the impact of digitizing work processes on the performance of employees.

This final chapter contains two sections: the first presents the results, and the second discusses these results to complete our research.

We will initially provide the findings of the survey we conducted on the personnel of the CASNOS-Skikda agency.

Next, we will conduct a thorough examination of the responses to analyze the data. This will enable us to address our assumptions, validate our hypothesis, and draw conclusions based on the findings.

Section 1: Results

This part contains the quantitative data analysis from our investigation on how employees' performance is affected by digitalization.

1. Questionnaire design and statistical methods for the study

1.1. Questionnaire design

This study utilized a questionnaire as the primary instrument for gathering information, which was subsequently translated and processed to generate relevant findings. In order to accomplish the goals of the research, we developed and formulated the research survey, utilizing insights from prior studies in this domain and the theoretical foundation of the study, through a series of consecutive preliminary actions.

1.2. Measuring the extent of agreement with the axes of the questionnaire

If the objective of this study is to assess the level of agreement among participants regarding the statements in the questionnaire, then the suitable measure to use is the degree of agreement measure. One of the most renowned measures for this purpose is the "Likert scale". In this scale, the researcher presents a set of statements directly related to the phenomenon under investigation, and assigns a range of scores from one to five, based on the chosen Likert scale. The study utilized

the five-point Likert scale to measure the levels of agreement. The statements were assigned the following weights:

To determine the length of the cells of the pentagonal scale (lower and upper limits) used in the axes of the study, the range (5 - 1 = 4) was calculated, then divided by the number of cells of the scale to obtain the correct cell length (4/5 = 0.80), then this value was added to the lowest value in the scale (or the beginning of the scale, which is the correct one), to determine the upper limit of this cell, and thus the cell length became as follows:

Table 4: Likert scale categories

Degree	**range**		**Evaluation**	**Sphere of approval**
	From	To		
1	**1**	**1.80**	Very low	Strongly Disagree
2	**1.81**	**2.60**	Low	Disagree
3	**2.61**	**3.40**	Medium	Neutral
4	**3.41**	**4.20**	High	Agree
5	**4.21**	**5**	very high	Strongly agree

Source: Prepared by the student based on the results of the spss v21

1.3.Statistical processing methods

The Statistical Package for Social Sciences (SPSS) program was utilized to analyze the sample data. The study utilizes several crucial statistical treatment approaches, including:

- **Frequencies and percentages:** The characteristics of the study sample were described using frequencies and percentages. These measures were also utilized to determine the responses of the sample members to the different research axes.
- **Arithmetic mean:** It is utilized to ascertain the comparative significance of the respondents' responses with respect to the dimensions of the research instrument. The arithmetic mean is utilized to organize the respondents' responses based on the level of consensus and to determine the magnitude of agreement or disagreement among individuals regarding each statement on the questionnaire axes.

- **Standard Deviation:** The measure was employed to ascertain the degree of variance among the responses of the study participants to each statement, as well as the dispersion in the responses of the sample members. A value closer to zero indicates that the responses are concentrated rather than spread.
- **Cronbach's Alpha coefficient:** The questionnaire statements were assessed for stability, with values ranging from 0 to 1. If the data lacks complete stability, the coefficient value is zero. However, if the data exhibits complete stability, the coefficient value is one. This implies that an increase in the coefficient value corresponds to an increase in the data's credibility.
- **Pearson correlation coefficient:** It is utilized to assess the internal consistency of each statement in the questionnaire with its corresponding axis.
- **Kolmogorov Smirnov Normal Distribution Test**: This test is utilized to determine the distributional characteristics of a specific phenomenon's data, and whether or not it adheres to a normal distribution.
- **T-test** to find out the effect between the two variables.

1.4.Inferential statistics methods

- **Cronbach Alpha reliability coefficient:** This statistical test is crucial for examining questionnaire data in order to establish its credibility. Based on the outcomes of this test, the questionnaire will either be revised or approved. This test is utilized to determine the consistency of the questionnaire questions.

2. Testing the reliability and validity of the study tool

2.1.Stability of the study tool

The Stability of the questionnaire implies that it yields consistent results when administered multiple times under identical settings and conditions. In simpler terms, questionnaire stability refers to the consistency of the questionnaire's results, meaning that they do not change considerably when the questionnaire is given to the same sample members multiple times throughout particular time periods.

In order to assess the reliability of the study tool, the Cronbach's Alpha coefficient was calculated. The results for both the dimensions of the study tool and the questionnaire as a whole are presented below:

- **First axe:**

Table 5: Reliability stats

Cronbach's Alpha	**No. of elements**
,754	5

Source: Prepared by the student based on the results of the spss v21

- **Second axe:**

Table 6: Reliability stats

Cronbach's Alpha	**No. of elements**
,907	5

Source: Prepared by the student based on the results of the spss v21

- **Third axe:**

Table 7: Reliability stats

Cronbach's Alpha	**No. of elements**
,901	8

Source: Prepared by the student based on the results of the spss v21

- **Fourth axe:**

Table 8: Reliability stats

Cronbach's Alpha	No. of elements
,792	8

Source: Prepared by the student based on the results of the spss v21

- **The overall questionnaire**

Table 9: Reliability stats

Cronbach's Alpha	No. of elements
,830	26

Source: Prepared by the student based on the results of the spss v21

From tables above, it is clear that the value of Cronbach's alpha coefficients was high, as it reached in the axis: **employees awareness of ICT tools used in workplace** (0.754), while in the axis: **digitization effect on work processes** (0.907), as we find In the Reliability dimension, the reliability rate reached (0.709), and in the Responsiveness dimension, the reliability rate reached (0.705), while in the axis: **The impact of digitization on employee performance (0**.901), in the last axis: **Challenges and obstacles faced by employees (0**,792). The value of the Cronbach's alpha coefficient for the overall questionnaire is (0,830), and this means that the reliability coefficient is high and is greater than the acceptable percentage estimated at 60%, which reflects the character of reliability and validity of the questionnaire and its dimensions.

2.2.Validity of the study tool

The validity of the questionnaire tool refers to its ability to accurately measure the specific construct it was intended to examine. Validity refers to the extent to which the questionnaire contains all the necessary elements for analysis and has clear statements that can be understood by all users. It is measured by Cronbach's alpha, which has a value of **0.911** or **91.1%,** indicating a

high level of homogeneity and consistency among the statements.
It is important to mention that we administered the questionnaire to the supervisors, and subsequently made changes by deleting and modifying certain sentences. Therefore, the stability and validity of the questionnaire have been verified, instilling us with absolute confidence in its validity.

2.3.Internal consistency validity of the study

By calculating the correlation coefficients between each dimension of the questionnaire and the final score for the axis itself (conducted from the part to the whole), internal consistency refers to the degree to which each statement of the questionnaire is consistent with the axis to which this statement belongs. In this case, the Pearson coefficient is used to determine the correlation coefficient. This factor was applied based on the data collected from the survey sample to determine the degree to which the questionnaire's components relate to the questionnaire as a whole and to measure the validity of its internal consistency:

- Measuring the internal consistency of the statements of the first axis

Table 10: Measuring the internal consistency of the statements of the first axis

Statement	Pearson's correlation coefficient	Significance level
1	0.685**	0.000
2	0.709**	0.000
3	0.840**	0.000
4	0.732**	0.000
5	0.648**	0.000
First axis		
**The correlation is statistically significant at the 0.01 significance level		

∗At the significance level ($\alpha = 0.05$)

∗∗ At the significance level ($\alpha=0.01$)

Source: Prepared by the student based on the results of the spss v21

From the table, it can be seen that all the statements of the first axis had a positive correlation between them and the axis to which they belong, and all the statements were statistically significant at the significance level of 0.01, so it can be said that the statements have internal consistency.

- Measuring the internal consistency of the statements of the second axis

Table 11: Measuring the internal consistency of the statements of the second axis

Statement	Pearson's correlation coefficient	Significance level
1	0.848**	0.000
2	0.888**	0.000
3	0.873**	0.000
4	0.882**	0.000
5	0.819**	0.000
second axis		
**The correlation is statistically significant at the 0.01 significance level		

∗At the significance level ($\alpha = 0.05$)

∗∗ At the significance level ($\alpha=0.01$)

Source: Prepared by the student based on the results of the spss v21

From the table, it is clear that all the statements of the second axis had a positive correlation between them and the axis to which they belonged, and all the statements were statistically significant at the significance level of 0.01, so it can be said that the statements have internal consistency.

- Measuring the internal consistency of the statements of the third axis

Table 12: Measuring the internal consistency of the statements of the third axis

Statement	Pearson's correlation coefficient	Significance level

1	0.741**	0.000
2	0.785**	0.000
3	0.768**	0.000
4	0.847**	0.000
5	0.834**	0.000
6	0.773**	0.000
7	0.705**	0.000
8	0.687**	0.000
third axis		
**The correlation is statistically significant at the 0.01 significance level		

∗At the significance level ($\alpha = 0.05$)

∗∗ At the significance level ($\alpha=0.01$)

Source: Prepared by the student based on the results of the spss v21

From the table, it can be seen that all the statements of the third axis had a positive correlation between them and the axis to which they belong, and all the statements were statistically significant at the significance level of 0.01, so it can be said that the statements have internal consistency.

- Measuring the internal consistency of the statements of the last axis

Table 13: Measuring the internal consistency of the statements of the fourth axis

Statement	Pearson's correlation coefficient	Significance level
1	0.713**	0.000
2	0.729**	0.000
3	0.611**	0.000
4	0.635**	0.000
5	0.665**	0.000
6	0.606**	0.000
7	0.702**	0.000

8	0.481**	0.000
fourth axis		
**The correlation is statistically significant at the 0.01 significance level		

∗At the significance level ($\alpha = 0.05$)

∗∗ At the significance level ($\alpha=0.01$)

Source: Prepared by the student based on the results of the spss v21

From the table, it is clear that all the statements of the fourth axis had a positive correlation between them and the axis to which they belonged, and all the statements were statistically significant at the significance level of 0.01, so it can be said that the statements have internal consistency.

2.4.Semnerov-Kolmogorov normal distribution test

By using the following two hypotheses, we hope to determine which of the probability distributions—that is, the normal distribution—is followed by the distribution of the study data through this test:

H0: The study data follows a normal distribution

H1: The study data do not follow a normal distribution

When the probability value (SIG) exceeds the study's predefined significance level, the null hypothesis is accepted and the alternative is rejected. The normal distribution test utilizing Kolmogorov Smirnov is displayed in the following table:

Table 14: Semnerov-Kolmogorov normal distribution test

Test result	Significance level (sig)	Z-value	Axes
The distribution is normal	**0.435**	**0.870**	**Total**

Source: Prepared by the student based on the results of the spss v21

The table above demonstrates that the test's significance level for each of the questionnaire's dimensions is greater than the null hypothesis's significance level (0.05), leading us to accept the

null hypothesis and reject the alternative. This indicates that the data in our study has a normal distribution, which is advantageous because the majority of the study variables do as well. Continue the study's investigation by utilizing parametric test analysis techniques.

3. Presentation of sample characteristics

To begin with, it is important to know our profiles in terms of gender, age and years of experience. The study sample consists of 60 employees from different departments.

- **Gender of respondent**

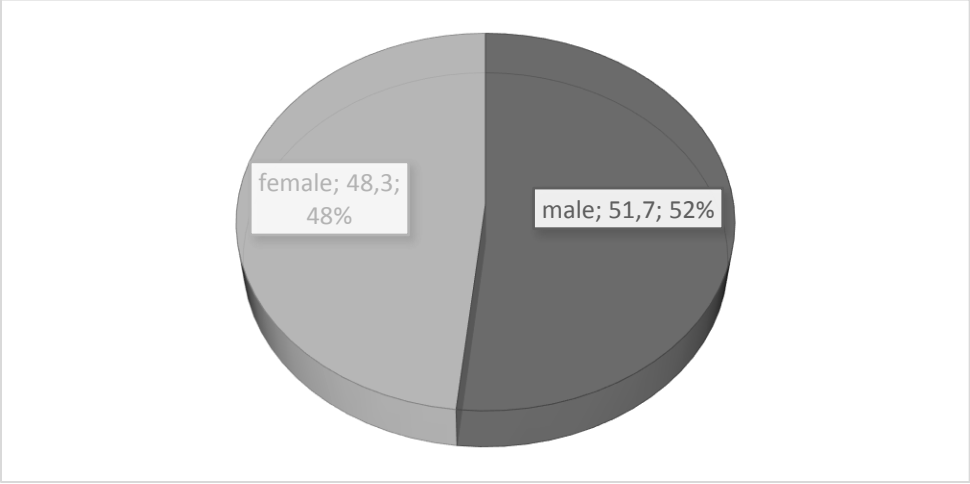
Table 15: Distribution of sample members by sex

Variable	Statement	Frequency	Percentage
Sex	**Male**	**31**	**51.7**
	Female	**29**	**48.3**
Total		**60**	**100**

Source: Prepared by the student based on the results of the spss v21

The table clearly indicates that males constitute the majority at 51.7%, whereas females account for 48.3%. The subsequent diagram depicts this:

Figure 8: Distribution of sample members by sex



Source: Prepared by the student based on the results of the spss v21

- **Age of respondent**

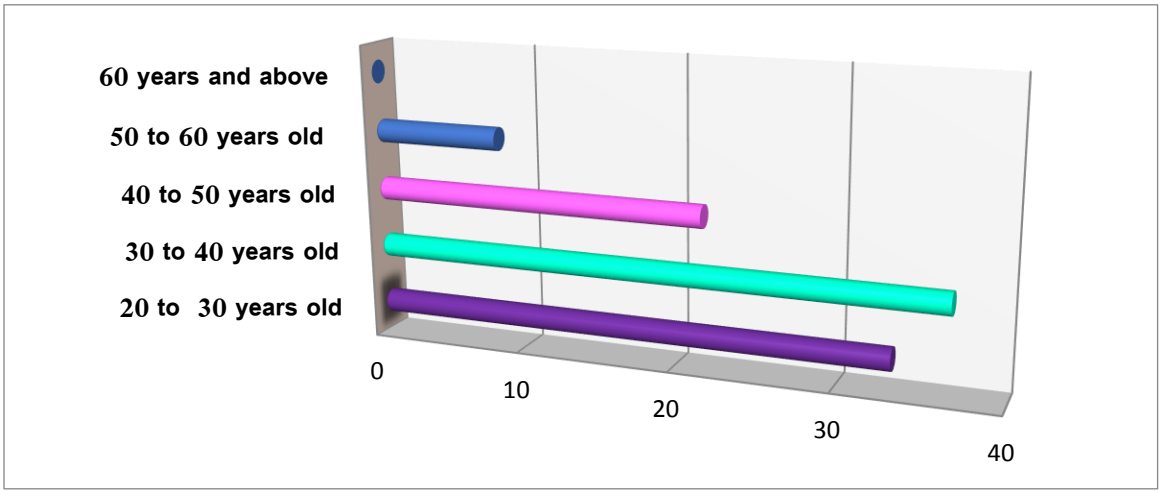
Table 16: Sample members by age

Variable	Statement	Frequency	Percentage
Age	20 to 30 years old	20	33.3
	30 to 40 years old	22	36.7
	40 to 50 years old	13	21.7
	50 to 60 years old	5	8.3
	60 years and above	00	00
Total		60	100

Source: Prepared by the student based on the results of the spss v21

It is clear from the table that 36.7% represent the age group of 30 to 40 years, while 33.3% and 21.7% represent the age group of 20 to 30 years and 40 to 50 years, respectively, then 8.3% for 50 to 60 years, and finally the zero percent for 60 years and above. The following figure shows this:

Figure 9: Distribution of sample members by age



Source: Prepared by the student based on the results of the spss v21

- **Years of experience**

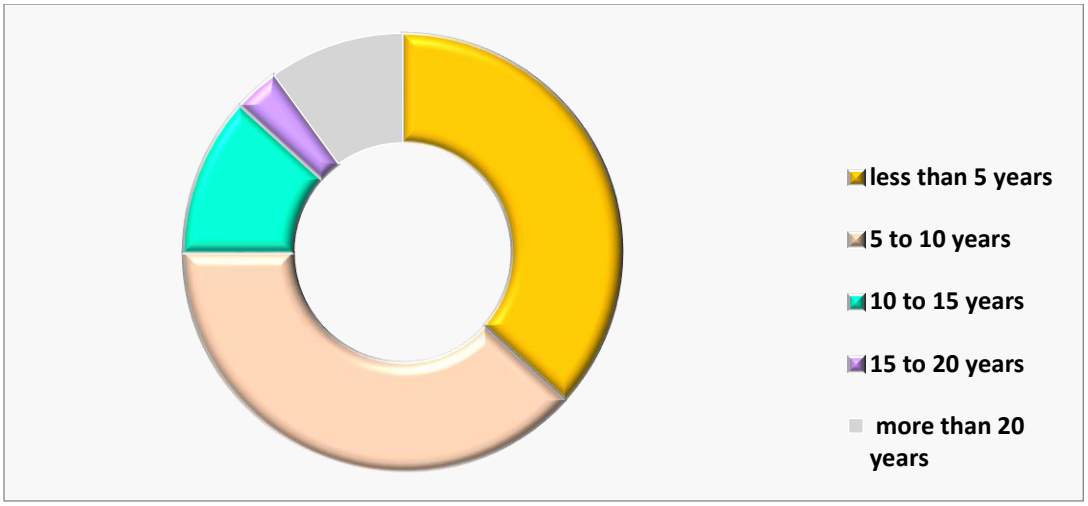
Table 17: Sample members by Years of experience

Variable	Statement	Frequency	Percentage
Years of experience	Less than 5 years	22	36.7
	5 to 10 years	23	38.3
	10 to 15 years	7	11.7
	15 to 20 years	2	3.3
	More than 20 years	6	10
Total		60	60

Source: Prepared by the student based on the results of the spss v21

It is clear from the table that 38.3% represent respondents with work experience from 5 to 10 years, while 36.7% and 11.7% represent experience of less than 5 years and 10 to 15 years, respectively, and the total percentage of 13.3% shows respondents with experience of more than 20 years and 15 to 20 years. The following figure illustrates this:

Figure 10: Distribution of sample members by years of experience



Source: Prepared by the student based on the results of the spss v21

4. Statistical description of the study axes

- **Results of the descriptive analyses related to the first axis**

Table 18: Analyzing the first axis statements

Statements	Arithmetic mean	Standard deviation	Rank	Evaluation
I am very familiar with the digital tools and technologies used in my workplace	4.00	0.759	3	high
I have a comprehensive knowledge of the services offered by all the e-management systems implemented in my workplace	3.90	0.915	4	high
I always use digital tools and technologies to do my work	4.03	0.862	2	High
I received the right training and support to use digital tools in my work	3.20	1.312	5	average
I feel that digitalization has improved access to the resources and information needed to do my job	4.20	0.879	1	High
First axis	3.86	0.684	/	High

Source: Prepared by the student based on the results of the spss v21

The results of the table show that the majority of the statements expressing the first axis by the study sample, represented by Casnos employees, received moderate to high scores ranging from (3.20 - 4.20), where the paragraph "I feel that digitization has improved my access to resources and information needed to perform my work" received the highest score (4.20) with a standard deviation of (0.879), while the paragraph "I received appropriate training and support to use digital tools in my work" received the lowest mean (3.20) with a standard deviation of (0.879), while the overall average obtained by the axis "the extent of employees' knowledge of the e-management systems applied in the organization" was at a high level of (3.86) with a standard deviation of (0.684).

- **Results of the descriptive analyses related to the second axis**

Table 19: Analyzing the second axis statements

Statements	Arithmetic mean	Standard deviation	Rank	Evaluation
The introduction of digital tools has greatly impacted business processes	4.06	1.022	3	High
Digitalization has simplified administrative procedures	4.25	0.836	1	very high
Digitalization has reduced the number of paper transactions	3.86	1.141	4	High
Digitalization has facilitated communication between employees and different departments	4.21	0.825	2	very high
Digitalization has saved material resources and reduced costs	3.75	1.018	5	High
Second axis	4.03	0.833	/	High

Source: Prepared by the student based on the results of the spss v21

The results of the table show that the majority of the statements expressing the second axis by the study sample, represented by Casnos employees, received high to very high scores ranging from (3.75 to 4.25), where the paragraph "digitization contributed to simplifying administrative procedures" received the highest score of (4.25) with a standard deviation of (0.836), while the paragraph "Digitization has contributed to saving material resources and reducing costs" received the lowest average (3.75) with a standard deviation of (1.018), and the overall average obtained by the axis "the extent of the impact of digitization on work procedures" was at a high level of (4.03) with a standard deviation of (0.833).

- Results of the descriptive analyses related to the third axis

Table 20: Analyzing the third axis statements

Statements	Arithmetic mean	Standard deviation	Rank	Evaluation
Digitalization has increased the employee's knowledge of the tasks assigned to them	3.91	0.869	3	High
Digitalization has contributed to the speedy completion of work	4.23	0.980	1	very high
Digitalization has reduced the number of errors at work	3.75	1.002	6	High
Digitalization has increased employee productivity	3.81	1.033	5	High
Digitalization has made it easier to monitor and follow up	4.03	0.956	2	High
Digitalization has stimulated creativity and self-development among employees	3.56	1.031	8	High
Digitalization has helped train employees in new tasks	3.85	0.917	4	High
Digitalization has contributed to employee participation in decision-making	3.61	0.903	7	High
Third axis	3.84	0.740	/	High

Source: Prepared by the student based on the results of the spss v21

The results of the table show that the majority of the statements expressing the third axis by the study sample, represented by Casnos employees, received high to very high scores ranging between (3.56 - 4.23), where the paragraph "digitization contributed to the speed of work completion" received the highest score of (4.23) with a standard deviation of (0.980), while the paragraph "Digitization has contributed to stimulating the spirit of creativity and self-development among employees" obtained the lowest mean (3.56) with a standard deviation of (1.031), and the

overall mean obtained by the axis "the impact of digitization on employee performance" was at a high level of (3.84) with a standard deviation of (0.740).

- Results of the descriptive analyses related to the fourth axis

Table 21: Analyzing the fourth axis statements

Statements	Arithmetic mean	Standard deviation	Rank	Evaluation
You have difficulty using a computer to do the work you need to do	2.83	1.152	7	Average
You're having trouble dealing with electronic systems	2.81	1.255	8	Average
There is resistance and refusal by some employees to digitalize work processes	3.50	1.112	5	High
There is not enough infrastructure to keep up with the development of e-management systems	3.90	0.915	3	High
There is a shortage of human resources specialized in developing and supporting e-management systems	4.08	0.925	1	High
Encountered technical issues or system malfunctions related to the hardware and software used	3.96	0.780	2	High
There are concerns about data privacy or security related to the use of digital tools and softwares	3.63	1.024	4	High
I feel that digitalization has led to the loss of the personal touch or human connection in the delivery of public services	3.06	1.162	6	High
Fourth axis	3.47	0.670	/	High

Source: Prepared by the student based on the results of the spss v21

The results of the table show that the majority of the statements expressing the fourth axis by the study sample, represented by Casnos employees, received moderate to high scores ranging from (2.81 - 4.08), where the paragraph "There is a shortage and deficit in the number of human resources specialized in developing and supporting electronic management systems" received the highest score of (4.08) with a standard deviation of (0.925), while the paragraph "You face difficulties in dealing with electronic systems" received the lowest mean (2.81) with a standard deviation of (1.255). while the overall mean obtained by the axis "Challenges and obstacles" was at a high level of (3.47) with a standard deviation of (0.670).

5. Validity of hypotheses and discussion of results

1. First sub-hypothesis

Ho: Employees who have higher knowledge and understanding of e-management systems do not show higher levels of job performance compared to those with less knowledge.
H1: Employees with higher knowledge and understanding of e-administrative systems will show higher levels of job performance compared to those with less knowledge.

Table 22: Results of testing the first sub-hypothesis

Statement	test value = 3					Hypothesis test result
First sub-hypothesis	Arithmetic mean	Standard deviation	The calculated t-value	Degree of freedom	Significance level	accepted
	3.86	0.684	9.806	59	0.000	

Source: Prepared by the student based on the results of the spss v21

It is clear from the above table that the arithmetic mean of the respondents' answers regarding employees' knowledge and understanding of electronic administrative systems amounted to 3.86 with a standard deviation of 0.684. The calculated (T) value (9.806) is greater than the tabulated

(T) (1.96), the degree of freedom is 59, and the level of significance sig=0.000, which is less than the adopted level of 0.05. Therefore, we reject the null hypothesis (H0) and accept the alternative hypothesis (H1) which states: "Employees who have higher knowledge and understanding of e-management systems will exhibit higher levels of job performance compared to those who have less knowledge".

2. Second sub-hypothesis

Ho: The digitization of work processes does not increase efficiency and reduce the time required to complete tasks.

H1: The digitization of work processes increases efficiency and reduces the time required to complete tasks.

Table 23: Results of testing the second sub-hypothesis

Statement	test value = 3					Hypothesis test result
Second sub-hypothesis	Arithmetic mean	Standard deviation	The calculated t-value	Degree of freedom	Significance level	accepted
	4.03	0.833	9.568	59	0.000	

Source: Prepared by the student based on the results of the spss v21

It is clear from the above table that the arithmetic mean of the respondents' answers regarding the digitalization of work processes was 4.03 with a standard deviation of 0.833. The calculated (T) value (9.568) is greater than the tabulated (T) (1.96), the degree of freedom is 59, and the level of significance sig=0.000, which is less than the adopted level of 0.05. Therefore, we reject the null hypothesis (H0) and accept the alternative hypothesis (H1) which states: "The digitalization of work processes increases efficiency and reduces the time required to complete tasks".

3. Third sub-hypothesis

H0: Digitalization does not positively affect employee performance by enhancing their ability to manage workloads and increase productivity.
H1: Digitalization positively affects employees' performance by enhancing their ability to manage workloads and increase productivity.

Table 24: Results of testing the third sub-hypothesis

Statement	test value = 3					Hypothesis test result
Third sub-hypothesis	Arithmetic mean	Standard deviation	The calculated t-value	Degree of freedom	Significance level	accepted
	3.84	0.740	8.875	59	0.000	

Source: Prepared by the student based on the results of the spss v21

It is clear from the above table that the arithmetic mean of the respondents' answers regarding the positive impact of digitization on employee performance is 3.84 with a standard deviation of 0.740. The calculated (T) value (8.875), which is greater than the tabulated (T) (1.96), and the degree of freedom is 59, and the significance level sig=0.000, which is less than the adopted level of 0.05. Therefore, we reject the null hypothesis (H0) and accept the alternative hypothesis (H1) which states: "Digitization positively affects employee performance by enhancing their ability to manage workloads and increase productivity."

4. Last sub-hypothesis

H0: The main challenges and barriers employees face during the digitization process are not related to insufficient training and resistance to change.
H1: The main challenges and barriers employees face during the digitization process are related to insufficient training and resistance to change.

Table 25: Results of testing the fourth sub-hypothesis

Statement	test value = 3					Hypothesis test result
Fourth sub-hypothesis	Arithmetic mean	Standard deviation	The calculated t-value	Degree of freedom	Significance level	accepted
	3.47	0.670	5.487	59	0.000	

Source: Prepared by the student based on the results of the spss v21

It is clear from the above table that the arithmetic mean of the respondents' answers regarding the challenges and obstacles faced by employees amounted to 3.47 with a standard deviation of 0.670. The calculated (T) value (5.487) is greater than the tabulated (T) (1.96), the degree of freedom is 59, and the level of significance sig=0.000, which is less than the adopted level of 0.05. Therefore, we reject the null hypothesis (H0) and accept the alternative hypothesis (H1) which states: "The main challenges and barriers faced by employees during the digitalization process are related to inadequate training and resistance to change."

5. The main hypothesis

H0: The digitalization of work processes does not affect the performance of employees in the public sector.

H1: The digitalization of work procedures affects the performance of employees in the public sector.

Table 26: Results of the main hypothesis test

Statement	test value = 3	Hypothesis test result

Main hypothesis	Arithmetic mean	Standard deviation	The calculated t-value	Degree of freedom	Significance level	accepted
	3.77	0.434	13.772	59	0.000	

Source: Prepared by the student based on the results of the spss v21

It is clear from the above table that the arithmetic mean of the respondents' answers regarding the impact of digitizing work procedures on employee performance is 3.77 with a standard deviation of 0.434. The calculated (T) value (13.772), which is greater than the tabulated (T) (1.96), the degree of freedom is 59, and the significance level sig=0.000, which is less than the adopted level of 0.05. Therefore, we reject the null hypothesis (H0) and accept the alternative hypothesis (H1) which states: "The digitalization of work procedures affects the performance of employees in the public sector".

6. summary of the results

In our study, the impact of digitalization on employee performance at CASNOS-Skikda, we used a questionnaire with a five-point Likert scale, the study analyzed responses from 60 employees, with statistical methods including SPSS for frequencies, percentages, and correlation coefficients. High reliability and validity of the questionnaire were confirmed, with Cronbach’s Alpha values indicating consistent measurement.

Employees demonstrated a high level of familiarity with digital tools and technologies, which significantly simplified administrative procedures, reduced paper transactions, and improved communication within the organization. Digitalization was found to enhance task knowledge, increase the speed of work completion, reduce errors, boost productivity, facilitate monitoring, stimulate creativity, improve training, and encourage participation in decision-making.

However, challenges were identified, including technical issues, resistance to change, inadequate infrastructure, concerns about data privacy, and the perceived loss of personal touch in service

delivery. The statistical analysis confirmed the reliability and validity of the questionnaire, showing positive correlations within each axis and supporting the hypotheses regarding the benefits of digitization.

Overall, the results indicate that while digitalization has positively affected employee performance and work processes, addressing the identified challenges is crucial for further improvement.

Key Findings

Employee Familiarity with Digital Tools: The majority of employees reported a high level of familiarity with digital tools and technologies. This widespread familiarity is crucial as it underpins the successful implementation and utilization of digital systems within the organization.

Simplification of Administrative Procedures: Digitalization significantly streamlined administrative procedures, making processes more efficient and less time-consuming. This change has allowed employees to focus more on core tasks rather than being bogged down by cumbersome administrative duties.

Reduction of Paper Transactions: The reduction in paper transactions not only contributes to environmental sustainability but also improves operational efficiency. Digital records are easier to manage, search, and retrieve, leading to enhanced productivity.

Improvement in Communication: The implementation of digital tools has markedly improved communication within the organization. Employees can now communicate more effectively and efficiently, facilitating better collaboration and coordination among different departments.

Enhancement of Task Knowledge and Performance: Digitalization has provided employees with better access to information and resources, enhancing their knowledge and competency in performing their tasks.

Despite the numerous benefits, our study also highlighted several challenges that need to be addressed to fully realize the potential of digitalization:

Technical Issues: Technical issues such as system failures and downtime can disrupt work processes and reduce efficiency.

Resistance to Change: Some employees exhibit resistance to adopting new digital tools and systems, preferring to stick to traditional methods.

Inadequate Infrastructure: The existing digital infrastructure may be inadequate to support the full-scale implementation of new technologies, requiring significant upgrades and investments.
Data Privacy Concerns: Concerns about the privacy and security of digital data are prevalent among employees, necessitating robust cybersecurity measures.

Section 2: discussion

The findings of this study illuminate the complex relationship between the digitalization of public services and employee performance within the context of CASNOS-Skikda. Through a comprehensive analysis incorporating quantitative methods, several key insights have emerged, warranting a thorough discussion.

The high level of familiarity with digital tools among employees is a cornerstone of successful digital transformation. Our findings indicate that employees at CASNOS-Skikda are well acquainted with various digital technologies, which has facilitated smoother transitions and better utilization of new systems. This familiarity has been cultivated through training programs and ongoing support, highlighting the importance of continuous education in digital literacy. As employees, become more adept at using these tools, their confidence and efficiency in performing tasks increase, leading to higher overall productivity.

Digitalization has significantly streamlined administrative processes, making them more efficient and less labor-intensive. Traditional paper-based methods have been replaced with automated systems that reduce the time and effort required for documentation and processing. This shift has not only expedited workflows but also minimized human errors associated with manual handling. Employees now spend less time on routine administrative tasks and more time on value-added activities, enhancing their overall productivity and job satisfaction.

The move towards digital records has resulted in a marked reduction in paper transactions. This transition aligns with broader environmental sustainability goals by reducing the organization’s carbon footprint. Furthermore, digital records are easier to manage, search, and retrieve, which improves operational efficiency and data accessibility. The enhanced organization of records also

facilitates better compliance with regulatory requirements and audits, reducing the risk of discrepancies and enhancing transparency.

Enhanced communication is one of the most notable benefits of digitalization. Digital tools such as email, instant messaging, and collaborative platforms have revolutionized how employees interact and share information. These tools enable real-time communication, bridging geographical and departmental divides, and fostering a more collaborative work environment. Improved communication leads to faster decision-making, better problem-solving, and a more cohesive organizational culture.

Technical issues such as system failures, downtime, and software glitches can disrupt work processes and reduce efficiency. These problems can be particularly frustrating for employees who rely heavily on digital tools to perform their tasks. Ensuring that robust technical support and maintenance protocols are in place is essential to mitigate these disruptions. Regular updates and upgrades to the digital infrastructure can also help in maintaining system reliability and performance.

Resistance to change among employees is a common challenge in digital transformation initiatives. Some employees may be reluctant to adopt new technologies due to a lack of familiarity or fear of obsolescence. Overcoming this resistance requires a comprehensive change management strategy that includes clear communication about the benefits of digitalization, training programs to build competence and confidence, and support systems to address concerns and feedback. Engaging employees in the transformation process and demonstrating how digital tools can enhance their work can help in reducing resistance.

The existing digital infrastructure may be inadequate to support the full-scale implementation of new technologies. This inadequacy can manifest as insufficient hardware, outdated software, or limited network capabilities. Investing in upgrading the digital infrastructure is crucial for ensuring that employees have the necessary tools and resources to perform their tasks efficiently. This investment includes not only the procurement of new technologies but also the enhancement of network security and data protection measures.

Concerns about the privacy and security of digital data are prevalent among employees. These concerns are valid, given the increasing incidence of cyber-attacks and data breaches. Implementing robust cybersecurity measures, such as encryption, firewalls, and regular security audits, is essential to protect sensitive information. Additionally, educating employees about best practices for data security and fostering a culture of vigilance can help in mitigating these risks.

The study conclusively demonstrates that digitalization has had a predominantly positive impact on employee performance and work processes at CASNOS-Skikda. Employees have benefitted from improved efficiency, reduced errors, enhanced productivity, and better communication. However, addressing the identified challenges—such as technical issues, resistance to change, inadequate infrastructure, data privacy concerns, and the perceived loss of personal touch—is crucial for further improvement.

By proactively addressing these challenges, CASNOS-Skikda can optimize the benefits of digitalization, ensuring sustainable growth and a more efficient, productive workforce. This effort involves continuous investment in digital infrastructure, comprehensive training programs, robust technical support, and effective change management strategies. As the organization navigates the digital transformation journey, it will be well-positioned to harness the full potential of digitalization, driving enhanced value and experiences for its employees and stakeholders.

CONCLUSION

Conclusion

In conclusion, the study on the digitalization of public services within CASNOS in Skikda, Algeria, provides a comprehensive analysis of the profound impact of digital initiatives on organizational processes and employee performance. Utilizing a questionnaire-based approach with 60 employees and employing statistical methods such as SPSS, the study confirmed the high reliability and validity of its findings.

The findings revealed that employees at CASNOS demonstrated a high level of familiarity with digital tools and technologies, which significantly streamlined administrative procedures, reduced paper transactions, and enhanced internal communication. Specifically, digitalization was found to enhance task knowledge, accelerate work completion, minimize errors, increase productivity, facilitate monitoring, foster creativity, improve training effectiveness, and promote employee participation in decision-making processes.

However, the study also identified challenges inherent in digital transformation, including technical issues, resistance to change, inadequate infrastructure, concerns about data privacy, and perceptions of reduced personal interaction in service delivery. Despite these challenges, the statistical analysis supported hypotheses regarding the positive correlations between digitalization and employee performance across various axes.

In light of these findings, the successful implementation of digital strategies at CASNOS underscores the importance of addressing these challenges proactively. By investing in robust technical support, comprehensive change management strategies, infrastructure development, and privacy safeguards, organizations can maximize the benefits of digitalization while mitigating potential drawbacks.

Looking forward, the experience of CASNOS serves as a valuable case study for organizations navigating similar digital transformations. By prioritizing continuous adaptation, stakeholder engagement, and strategic alignment of digital initiatives with organizational goals, CASNOS and similar organizations can not only enhance operational efficiency but also foster a culture of innovation and resilience in the face of evolving technological landscapes

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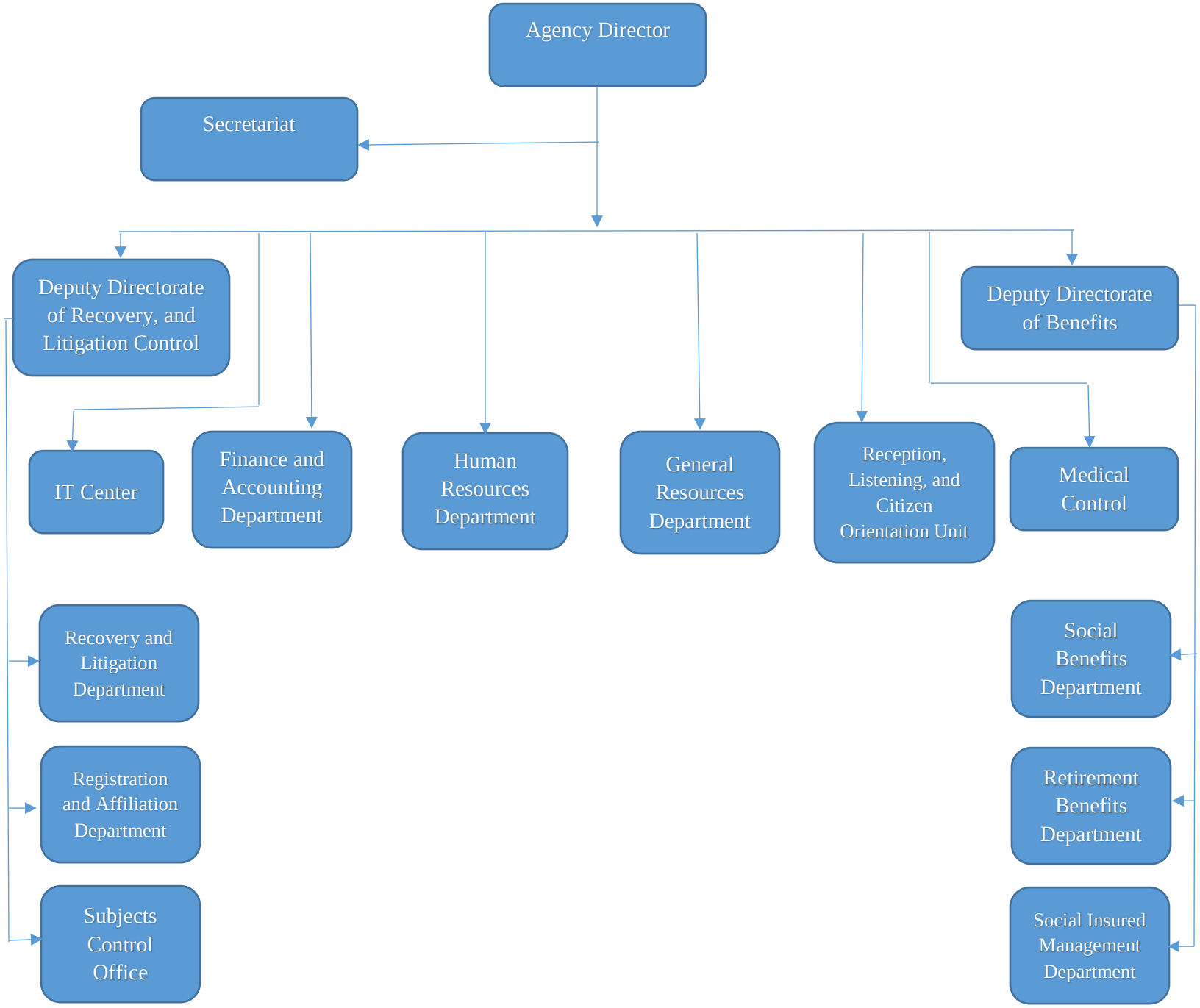
Appendices

Appendix A- Flowchart of CASNOS-Skikda


Agency Director
Secretariat
Deputy Directorate of Recovery, and Litigation Control
Deputy Directorate of Benefits
IT Center
Finance and Accounting Department
Human Resources Department
General Resources Department
Reception, Listening, and Citizen Orientation Unit
Medical Control
Recovery and Litigation Department
Registration and Affiliation Department
Subjects Control Office
Social Benefits Department
Retirement Benefits Department
Social Insured Management Department

CASNOS Skikda has two branches as follows:

Appendix B - Questionnaire

Ministry of Higher Education and Scientific Research

Higher National School of Management
Kolea

وزارة التعليم العالي والبحث العلمي

المدرسة الوطنية العليا للمناجمنت
القليعة

The impact of digitalization of work processes on employee performance

topic: Questionnaire

Within the framework of conducting a study on "The impact of the digitization of work procedures on employee performance", I am honored to place this questionnaire in your hands with the aim of obtaining the necessary information that serves the objectives of this study, so please answer the questions contained in this questionnaire accurately and objectively.
Finally, please accept my respect, appreciation and gratitude for your effective contribution to the preparation of this study.

Prepared by:
Mr. Mecheri mohamed

supervised by:
Dr. Moussaoui Samia

2023/2024

77. **Section one: Demographic Information**
78. Put an (x) in the appropriate box

1. Gender

- Male ☐
- Female ☐

2. Age

- 20 – 30 years old ☐
- 30 – 40 years old ☐
- 40 – 50 years old ☐
- 50 – 60 years old ☐
- More than 60 ☐

3. Years of experience

- Less the 5 years ☐
- 5 – 10 years ☐
- 10 – 15 years ☐
- 15 – 20 years ☐
- More than 20 years ☐

79. **Section two**

80. Put an (x) in the appropriate box

No.	statement	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
-	**Axe one: employees awareness of ICT tools used in workplace**					
1	I am very familiar with the digital tools and technologies used in my workplace					
2	I have a comprehensive knowledge of the services provided by all E-management systems implemented in my workplace					
3	I always use digital tools and technologies to do my job.					
4	I received appropriate training and support to use digital tools in my work					
5	I feel that digitization has improved my access to resources and information needed to do my job					
-	**Axe two: digitization effect on work processes**					
1	The introduction of digital tools has significantly impacted work processes					
2	Digitization has simplified administrative procedures.					
3	Digitization has reduced the number of paper transactions					
4	Digitization has facilitated communication between employees and different departments					
5	Digitization has contributed to saving material resources and reducing costs					
-	**Axe three: The impact of digitization on employee performance**					
1	Digitization has increased an employee's knowledge of the tasks assigned to them					
2	Digitization has contributed to the increase in the speed of work completion					
3	Digitization has contributed to a decrease in the rate of errors in work					
4	Digitization has contributed to increasing employee productivity					
5	Digitization has facilitated the process of monitoring and follow-up					
6	Digitization has contributed to stimulating the spirit of creativity and self-development among employees.					

7	Digitization has contributed to training employees on new tasks					
8	Digitization has contributed to employee participation in decision-making					
- **Axe four: Challenges and obstacles faced by employees**						
1	You are having difficulty using a computer to perform the required work					
2	You have difficulties in dealing with electronic systems					
3	There is resistance and refusal by some employees to digitize work procedures					
4	There is insufficient infrastructure to keep up with the development of e-management systems					
5	There is a shortage of human resources specialized in developing and supporting e-management systems.					
6	Have you encountered technical issues or system malfunctions related to the tools and programs used					
7	There are concerns about data privacy or security related to the use of digital tools and software					
8	I feel that digitization has led to a loss of personal touch or human contact in the delivery of public services					

Ministry of Higher Education and Scientific Research
Higher National School of Management
Kolea

وزارة التعليم العالي والبحث العلمي
المدرسة الوطنية العليا للمناجمنت
القليعة

الموضوع: استبيان

السلام عليكم ورحمة الله وبركاته

في إطار القيام بدراسة حول "**تأثير رقمنة إجراءات العمل على أداء الموظفين**" يشرفني ان اضع بين أيديكم هذه الاستمارة بهدف الحصول على المعلومات اللازمة والتي تخدم أهداف هذه الدراسة، لذا يرجى منكم الإجابة على الأسئلة الواردة في هذه الاستمارة بدقة وموضوعية.

وفي الأخير تقبلوا مني كل الاحترام والتقدير وجزيلا الشكر والعرفان على مساهمتكم الفعالة في إعداد هذه الدراسة .

الطالب: **تحت اشراف الأستاذة:**

– مشري محمد موساوي سامية

السنة الجامعية: 2024/2023

القسم الأول: البيانات الشخصية

ضع علامة(x) في الخانة التي تراهامناسبة

1. الجنس:

- **ذكر** ☐
- **انثى** ☐

2. العمر:

- **من 20 الى 30 سنة** ☐
- **من 30 الى 40 سنة** ☐
- **من 40 الى 50 سنة** ☐
- **من 50 الى 60 سنة** ☐
- **60 سنة فأكثر** ☐

4. عدد سنوات الخبرة

- **أقل من 5 سنوات** ☐
- **من 5 الى 10 سنوات** ☐
- **من 10 الى 15 سنة** ☐
- **من 15 الى 20 سنة** ☐
- **20 سنة فأكثر** ☐

القسم الثاني: ضع علامة(x) في الخانة التي تراها مناسبة

الرقم	العبارة	موافق بشدة	موافق	محايد	غير موافق	غير موافق بشدة
المحور الأول: مدى معرفة الموظفين بأنظمة الإدارة الإلكترونية المطبقة في المؤسسة						
1	أنا على دراية كبيرة بالأدوات والتقنيات الرقمية المستخدمة في مكان عملي					
2	لدي معرفة شاملة عن الخدمات التي تقدمها جميع أنظمة الإدارة الإلكترونية المطبقة في مكان عملي					
3	دائما ما أستعمل الأدوات والتقنيات الرقمية لأداء عملي					
4	تلقيت التدريب والدعم المناسبين لاستخدام الأدوات الرقمية في عملي					
5	أشعر أن الرقمنة قد حسنت من إمكانية الوصول إلى الموارد والمعلومات اللازمة لأداء عملي					
المحور الثاني: مدى تأثير الرقمنة على اجراءات العمل						
1	لقد أثر إدخال الأدوات الرقمية بشكل كبير على اجراءات العمل					
2	ساهمت الرقمنة في تبسيط الاجراءات الإدارية					
3	ساهمت الرقمنة في تخفيض عدد المعاملات الورقية					
4	ساهمت الرقمنة في تسهيل عملية الاتصال بين الموظفين والمديريات المختلفة					
5	ساهمت الرقمنة في توفير الموارد المادية وتقليل التكاليف					
المحور الثالث: تأثير الرقمنة على أداء الموظفين						
1	ساهمت الرقمنة في زيادة معرفة الموظف بالمهام الموكلة إليه					
2	ساهمت الرقمنة في سرعة انجاز العمل					
3	ساهمت الرقمنة في انخفاض نسبة الأخطاء في العمل					
4	ساهمت الرقمنة في زيادة انتاجية الموظف					
5	ساهمت الرقمنة في تسهيل عملية الرقابة والمتابعة					
6	ساهمت الرقمنة في تحفيز روح الإبداع والتطوير الذاتي بين الموظفين					
7	ساهمت الرقمنة في تدريب الموظفين على مهام جديدة					
8	ساهمت الرقمنة في مشاركة الموظفين في اتخاذ القرارات					
المحور الرابع: التحديات والمعيقات						

1	تواجهك صعوبات في التعامل مع الحاسوب لأداء الأعمال المطلوبة					
2	تواجهك صعوبات في التعامل مع الأنظمة الإلكترونية					
3	توجد مقاومة ورفض من قبل بعض الموظفين لرقمنة اجراءات العمل					
4	لا توجد بنية تحتية كافية لمواكبة التطور الحاصل في انظمة الإدارة الإلكترونية					
5	يوجد نقص وعجز في عدد الموارد البشرية المتخصصة في تطوير ودعم أنظمة الإدارة الإلكترونية					
6	واجهت مشاكل تقنية أو أعطال في النظام تتعلق بالأدوات والبرامج المستخدمة					
7	توجد مخاوف بشأن خصوصية البيانات أو الأمن المتعلق باستخدام الأدوات الرقمية والبرامج					
8	أشعر أن الرقمنة أدت إلى فقدان اللمسة الشخصية أو التواصل الإنساني في تقديم الخدمات العامة					

Appendix C - The internal consistency of the questionnaire's axes

- The internal consistency of the questionnaire's axes:

Correlations

		First axis
A1	Pearson correlation	,685**
	Sig. (two-tailed)	,000
	N	60
A2	Pearson correlation	,709**
	Sig. (two-tailed)	,000
	N	60
A3	Pearson correlation	,840**
	Sig. (two-tailed)	,000
	N	60
A4	Pearson correlation	,732**
	Sig. (two-tailed)	,000
	N	60
A5	Pearson correlation	,648**
	Sig. (two-tailed)	,000
	N	60
At	Pearson correlation	1
	Sig. (two-tailed)	
	N	60

**. Correlation is significant at the 0.01 level (two-tailed).

*. Correlation is significant at the 0.05 level (two-tailed).

Correlations

		Second axis
B1	Pearson correlation	,848**
	Sig. (two-tailed)	,000
	N	60
B2	Pearson correlation	,888**
	Sig. (two-tailed)	,000
	N	60
B3	Pearson correlation	,873**
	Sig. (two-tailed)	,000
	N	60

	Pearson correlation	,882**
B4	Sig. (two-tailed)	,000
	N	60
	Pearson correlation	,819**
B5	Sig. (two-tailed)	,000
	N	60
	Pearson correlation	1
Bt	Sig. (two-tailed)	
	N	60

**. Correlation is significant at the 0.01 level (two-tailed).

Correlations

		Third axis
	Pearson correlation	,741**
C1	Sig. (two-tailed)	,000
	N	60
	Pearson correlation	,785**
C2	Sig. (two-tailed)	,000
	N	60
	Pearson correlation	,768**
C3	Sig. (two-tailed)	,000
	N	60
	Pearson correlation	,847**
C4	Sig. (two-tailed)	,000
	N	60
	Pearson correlation	,834**
C5	Sig. (two-tailed)	,000
	N	60
	Pearson correlation	,773**
C6	Sig. (two-tailed)	,000
	N	60
	Pearson correlation	,705**
C7	Sig. (two-tailed)	,000
	N	60
	Pearson correlation	,687**
C8	Sig. (two-tailed)	,000
	N	60
Ct	Pearson correlation	1

	Sig. (two-tailed)	
	N	60

**. Correlation is significant at the 0.01 level (two-tailed).

Correlations

		Fourth axis
D1	Pearson correlation	,741**
	Sig. (two-tailed)	,000
	N	60
D2	Pearson correlation	,785**
	Sig. (two-tailed)	,000
	N	60
D3	Pearson correlation	,768**
	Sig. (two-tailed)	,000
	N	60
D4	Pearson correlation	,847**
	Sig. (two-tailed)	,000
	N	60
D5	Pearson correlation	,834**
	Sig. (two-tailed)	,000
	N	60
D6	Pearson correlation	,773**
	Sig. (two-tailed)	,000
	N	60
D7	Pearson correlation	,705**
	Sig. (two-tailed)	,000
	N	60
D8	Pearson correlation	,687**
	Sig. (two-tailed)	,000
	N	60
Dt	Corrélation de Pearson	1
	Sig. (bilatérale)	
	N	60

**. Correlation is significant at the 0.01 level (two-tailed).

- Normal Distribution Test

Single-sample Kolmogorov-Smirnov test

		Total
N		60
P Normal parameters [a,b]	Average	3,7718
	Standard deviation	,43410
Extreme differences	Absolute	,112
	Positive	,089
	Negative	-,112
Kolmogorov-Smirnov Z		**,870**
Asymptotic significance (bilateral)		**,435**

a. The distribution to be tested is Gaussian.
b. Calculated from the data.

- Personal information

Gender

		Number	Percentage	Valid percentage	Cumulative percentage
Valide	male	31	51,7	51,7	51,7
	female	29	48,3	48,3	100,0
	Total	60	100,0	100,0	

Age

		Number	Percentage	Valid percentage	Cumulative percentage
Valide	20-30 years old	20	33,3	33,3	33,3
	30-40 years old	22	36,7	36,7	70,0
	40-50 years old	13	21,7	21,7	91,7
	50-60 years old	5	8,3	8,3	100,0
	Total	60	100,0	100,0	

Years of experience

		Number	Percentage	Valid percentage	Cumulative percentage
Valide	Less than 5years	22	36,7	36,7	36,7
	5-10 years	23	38,3	38,3	75,0
	10-15 years	7	11,7	11,7	86,7
	15-20 years	2	3,3	3,3	90,0
	More than 20 years	6	10,0	10,0	100,0
	Total	60	100,0	100,0	

- Means and standard deviations

Single-sample statistics

	N	Mean	Standard deviation	Mean standard error
a1	60	4,0000	,75913	,09800
a2	60	3,9000	,91503	,11813
a3	60	4,0333	,86292	,11140
a4	60	3,2000	1,31226	,16941
a5	60	4,2000	,87914	,11350
Axis 1	60	3,8667	,68462	,08838

Single-sample statistics

	N	Mean	Standard deviation	Mean standard error
b1	60	4,0667	1,02290	,13206
b2	60	4,2500	,83615	,10795
b3	60	3,8667	1,14191	,14742
b4	60	4,2167	,82527	,10654
b5	60	3,7500	1,01889	,13154
Axis 2	60	4,0300	,83388	,10765

Single-sample statistics

	N	Mean	Standard deviation	Mean standard error
c1	60	3,9167	,86928	,11222
c2	60	4,2333	,98060	,12660
c3	60	3,7500	1,00212	,12937
c4	60	3,8167	1,03321	,13339
c5	60	4,0333	,95610	,12343
c6	60	3,5667	1,03115	,13312
c7	60	3,8500	,91735	,11843
c8	60	3,6167	,90370	,11667
Axis 3	60	3,8479	,74008	,09554

Single-sample statistics

	N	Mean	Standard deviation	Mean standard error
d1	60	2,8333	1,15225	,14876
d2	60	2,8167	1,25538	,16207
d3	60	3,5000	1,11233	,14360
d4	60	3,9000	,91503	,11813
d5	60	4,0833	,92593	,11954
d6	60	3,9667	,78041	,10075
d7	60	3,6333	1,02456	,13227
d8	60	3,0667	1,16250	,15008
Axis 4	60	3,4750	,67050	,08656

- Testing the study hypotheses

Single-sample statistics

	N	Mean	Standard deviation	Mean standard error
S.H 1	60	3,8667	,68462	,08838
S.H 2	60	4,0300	,83388	,10765
S.H 3	60	3,8479	,74008	,09554
S.H 4	60	3,4750	,67050	,08656
Main H	60	3,7718	,43410	,05604

Single-sample statistics

	Test value = 3					
	t	ddl	Sig. (bilatérale)	Mean difference	95% confidence interval of the difference	
					Lower	Superior
S.H 1	9,806	59	,000	,86667	,6898	1,0435
S.H 2	9,568	59	,000	1,03000	,8146	1,2454
S.H 3	8,875	59	,000	,84792	,6567	1,0391
S.H 4	5,487	59	,000	,47500	,3018	,6482
Main H	13,772	59	,000	,77179	,6597	,8839