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## GRADUATE DISSERTATION

Presentation with view to obtaining an academic master's degree  
in the specialty

« E-gouvernement »

### **The Impact of Digitalization on Workflow in The Public Sector**

**Case Study : the Ministry of Higher Education and Scientific Research  
« The Employee Training Sub-Department »**

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## **ABSTRACT:**

This study investigates the impact of digitization on workflow efficiency and employee adaptation within the Employee Training Sub-Department of the Ministry of Higher Education in Algeria. The research explores how digital tools like e-learning platforms and automated workflows are transforming training processes. It examines the benefits, such as increased efficiency and enhanced data handling, as well as the challenges, including infrastructure limitations and digital literacy gaps. The study employs a qualitative case study approach, utilizing semi-structured interviews and document analysis, to provide actionable insights for policymakers and training administrators. The findings highlight the importance of addressing both technological and organizational factors to optimize digital transformation in public sector training

**Keywords:** Digitization, Workflow Efficiency, Employee Adaptation, Public Sector, Higher Education, Employee Training, Digital Transformation, Information Technology, Case Study, Algeria.

## **Résumé:**

Cette étude examine l'impact de la numérisation sur l'efficacité du flux de travail et l'adaptation des employés au sein de la Sous-Direction de la Formation des Employés du Ministère de l'Enseignement Supérieur en Algérie. La recherche explore comment les outils numériques tels que les plateformes d'apprentissage en ligne et les flux de travail automatisés transforment les processus de formation. Elle examine les avantages, tels qu'une efficacité accrue et une meilleure gestion des données, ainsi que les défis, notamment les limitations de l'infrastructure et les lacunes en matière de littératie numérique. L'étude adopte une approche d'étude de cas qualitative, utilisant des entretiens semi-structurés et l'analyse de documents, afin de fournir des informations exploitables aux décideurs politiques et aux administrateurs de la formation. Les résultats soulignent l'importance de prendre en compte à la fois les facteurs technologiques et organisationnels afin d'optimiser la transformation numérique de la formation dans le secteur public.

**Mots clés :** Numérisation, Efficacité du Flux de Travail, Adaptation des Employés, Secteur Public, Enseignement Supérieur, Formation des Employés, Transformation Numérique, Technologie de l'Information, Étude de Cas, Algérie.

## ملخص :

تدرس هذه الدراسة تأثير الرقمنة على كفاءة سير العمل وتكيف الموظفين في الإدارة الفرعية لتدريب الموظفين بوزارة التعليم العالي في الجزائر. يستكشف البحث كيف تعمل الأدوات الرقمية مثل منصات التعلم الإلكتروني وتدفقات العمل الآلية على تحويل عمليات التدريب. كما يدرس الفوائد، مثل زيادة الكفاءة وتحسين معالجة البيانات، والتحديات، بما في ذلك القيود المفروضة على البنية التحتية والفجوات في الإلمام الرقمي. تستخدم الدراسة نهج دراسة الحالة النوعية، وتستخدم المقابلات شبه المنظمة وتحليل الوثائق، لتوفير رؤى قابلة للتنفيذ لوضعي السياسات ومديري التدريب. تبرز النتائج أهمية معالجة كل من العوامل التكنولوجية والتنظيمية لتحسين التحول الرقمي في تدريب القطاع العام.

**الكلمات المفتاحية :** الرقمنة، كفاءة سير العمل، تكيف الموظفين، القطاع العام، التعليم العالي، تدريب الموظفين، التحول الرقمي، تكنولوجيا المعلومات، دراسة حالة، الجزائر.

## **ACKNOWLEDGMENTS**

Source of all: Thank you, God.

My constant: Family, your presence mattered.

To my Supervisor & Hosts: Your guidance shaped this. Your support enabled it.

To My Teachers: You sparked the flame.

Team EG: Unforgettable experience, Shared moments, lasting impact.

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## Abbreviations list

Abbreviations	FULL MEANING
G2C	Government-to-Citizen
HEI(s)	Higher Education Institution(s)
ICT	Information and Communication Technology
LMS	Learning Management System
SDG	Sustainable Development Goal

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**General  
Introduction**

**Background:** Overview of digitization in public sector organizations.

Digitalization was, still is, and will always be the direction for governments to adopt and work with, as we have seen the recent increase in interest regarding it. Governments are rapidly adopting digital tools such as e-learning platforms, automated workflows, cloud computing, and artificial intelligence (AI) for better workflows and increasing efficiency, transparency, and service delivery, along with many more benefits such as reducing bureaucracy, lowering costs, and enhancing accessibility.

This shift towards digitization aims to improve public service delivery by harnessing the power of technology, data, and connectivity. By embracing digitization, governments can simplify and automate processes, improve efficiency and effectiveness, and enhance the overall citizen experience. In addition to these benefits, digital transformation in the public sector requires governments to manage citizen expectations and create value in digital services. (Teixeira, 2021)

In the context of Algeria, digitalization enables:

- streamline processes : Implementing automation tools to handle repetitive tasks frees up human resources for more strategic roles. Automation can include everything from data entry to customer service.
- enhance data collection and sharing : digitalization helps the public sector move from slow, manual processes to faster, smarter, and more collaborative ways of managing data. by having Automated Data Collection tools, Centralized Databases, Improved Data Accuracy and Quality, Real-Time Access and Analysis
- ultimately improve public services.

While digitization in the public sector promises many benefits, it is important to consider the potential drawbacks and challenges that may arise from involving citizens in this process. One of the main concerns is the potential for increased problems and complications. Involving citizens as additional resources or participants in policymaking can open the door to conflicting opinions, differing priorities, and potential power struggles. In addition, reliance on digital technologies can raise concerns about privacy and security. When

governments collect and store large amounts of citizen data, there is an increased risk of data breaches and unauthorized access. Protecting citizens' personal information is an important responsibility for governments. In addition, the development of digital technologies and advancements in artificial intelligence have brought about significant transformations in contemporary society. (Krettek & Josefsson, 2021)

### 1- Objectives :

This research will:

- Provide empirical evidence on digitization's real-world impact in a public sector context.
- Help policymakers refine digital training strategies (e.g., targeted upskilling, infrastructure upgrades).
- Contribute to literature on public sector digital transformation with a focus on workflow dynamics.

### 2- Problem statement

the actual impact of this digitization on workflow efficiency, employee satisfaction, and institutional performance remains understudied—especially in bureaucratic public sector environments where resistance to change and infrastructural challenges are common. (world bank, 2022)

In order to achieve these objectives, and on the basis of all the above, we formulate the following research problem: **“What are the actual impacts of digitization on workflow efficiency and employee adaptation within the Employee Training Sub-Department of the Ministry of Higher Education?”**

### 3- Research methodology :

This study examines the impact of digitization on workflow efficiency within the Employee Training Sub-Department of the Ministry of Higher Education. Specifically, we analyze how digital transformation influences employee productivity, training processes, and overall organizational performance. Additionally, we explore user satisfaction, challenges in adoption, and key requirements for optimizing digital tools in a public sector context.

The research is structured into Three key chapters:

**Chapter I** reviews existing literature on digitization in the public sector, its effects on employee workflows, and the conceptual framework guiding this study.

**Chapter II** outlines the host organization and the methodology, including research design, data collection (interviews / documentation / observation ), and analysis techniques.

**Chapter III** presents the findings, discussions, and recommendations, assessing how digitization has transformed training workflows and identifying areas for improvement.

By focusing on a real-world public sector case study, this research aims to provide actionable insights for policymakers, training administrators, and digital transformation strategists.

## 4- Significance of the Study

This research holds critical importance for three key stakeholders:

### 1. Academic Contribution

- **Fills a Literature Gap:** While studies on digitization abound, few focus on its impact on public sector training workflows, especially in bureaucratic contexts like ministries. This study adds empirical evidence to under-researched areas like:
  - Behavioral adaptation of employees to digital tools.
  - Workflow efficiency metrics in mandatory training programs.
- **Advances Theoretical Frameworks:** Tests the applicability of models like the Technology Acceptance Model (TAM) or Diffusion of Innovation Theory in public sector digitization.

### 2. Practical Benefits for the Ministry of Higher Education

- **Identifies Pain Points:** Reveals specific inefficiencies (e.g., duplicate processes, low engagement) in the current digital training system.
- **Data-Driven Solutions:** Provides actionable recommendations to:
  - Improve training platform usability.
  - Address employee resistance through targeted upskilling.
  - Optimize resource allocation (e.g., reducing redundant tools).

### 3. Policy Implications

- Informs Government Digital Strategies: Findings can guide other public sector departments undergoing similar transitions.
- Supports SDG 4 (Quality Education): By modernizing training workflows, the Ministry can better equip educators/administrators, indirectly improving higher education delivery. (UN, 2023)

### 4. Broader Societal Impact

- Enhances Public Service Quality: Efficient training translates to a more skilled workforce, improving service delivery in higher education institutions.
- Cost Savings: Digitization reduces paperwork and operational costs, benefiting taxpayers.

### 5- Personal Motivation for the Study :

This research topic aligns closely with both my academic background and professional interests. As a student specializing in digital transformation, I am deeply fascinated by the potential of technology to streamline workflows, enhance efficiency, and drive institutional progress. My passion for digitization extends beyond its technical aspects—I am particularly drawn to its real-world applications in improving public sector operations, where innovation can directly impact national development.

The public sector, with its unique challenges and societal influence, presents a compelling area for research. By focusing on the Employee Training Sub-Department in the Ministry of Higher Education, I aim to contribute actionable insights that can help optimize training processes, empower employees, and ultimately strengthen the quality of public service delivery in my country. This study represents not only an academic pursuit but also a personal commitment to leveraging technology for meaningful, large-scale improvement.

**CHAPTER I :**  
**Theoretical Framework**

# CHAPTER I : Theoretical Framework

This chapter provides an overview of existing research relevant to the impact of digitization on workflow, particularly within the context of public sector organizations. It explores the definition and trends of digitization, its impact on employee training, the challenges associated with its adoption, and relevant theoretical frameworks.

## 1- Section 1 : Literature review

### digitalization theories :

To effectively analyze the impact of digitization on workflow within the employee training sub-department of the Ministry of Higher Education in Algeria, this study will primarily draw upon the **Technology Acceptance Model (TAM)**. (Davis, 1989) and complement it with insights from the **Diffusion of Innovation Theory**, (Rogers, 2003) and the **Institutional Theory**. These frameworks offer robust lenses through which to understand the adoption and utilization of digital technologies and the factors influencing their success within organizational settings.

### 1.1- Technology Acceptance Model (TAM) :

#### 2.2.1 - Theory development:

The Technology Acceptance Model (TAM), developed by (Davis, 1989), posits that an individual's acceptance and use of a new technology are primarily determined by two key beliefs: **perceived usefulness (PU)** and **perceived ease of use (PEOU)**.

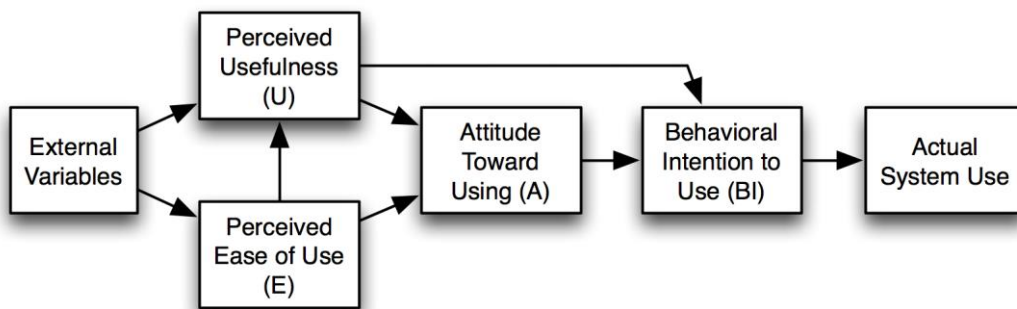
- **Perceived Usefulness (PU):** This refers to the degree to which an individual believes that using a particular technology will enhance their job performance or effectiveness (Davis, 1989). In the context of digital training tools, employees are more likely to adopt and utilize them if they believe these tools will make their training processes more efficient, effective, and less time-consuming. (Venkatesh & Davis, 2000) For instance, if employees perceive that digital platforms allow for easier access to training materials, facilitate better communication with trainers, and provide opportunities for self-paced learning that ultimately improves their skills and knowledge relevant to their roles, their perceived usefulness of these technologies will be high.
- **Perceived Ease of Use (PEOU):** This refers to the degree to which an individual believes that using a particular technology will be free from effort (Davis, 1989). If

## CHAPTER I : Theoretical Framework

employees find digital training tools to be user-friendly, intuitive, and requiring minimal effort to learn and operate, they are more likely to adopt them (Venkatesh & Davis, 2000). Conversely, if the digital platforms are perceived as complex, difficult to navigate, or requiring significant technical expertise, employees may be hesitant to use them, regardless of their potential usefulness.

TAM also suggests that external variables, such as organizational support, training provided, and the characteristics of the technology itself, can influence PU and PEOU, which in turn affect an individual's **attitude toward using** the technology and their **behavioral intention to use** it (Davis, 1989). Behavioral intention is then considered a direct predictor of actual system use.

*Figure 1: The Technology Acceptance Model (TAM) – Davis (1989)*



**source:** Davis, F. D. (1989). *Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340.*

### 2.2.1 - Relevance to the Study:

TAM provides a valuable framework for understanding employee perceptions of the digital training tools being implemented in the Ministry of Higher Education's training sub-department. By examining employees' perceived usefulness (e.g., impact on workflow efficiency, accessibility of resources) and perceived ease of use (e.g., user-friendliness of platforms, technical support), this study can identify factors influencing their acceptance and adoption of these digital tools. Understanding these perceptions is crucial for identifying both the benefits and potential drawbacks of the implemented technologies and for developing strategies to enhance their effective utilization.

### 1.2- Diffusion of Innovation Theory ( DOI )

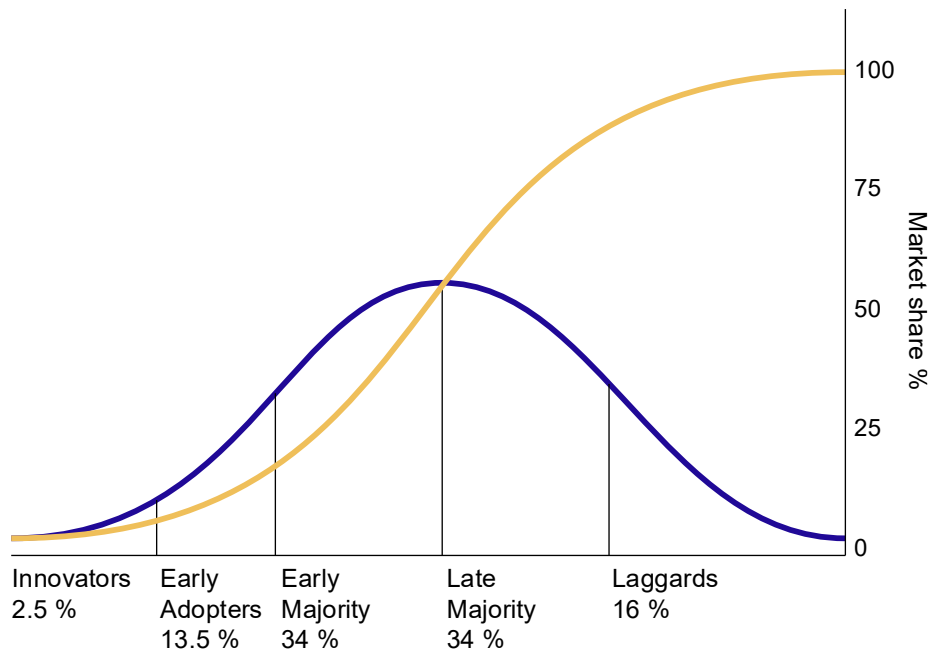
#### 1.2.1- Theory development:

Complementing TAM, the Diffusion of Innovation Theory (DOI), developed by (Rogers, 2003), provides a broader perspective on how new ideas and technologies spread within a social system. DOI identifies several characteristics of an innovation that influence its rate of adoption:

- **Relative Advantage:** The degree to which an innovation is perceived as better than the idea it supersedes (Rogers, 2003), Digital training tools may offer a relative advantage over traditional methods in terms of flexibility, accessibility, cost-effectiveness, and opportunities for interactive learning.
- **Compatibility:** Compatibility refers to how well an innovation aligns with the values, prior experiences, and specific needs of those who might adopt it" (Rogers, 2003). The compatibility of digital training tools with the existing organizational culture, technological infrastructure, and employees' learning preferences will influence their adoption.
- **Complexity:** The degree to which an innovation is perceived as difficult to understand and use (Rogers, 2003), As highlighted in TAM's PEOU, the less complex digital training tools are perceived to be, the more likely they are to be adopted.
- **Trialability:** The degree to which an innovation may be experimented with on a limited basis (Rogers, 2003), Allowing employees to pilot digital training modules or platforms can reduce uncertainty and increase their willingness to adopt them.
- **Observability:** The degree to which the results of an innovation are visible to others (Rogers, 2003), When employees see the positive impacts of digital training on their colleagues' workflow and skills, they may be more inclined to adopt these tools themselves.

DOI also describes the different adopter categories (innovators, early adopters, early majority, late majority, and laggards) and the stages in the adoption process (awareness, interest, evaluation, trial, and adoption).

*Figure 2: The Technology Adoption Lifecycle*



Source : Rogers, E. M. (2003). *Diffusion of Innovations (5th ed.)*. Free Press.

### 1.2.2- Relevance to the Study:

The Diffusion of Innovation Theory can help understand the broader organizational context of digital tools adoption within the Ministry of Higher Education. By considering the perceived relative advantage, compatibility, complexity, trialability, and observability of the digital training initiatives, this study can identify factors that facilitate or hinder their diffusion among employees. Furthermore, understanding the different stages of adoption and potential adopter categories can inform targeted strategies for promoting the successful implementation and widespread use of digital tools within the training sub-department.

### 1.3- Institutional Theory :

#### 1.3.1- Theory development:

Developed by DiMaggio and Powell (1983), Institutional Theory offers a complementary perspective by examining the deeper and more resilient aspects of social structure that influence organizational behavior. It argues that organizations within the same "organizational field" (defined as organizations that, in the aggregate, constitute a recognized area of institutional life) tend to become more similar over time through a process called **institutional isomorphism**. This isomorphism occurs not necessarily due to efficiency or competitive pressures, but rather due to pressures for legitimacy and social acceptance

## CHAPTER I : Theoretical Framework

(DiMaggio & Powell, 2000), identified three key mechanisms driving institutional isomorphism:

1. **Coercive Isomorphism:** This arises from formal and informal pressures exerted on organizations by other organizations upon which they are dependent, as well as by cultural expectations in the society within which organizations function. These pressures can stem from government regulations, mandates from funding bodies, or the demands of influential stakeholders. In the context of employee training in the Ministry of Higher Education, coercive pressures might include government policies on public sector modernization, directives from higher administrative bodies regarding training standards, or expectations from employee unions regarding access to digital learning opportunities.
2. **Mimetic Isomorphism:** This occurs when organizations imitate the structures and practices of other organizations that they perceive as successful or legitimate, particularly in situations of uncertainty or ambiguity (DiMaggio & Powell, 2000). When the Ministry of Higher Education's training sub-department faces uncertainty about the best way to implement digital training, it might look to other successful public sector organizations or even leading private sector entities for models and best practices in digital workflow and training delivery. This imitation can reduce the perceived risk associated with adopting new technologies and processes.
3. **Normative Isomorphism:** This results from pressures stemming from professionalization. Professional associations, educational institutions, and the spread of shared norms and values among professionals within a field contribute to normative pressures (DiMaggio & Powell, 2000). In the context of employee training, the professional standards and best practices advocated by training professionals, pedagogical experts, or IT specialists within the higher education sector can influence the adoption of particular digital training tools and workflow processes. The emphasis on certain pedagogical approaches facilitated by digital platforms or the perceived need for specific digital skills among employees can drive normative isomorphism.

### 1.3.2- Relevance to the Study:

Incorporating Institutional Theory provides a crucial layer of analysis for understanding the adoption of digitization in the employee training sub-department. While TAM focuses on individual employee acceptance and DOI on the diffusion process, Institutional Theory helps to explain the broader organizational and environmental forces that shape the context in which these individual and diffusion processes occur. By examining the coercive (e.g., governmental mandates), mimetic (e.g., imitation of successful models), and normative (e.g., professional standards) pressures influencing the Ministry of Higher Education, this study can gain a deeper understanding of *why* certain digital workflows and training tools are being

## CHAPTER I : Theoretical Framework

adopted, beyond just their perceived usefulness or ease of use by individual employees. This framework can illuminate the role of legitimacy, social norms, and external pressures in shaping the digital transformation of employee training within the Algerian public sector.

### 1.4- Integration of TAM, DOI, and Institutional Theory :

While TAM offers insights into the individual-level adoption of digital training tools based on perceived usefulness and ease of use, and DOI broadens the scope to explain how these innovations spread within the organizational context through their perceived characteristics, **Institutional Theory provides a crucial macro-level understanding of the organizational and environmental pressures that shape the very adoption and implementation of these digital initiatives within the Ministry of Higher Education.**

Institutional Theory underscores that the Ministry's decision to digitize its employee training sub-department is not solely driven by rational assessments of efficiency or the inherent qualities of the technology (as suggested by TAM and DOI). Instead, it is also significantly influenced by broader institutional forces that compel organizations within similar fields to adopt similar structures and practices for legitimacy and survival (DiMaggio & Powell, 2000).

**Specifically, coercive pressures** from the Algerian government's national digital transformation strategy and any mandates from higher administrative bodies regarding public sector modernization may necessitate the adoption of digital training workflows. The Ministry might feel compelled to implement digital solutions to align with national directives and maintain legitimacy within the broader public sector landscape.

**Mimetic pressures** also play a role. Observing other successful government ministries or even higher education institutions, both domestically and internationally, that have effectively implemented digital training programs could lead the Ministry to imitate their strategies and adopt similar digital tools and platforms. This mimetic behavior can reduce uncertainty and enhance the perceived legitimacy of their digitization efforts.

Furthermore, **normative pressures** arising from the professionalization of training and development, the increasing emphasis on technology-enhanced learning pedagogies, and the expectations of a digitally skilled workforce can influence the Ministry's adoption of specific digital training standards and practices. The influence of training professionals and IT

## CHAPTER I : Theoretical Framework

experts within the Algerian higher education sector will likely shape the selection and implementation of digital tools.

**Therefore, a comprehensive understanding of the impact of digitization on workflow in the Ministry of Higher Education's training sub-department requires considering all three theoretical lenses.** An individual employee's decision to engage with digital tools (TAM) is influenced by their perceptions, but the availability and characteristics of these tools (DOI) are, in turn, shaped by the institutional pressures (Institutional Theory) acting upon the Ministry. The Ministry's drive to adopt digital training is not just about individual acceptance or the features of the technology; it's also about conforming to broader governmental expectations, emulating successful peers, and adhering to professional norms within the field.

By integrating TAM, DOI, and Institutional Theory, this study aims to provide a holistic and nuanced analysis of the multifaceted factors influencing the adoption and impact of digitization on workflow efficiency and employee perceptions within the specific institutional context of the Ministry of Higher Education in Algeria, ultimately leading to more informed and contextually relevant recommendations for successful digital transformation.

*Tableau 1: Synthesis of Theoris*

<b>Theory</b>	<b>Explains</b>	<b>Limitations in Public Sector</b>
<b>TAM</b>	Employee adoption behavior	Weak for mandatory-use contexts
<b>DOI</b>	Speed/scale of adoption	Underestimates bureaucratic inertia
<b>Institutional</b>	Why digitization is adopted	Doesn't predict success/failure

Elaborated by the student

## Section 2 : Conceptual Framework

### 2.1- Digitalization

#### 2.1.1- Definition and key concepts

According to Gartner, digitalization isn't merely about the act of making things digital; it represents the strategic and profound adoption of digital technologies to fundamentally reshape an organization's core business model, thereby unlocking novel avenues for revenue generation and the creation of new forms of value. It's the dynamic and ongoing process of evolving towards a truly digital enterprise, where digital capabilities are deeply integrated into how the business operates (Gartner, 2022). Expanding on this, IGI Global (2024) defines digitalization as the comprehensive process of making digital everything that can be digitized, encompassing the conversion of information into a digital format to enhance accessibility and connectivity. This perspective underscores the transformative potential of moving from analog to digital. Furthermore, (Riasanow & Chynchyk, 2020) view digitalization, drawing on Clerck's work, as the adoption of digital technologies to not only modify existing business processes but also to forge entirely new ones, ultimately aiming to improve overall business operations and enrich customer interactions. This highlights the proactive and innovative aspect of digitalization. In essence, digitalization signifies a holistic shift, leveraging digital tools and data not just for efficiency gains, but for fundamental changes in how organizations create, deliver, and capture value in an increasingly digital world (Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013)

**Digitization, in the context of public sector workflows**, refers to the process of converting information from analog to digital formats and leveraging digital technologies to streamline processes, enhance efficiency, and improve service delivery (Dunleavy, Margetts, Bastow, & Tinkler, 2010). This encompasses the adoption of various digital tools and platforms to manage information, automate tasks, and facilitate communication (Mergel, Edelmann, & Haug, 2019). Key concepts associated with digitization include automation, data analytics, cloud computing, and digital transformation, which collectively aim to modernize public sector operations (Bannister & Connolly, 2014)

#### 2.1.2- Impact of Digitization on G2C relation:

Digitalization is significantly transforming the relationship between governments and citizens, fostering a more accessible, convenient, and potentially transparent interaction. By breaking down geographical and temporal barriers, digital platforms like government websites, mobile apps, and online portals enable citizens to access public services 24/7 from

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anywhere with internet access (GovPilot, 2023). This eliminates the need for physical visits, reduces frustrating wait times, and streamlines essential processes such as applying for permits, paying bills, and accessing crucial government information (GovPilot, 2023). This enhanced convenience directly contributes to greater citizen satisfaction with public services.

Furthermore, digitalization offers the potential to increase transparency and build trust in government operations. Online portals can provide citizens with real-time tracking of their applications, offer insights into decision-making processes, and even host public consultations, fostering greater visibility (Rocket.Chat, 2023). Open data initiatives, where government data is made publicly available in digital formats, empower citizens, researchers, and businesses to scrutinize government activities, promoting accountability and identifying areas for improvement. This openness can cultivate a stronger sense of trust between the government and the people it serves (Rocket.Chat, 2023).

Moreover, the data collected through digital interactions provides governments with valuable insights into citizen needs and service usage (ICTA , 2024). Analyzing this data allows policymakers and administrators to better understand citizen demands, tailor services more effectively, and make data-driven decisions about resource allocation. This responsiveness can lead to more citizen-centric policies and improved outcomes, strengthening the bond between government and its constituents.

In essence, digitalization in the G2C context aims to create a more direct, efficient, transparent, and responsive relationship. By leveraging digital tools, governments can empower citizens with greater access and information, fostering a more engaged and trusting dynamic. While challenges in ensuring digital inclusivity remain, the potential for a more positive and effective G2C relationship through digitalization is substantial and continues to be a key driver of digital government initiatives globally.

### **2.1.3- Transformative Effects of Digitalization on Public Administration:**

**Efficiency Improvements:** Research suggests that the digitization of employee training can lead to significant efficiency improvements. E-learning platforms and digital training modules offer flexibility in terms of time and location, allowing employees to learn at their own pace and reducing the need for physical classrooms and travel (Ruiz, Mintzer, & Leipzig, 2006). Studies have shown that digital training can reduce training time and costs

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while potentially increasing knowledge retention through interactive and engaging content (Alvarez & Garofano, 2009). For example, a study by Smith (2015) found that organizations implementing online training programs experienced a 25% reduction in training costs compared to traditional methods.

**Enhanced Citizen Access and Satisfaction:** Digitalization breaks down geographical and temporal barriers to accessing public services. Citizens can interact with government agencies through websites, mobile apps, and online portals at their convenience, 24/7, from anywhere with an internet connection (GovPilot, 2023). This eliminates the need for physical visits, reduces wait times, and streamlines processes like applying for permits, paying bills, or accessing information. The result is often a more positive experience for citizens, leading to increased satisfaction with government services (GovPilot, 2023). Think of online tax filing, digital applications for social benefits, or access to government information repositories – these enhance convenience and empower citizens.

**Increased Transparency and Trust:** Digital platforms can make government operations more visible and accountable. Online portals can track the status of applications, provide information on decision-making processes, and even host public consultations (Rocket.Chat, 2023). Open data initiatives, where government data is made publicly available in digital formats, further enhance transparency and allow citizens, researchers, and businesses to scrutinize government activities and identify areas for improvement. This openness can foster greater trust between the government and the populace (Rocket.Chat, 2023).

**Improved Internal Efficiency and Collaboration:** Automating routine tasks through digital workflows significantly boosts efficiency within government agencies (Whatfix, 2023). Processes like data entry, document management, and approvals can be handled electronically, freeing up human resources for more complex and strategic work. Digital communication tools and shared platforms also facilitate seamless collaboration between different government departments and agencies, breaking down silos and enabling more integrated service delivery (WorkPoint 365). For instance, a digital case management system can allow different social service agencies to share relevant information securely, leading to more coordinated support for citizens.

**Potential for Cost Reduction (Long-Term) and Initial Investment:** While the initial costs of implementing digital infrastructure, software, and developing digital content for services and training can be substantial (Phillips, 2007), the long-term benefits often include

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significant cost reductions. E-learning, as mentioned, can reduce expenses associated with physical classrooms, travel, and instructor time (Ruiz, Mintzer, & Leipzig, 2006), Automation of administrative tasks can also lead to lower operational costs. However, a thorough cost-benefit analysis is crucial to understand the return on investment and plan for ongoing maintenance and updates of digital resources (Kirkpatrick & &, 2016).

**Data-Driven Decision Making:** Digitalization enables governments to collect vast amounts of data on service usage, citizen needs, and operational performance (ICTA , 2024). By analyzing this data, policymakers and administrators can gain valuable insights to inform decision-making, allocate resources more effectively, and tailor services to better meet the needs of the population. A data-driven approach can lead to more evidence-based policies and improved outcomes across various sectors. For example, analyzing trends in online service usage can help identify areas where digital infrastructure needs to be strengthened or where new online services are in demand.

**In essence,** digitalization in the public sector is a multifaceted transformation that aims to create a more accessible, transparent, efficient, and responsive government. While challenges related to implementation costs and ensuring inclusivity exist, the potential benefits for both citizens and the government are significant and continue to drive the global trend towards digital governance.

### 2.1.4- Challenges in Digital Adoption globally:

1. **Legacy Systems and Outdated Infrastructure:** Many public sector organizations rely on outdated technological systems that are difficult to integrate with modern digital tools, hindering the adoption of new technologies (KPMG, 2024)
2. **Budget Constraints and Resource Allocation:** Limited financial resources and competing priorities often make it challenging for public sector entities to invest in the necessary technology, software, and infrastructure upgrades for digital transformation (KPMG, 2024).
3. **Resistance to Change and Organizational Culture:** A bureaucratic culture and resistance from employees who are accustomed to traditional processes can significantly slow down the adoption of new digital tools and workflows (Whatfix, 2023).
4. **Digital Skills Gap and Lack of Expertise:** Public sector organizations often face a shortage of employees with the necessary technical skills and knowledge to implement and manage digital transformation initiatives effectively. (KPMG, 2024)

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5. **Data Security and Privacy Concerns:** Governments handle sensitive citizen data, making robust cybersecurity measures and adherence to data privacy regulations critical concerns that can slow down the adoption of cloud-based solutions and other digital platforms. (hartmanadvisors, 2024)
6. **Complex Regulatory Frameworks and Compliance:** The public sector operates within strict legal and regulatory environments, which can make the agile development and deployment of digital solutions challenging and time-consuming. (hartmanadvisors, 2024)
7. **Interoperability Issues and Data Silos:** Fragmented data and a lack of integration between different government departments and systems can impede the effective sharing of information and the delivery of seamless digital services. (Whatfix, 2023)
8. **Lack of a Clear Digital Strategy and Vision:** The absence of a well-defined roadmap and strategic alignment across different government entities can lead to disjointed digital initiatives and unclear objectives, hindering overall adoption. (Govnet.co.uk, 2023)
9. **Bureaucratic Hurdles and Decision-Making Processes:** Cumbersome decision-making processes and bureaucratic red tape can delay the approval and execution of digital transformation projects. (Govnet.co.uk, 2023)
10. **Digital Divide and Inclusivity:** Ensuring that digital services are accessible to all citizens, including those with limited digital literacy or access to technology, <sup>1</sup> remains a significant challenge (ResearchGate, 2025).

### 2.1.5- Global Trends in Digital Transformation :

1. **Mobile-First Strategies:** With the vast majority of the global population owning smartphones, organizations are increasingly prioritizing mobile-first approaches in their web design and customer interaction strategies. (Glimpse, 2025)
2. **Artificial Intelligence (AI) and Machine Learning (ML) Dominance:** AI and ML continue to be central, automating complex workflows and enabling more intelligent decision-making across industries (Veritis, 2025)
3. **Hyper-Personalization through AI:** AI is being leveraged to better localize content and products, offering consumers more tailored and personalized experiences, particularly in e-commerce and increasingly in education (Glimpse, 2025)

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4. **Rise of Automation Technologies:** The expanded use of automation technologies, including Robotic Process Automation (RPA), is a significant trend, streamlining repetitive tasks and freeing up human capital for innovation (Veritis, 2025)
5. **Cloud Computing Adoption:** Effective use of cloud technologies remains a foundational trend, providing scalability, flexibility, and enabling other digital advancements (Veritis, 2025)
6. **Low-Code/No-Code Development:** Platforms empowering teams without deep technical expertise to rapidly develop applications are gaining traction, democratizing software creation (Veritis, 2025)
7. **Enhanced Connectivity with 5G and Beyond:** The mainstreaming of 5G and the anticipation of 6G are revolutionizing communication and data transfer capabilities, enabling new applications and services (Veritis, 2025)
8. **Edge Computing and IoT Expansion:** Processing data closer to the source through edge computing and the growing interconnectedness of devices via the Internet of Things (IoT) are leading to faster response times and greater business reliability (Veritis, 2025)
9. **Generative AI for Content Creation and Interaction:** Generative AI is reshaping how content is created, how companies interact with customers, and even product design, offering new levels of creativity and efficiency (Veritis, 2025)
10. **Emphasis on Cybersecurity:** With increasing digital adoption, ensuring robust cybersecurity and data protection remains a critical and ongoing global trend. (Veritis, 2025)

### 2.1.6- The Algerian reality:

Building upon the global trends, Algeria is also actively pursuing digital transformation within its public sector, albeit with its own specific context, priorities, and challenges. Several aspects characterize the Algerian reality in this domain:

**1. National Digital Transformation Strategy:** Algeria has recognized the importance of digitization and has formulated a national strategy, "Digital Algeria 2030," with a more immediate National Digital Transformation Plan for 2025-2026 (Algeria Invest, 2024). This strategy outlines key pillars such as:

- **Basic Infrastructure Development:** Focus on improving telecommunications infrastructure, including increasing broadband penetration (both fixed and mobile)

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and enhancing internet connectivity across the country (Digital Arabia Network, 2021). There's a push to expand 4G networks and introduce fiber optic services.

- **Human Resources and Digital Skills:** Recognizing the need to develop a digitally skilled workforce through training and education initiatives (Digital Transformation in Algeria: Prospects and Challenges, n.d.).
- **Digital Governance:** Modernizing public administration through the implementation of e-government services, enhancing transparency, and improving citizen interaction with government entities (Hamidani & nadir, 2024) ,The "Bawabatak" platform is a key initiative in this regard (Hamidani & nadir, 2024)
- **Digital Economy:** Fostering the growth of the digital economy by supporting e-commerce, promoting digital payments, and encouraging tech-based startups (Digital Arabia Network, 2021)
- **Digital Society:** Aiming to bridge the digital divide and ensure digital inclusion for all citizens (Mekarssi, 2024)

**2. Focus on Public Service Modernization:** A significant driver of Algeria's digital transformation efforts is the modernization of public services. The government aims to simplify administrative procedures, reduce bureaucracy, and enhance the efficiency and accessibility of services for citizens and businesses. (Algeria Invest, 2024) Over 500 digital projects are reportedly planned for 2025-2026, with a significant focus on improving public service delivery. (Algeria Invest, 2024)

**3. E-government Initiatives:** Several e-government initiatives are underway, including the development of online portals and platforms for accessing public services (ResearchGate, 2024). The introduction of a digital platform for international students wishing to study in Algeria by the Ministry of Higher Education and Scientific Research (Ministry of Higher Education and Scientific Research, 2025) exemplifies this trend within the education sector.

**4. Challenges and Obstacles:** Despite the progress and ambitions, Algeria faces several challenges in its digital transformation journey : (Chaima & Soraya, 2024)

- **Infrastructure Gaps:** While mobile penetration is high, fixed broadband infrastructure needs improvement, and internet speeds can be a constraint (Mekarssi, 2024)
- **Digital Divide:** Disparities in internet access and digital literacy persist, particularly in rural areas (Mekarssi, 2024)

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- **Skills Gap:** A shortage of skilled professionals in digital technologies hinders the implementation and management of digital initiatives (Soltani Ahlem Fadila, s.d.).
  - **Bureaucracy and Resistance to Change:** Traditional bureaucratic processes and resistance to adopting new technologies within public sector organizations can slow down the pace of digital transformation (Chaima & Soraya, 2024)
  - **Regulatory Framework:** The need for a more comprehensive and adaptive legal framework to govern digital activities, ensure cybersecurity, and protect data is recognized as crucial (Soltani Ahlem Fadila, s.d.)
  - **Low Online Payment Penetration:** Despite efforts to promote e-commerce, the adoption of online payment methods remains relatively low. (Digital Arabia Network, 2021)
4. **Progress and Potential:** Despite the challenges, Algeria has shown progress in its digital transformation efforts, as reflected in its improvement in the ICT Development Index (Ecofin Agency, 2024)The strong mobile network infrastructure and a young, tech-savvy population present significant potential for further digital development. (Digital Arabia Network, 2021)

### 2.2- Workflow in public sector:

#### 2.2.1 - Definition and key concepts:

##### a- Definition:

Workflow in the public sector refers to the structured sequence of tasks, activities, and processes undertaken by individuals or teams within government organizations to achieve specific public service goals or outcomes (Axelor & BrightWork, s.d.). It encompasses the movement of information, documents, and tasks through various stages, often involving different departments or stakeholders, guided by established rules, procedures, and regulations (arXiv, 2015)The aim of well-defined workflows in the public sector is to ensure efficiency, accountability, transparency, and effective service delivery to citizens and other stakeholders (Appian, 2024)

##### b- Key Concepts:

- **Tasks and Activities:** These are the individual steps or actions that need to be completed within a workflow, such as reviewing documents, processing applications, or making decisions (Axelor, s.d.)

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- Sequence and Flow: Workflow emphasizes the specific order in which tasks must be performed and how information or items progress from one stage to the next (KYOCERA Document Solutions, s.d.)
- Actors and Roles: Public sector workflows involve various individuals, teams, or departments with defined responsibilities and roles in executing specific tasks. (IBM, 2020)
- Rules and Procedures: Public sector workflows are typically governed by established rules, regulations, and standard operating procedures that dictate how tasks should be performed and decisions should be made. (arXiv, 2015)
- Inputs and Outputs: Each stage of a workflow takes specific inputs (e.g., data, documents, requests) and produces defined outputs (e.g., approvals, decisions, completed services) that feed into subsequent stages or the final outcome.
- Automation: Increasingly, public sector workflows are being automated using digital tools and software to streamline repetitive tasks, improve efficiency, and reduce manual errors
- Efficiency and Optimization: A core goal of managing workflows in the public sector is to optimize processes, reduce bottlenecks, minimize delays, and improve overall efficiency in service delivery (KYOCERA Document Solutions, s.d.)
- Transparency and Accountability: Well-defined and documented workflows enhance transparency by making processes clear and trackable, which in turn supports accountability among those involved (Appian, 2024)
- Citizen-Centricity: Modern approaches to public sector workflow design often prioritize the citizen experience, aiming to create seamless and user-friendly processes for accessing government services (Axelor & BrightWork, s.d.)
- Compliance and Auditability: Public sector workflows must often incorporate compliance checks and maintain audit trails to ensure adherence to legal and regulatory requirements (Appian, 2024)

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### 2.2.1 - Trends in public sector globally :

- 1- Increased Focus on Citizen-Centricity: Public sector organizations are increasingly prioritizing the needs and experiences of citizens in the design and delivery of services, moving towards more user-friendly and accessible approaches (Brady Martz, 2025) (Columbia Southern University, 2022)
- 2- Emphasis on Data-Driven Decision Making: Governments are recognizing the value of data analytics to inform policy development, resource allocation, and performance management, leading to more evidence-based governance (McKinsey, 2015)
- 3- Growing Importance of Cybersecurity: With the increasing reliance on digital systems and the vast amounts of sensitive data held by governments, robust cybersecurity measures and data protection are becoming paramount (Brady Martz, 2025) (Columbia Southern University, 2022)
- 4- Adapting to Workforce Transitions: Public sector agencies are facing challenges related to an aging workforce, talent shortages, and evolving employee expectations, necessitating strategies for succession planning, recruitment, and flexible work arrangements (McKinsey, 2015)
- 5- Demand for Greater Financial Transparency and Accountability: Citizens and stakeholders are increasingly expecting clear and timely reporting on the use of public funds, pushing governments to enhance financial transparency and accountability mechanisms. (Brady Martz, 2025)
- 6- Increased Collaboration and Partnerships: Governments are increasingly collaborating with other public sector entities, private organizations, and non-governmental organizations to address complex societal challenges and deliver integrated services (Santos., 2023)
- 7- Focus on Efficiency and Productivity Improvement: There's a continuing drive to enhance the efficiency and productivity of public services through process optimization, technology adoption (including digitalization, but not limited to it), and better resource management (Currstine, 2013)
- 8- Addressing Diversity, Equity, and Inclusion (DEI): Public sector organizations are increasingly focusing on ensuring equitable access to services and promoting diversity and inclusion within their workforce and policies (Columbia Southern University, 2022)

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9- Emphasis on Long-Term Planning and Sustainability: Governments are recognizing the need to address long-term challenges like climate change and demographic shifts through strategic and sustainable planning initiatives. (McKinsey, 2015)

10- Evolving Governance Models: There's a shift towards more interactive and collaborative forms of governance, including greater citizen engagement in policy development and service design

**CHAPTER II :**  
**Methodological Framework**  
**And**  
**Host Organization**

## **CHAPTER II : Methodological Framework & Host Org**

This chapter outlines information's about the host organization and the methodological approach employed to investigate the digitization on workflow within the Employee Training Sub-Department of the Ministry of Higher Education. Given the research objectives, which aim to understand the nuances of this impact, explore employee perceptions, and identify implementation challenges, a qualitative research design utilizing semi-structured interviews and document analysis from the Ministry will be adopted.

### **Section 1: host organization “ministry of higher education and scientific research”:**

#### **1.1- Origin and Definition of the Ministry of Higher Education and Scientific Research:**

Since independence, the Ministry of Higher Education and Scientific Research has seen significant development due to political and constitutional changes in the Algerian system. Initially, it was under the supervision of the Ministry of National Education, based on the colonial legacy aimed at meeting classical demands. At that time, it was one of five educational directorates, managed under the Directorate of Higher Education, focusing on:

- Organizing and managing the higher education system
- Coordinating various academic affairs

In early 1971, a university familiarization program was introduced, allowing the promotion of higher education directors within the Ministry of National Education to a separate Ministry called the Ministry of Higher Education and Scientific Research, under Decree No. 71-15 dated January 20, 1971, which organized the central administrative structures.

From 1975 to 1985, the ministry underwent structural and functional reorganizations. In 1990, the scientific sector was placed under the Presidency and named the Ministry Delegate for Research and Technology. In 1992, it was renamed the Ministry of Universities, and in 1993 it became the State Secretariat for Higher Education and Scientific Research. By 1994, it officially became the Ministry of Higher Education and Scientific Research with ten directorates. In 1995, it was divided into six directorates and 19 sub-directorates; by 2003, there were nine directorates and 29 sub-directorates. This structure continued to evolve until

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the issuance of Executive Decree No. 21-134 dated April 7, 2021, which currently defines the structure as 10 directorates and 38 sub-directorates, still in effect today.

Second: Definition of the Ministry of Higher Education and Scientific Research

It is a public administrative body under the government, non-profit in nature, concerned with post-baccalaureate education and higher training across various fields to develop cultural standards and prepare competent national cadres.

It derives its legal framework from the civil service system to which it belongs. Given its nature, its relationship with other ministries is complementary, especially with the Ministry of Finance and Ministry of Labor, as it plays a major role in training personnel for other ministries.

The ministry is located in Ben Aknoun, opposite the National Institute of Statistics and Applied Economics, at "11 Doudou Mokhtar Street - Ben Aknoun - ITFC".

### **1.2- Functions of the Ministry of Higher Education and Scientific Research:**

1) In the Pedagogical Field:

- Define the pedagogical requirements for university admission at various levels (Bachelor's, Master's, Doctorate).
- Set initial higher education curricula for all universities, national institutes, and schools.
- Determine the conditions for progression from one academic year to another and the evaluation system.
- Specify the types of higher education disciplines, curriculum content, methods of knowledge assessment, admission and progression conditions, the nature of degrees, and issuance criteria.
- Propose and implement a university orientation system to help students choose their academic paths based on their qualifications and results, supported by comprehensive information about the needs and expected developments in various political, economic, social, and cultural sectors.
- Establish the study system, student rights, and duties within higher education institutions.

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- Represent the higher education and scientific research sector in international institutions.
- Award and oversee university degrees.
- Define the recruitment criteria for university professors.

### 2) In the Field of Research:

- Develop and propose strategies aimed at advancing research and training within the university system.
- Conduct supervisory studies to contribute to the enhancement and development of production techniques and methods.
- Adapt the higher education system to technological developments in information and communication.

### 3) In the Social and Cultural Field:

- Provide student support in terms of housing, meals, transportation, scholarships, and healthcare through the National Office for University Services.
- Make publications and books available by printing and distributing them through the University Press Office for the benefit of the academic community.

### 4) In the Administrative and Regulatory Field:

- Submit reports on the ministry's outcomes to the Prime Minister, National Council, and Council of Ministers according to the specified formats, procedures, and deadlines.
- Define the basic regulations for higher education teaching staff, including establishment and operation conditions.
- Establish the general statute for educators, including training, recruitment, and career advancement provisions.
- Propose long-, medium-, and short-term development plans for higher education.
- Oversee the expansion of the public higher education network across the national territory in line with the government's urban planning goals and equal access to higher education.

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- Standardize institutional efforts toward meeting priority needs in economic and social development.
- Ensure the application of legal and regulatory provisions related to safety, work, and study standards in higher education institutions.
- Take measures to ensure proper maintenance of infrastructure, equipment, and facilities and ensure their implementation.
- Set the infrastructure and equipment standards in higher education institutions in alignment with the national standardization system.
- Oversee the development of human resources within the ministry's institutions.
- Develop training plans for administrative and technical personnel and take all necessary implementation measures.

### **1.3- Objectives of the Ministry of Higher Education and Scientific Research:**

The ministry has several key objectives, including:

- Developing the educational system at the university level.
- Establishing a comprehensive and complete university system.
- Conducting future-oriented studies related to the development of educational activities.
- Expanding public higher education institutions across the national territory in alignment with the government's goals.
- Aligning higher education output with the requirements of the national labor market.
- Building a diverse documentary resource base accessible to students and researchers.
- Promoting a culture of research and innovation.

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### **1.4- Organizational Structure of the Ministry of Higher Education and Scientific Research:**

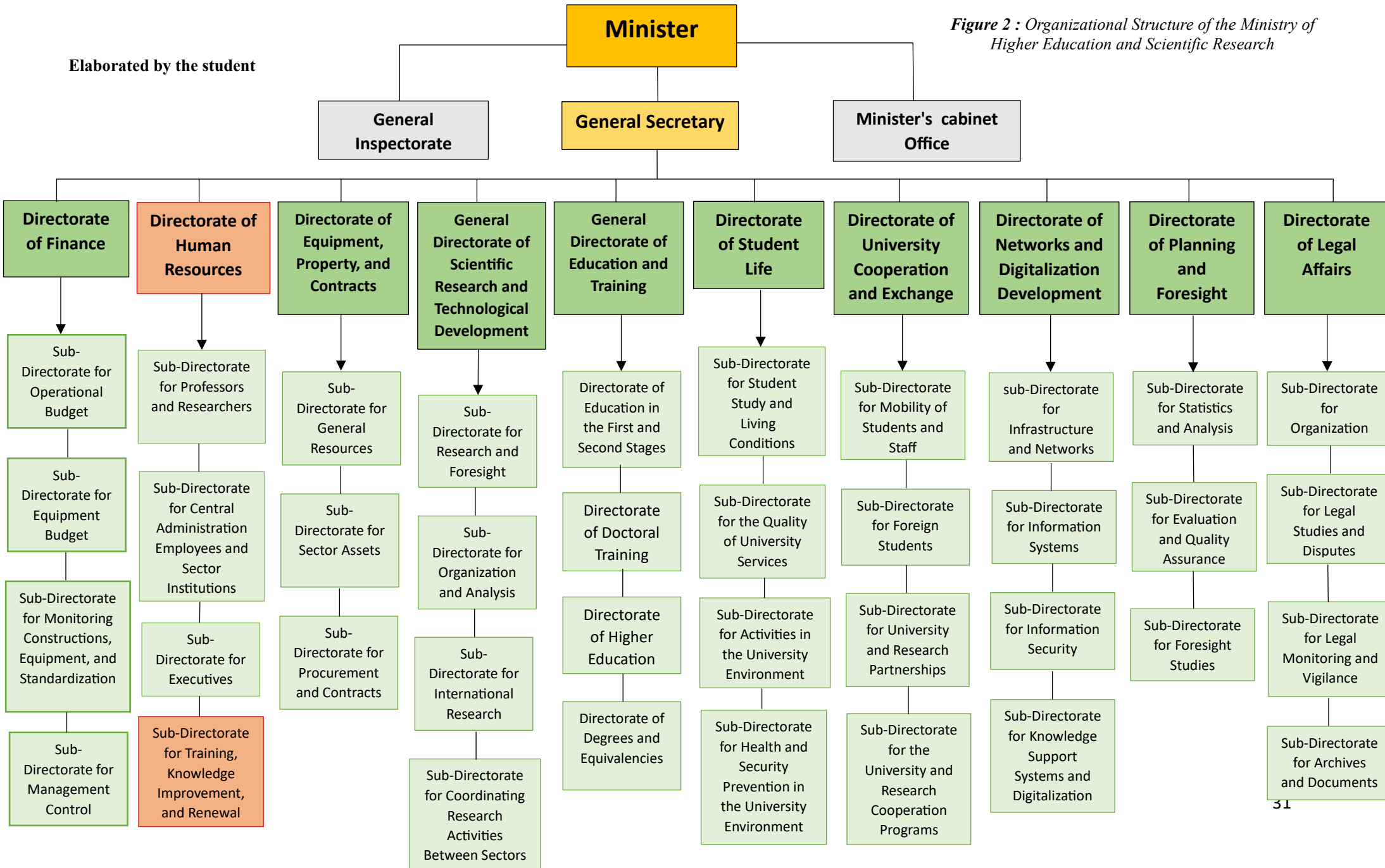
The ministry operates under a stable and comprehensive organizational structure. This structure clearly defines the roles of all internal directorates, decision-making hierarchies, and authority lines.

It reflects the ministry's organizational objectives, determined by the specific duties of various directorates and departments. These tasks aim to ensure efficiency and harmony among staff based on their qualifications, academic expertise, and skills. Experience also plays a major role in fostering organizational values that reinforce rational organization and management, both internally and externally.

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*Figure 2 : Organizational Structure of the Ministry of Higher Education and Scientific Research*

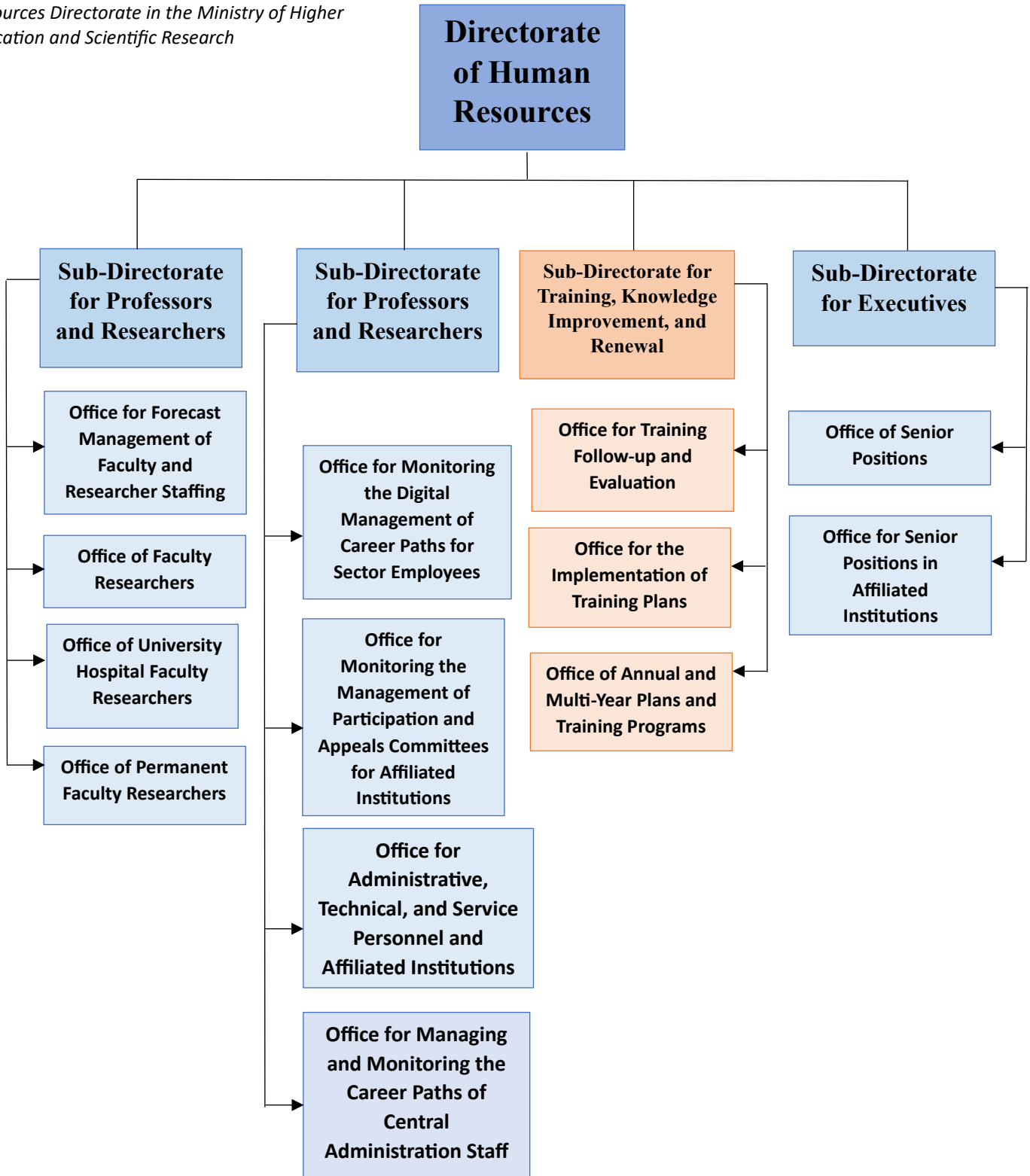
Elaborated by the student



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### 1.5- Organizational Structure of the Human Resources Directorate in the Ministry of Higher Education and Scientific Research

**Figure 3:** Organizational Structure of the Human Resources Directorate in the Ministry of Higher Education and Scientific Research



Elaborated by the student

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### **1.6- Analysis of the Organizational Structure of the Directorate of Human Resources:**

The Directorate of Human Resources includes four (4) sub-directorates:

#### **1. Sub-Directorate of Professors and Researchers**

Responsibilities include:

- Implementing the employment policy for teaching and hospital-university researchers and permanent researchers.
- Evaluating human resource management operations related to academic and research personnel conducted by higher education and scientific research institutions.
- Preparing policies for allocating financial positions and determining staff counts for teaching and hospital-university researchers and permanent researchers, in coordination with the General Directorate of Education and Training and the General Directorate of Scientific Research and Technological Development.
- Defining promotion criteria for researchers and hospital-university researchers and permanent researchers, also in coordination with the relevant general directorates.
- Ensuring the functioning of evaluation bodies responsible for researcher promotion and serving as their secretariat.
- Following up on any disputes related to the professional paths of teaching staff and researchers, in coordination with concerned bodies.
- Employing foreign professors and researchers and monitoring their professional paths.
- Activating the sector-wide competency database for professors and researchers.
- Activating an automated system for managing financial positions and the mobility and career progression of professors and researchers in coordination with relevant structures.

#### **2. Sub-Directorate of Central Administration and Sector Institutions Personnel**

Responsibilities include:

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- Overseeing the implementation of legislative and regulatory provisions governing the career paths of administrative and technical staff and contract agents within the sector's institutions.
- Assisting supervised institutions in managing their personnel and ensuring follow-up.
- Managing the career paths of central administration personnel.
- Participating in the development of digital career management systems for sector employees, in coordination with the relevant entity.
- Drafting legal texts determining the composition of parity committees specialized in managing sector personnel, as well as social service committees.
- Organizing meetings of appeal committees relevant to sector employees and acting as their secretariat.

### **3. Sub-Directorate of Executives**

Responsibilities include:

- Proposing criteria for the appointment to senior positions and functions within the sector.
- Preparing the sectoral record of senior positions and ensuring their legal occupation.
- Monitoring procedures related to appointments to senior positions at the level of the central administration and sector institutions.
- Ensuring follow-up on the career paths of high-ranking executives in the sector.
- Proposing indicators and standards for evaluating executive performance.
- Preparing an annual analytical report on various data concerning executives.

### **4. Sub-Directorate for Training, Skills Improvement, and Knowledge Renewal**

Responsibilities include:

- Collecting data to define sectoral training and knowledge renewal guidelines for employees.

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- Assisting supervised institutions in developing their training and development plans and ensuring follow-up.
- Implementing training and knowledge renewal plans for central administration staff and evaluating their effectiveness.
- Preparing annual reports for quantitative and qualitative evaluation of training and development activities at the sector level.

Drafting all legal texts related to specialized training and the framework for organizing professional exams and competitions for sector employees.

### Section 2: Methodological framework:

#### 2.1- Research Design: Qualitative Case Study

This research will employ a **qualitative case study design**. A case study approach is particularly suitable for in-depth exploration of a specific phenomenon within its real-world context (Yin, 2018)The Employee Training Sub-Department within the Ministry of Higher Education serves as the bounded system of analysis, allowing for a rich and detailed understanding of the digitization process and its consequences within this specific setting. A qualitative approach is chosen to capture the lived experiences, perspectives, and meanings attributed by individuals involved in the digitization process, providing a deeper understanding of the "how" and "why" behind the observed impacts (Creswell & Poth, 2018).

#### 2.2- Data Collection Methods:

This study will utilize three primary data collection methods to gather comprehensive information: semi-structured interviews, document analysis and non-participant observation.

##### 2.2.1 - Semi-Structured Interviews:

**Participants:** The primary source of data will be semi-structured interviews conducted with key stakeholders within the Employee Training Sub-Department. This will include:

1. **Simple Employees:** Individuals directly involved in and/or receiving employee training. Their firsthand experiences with any changes to the training process, their interaction with digital tools, and their perceptions of the impact on their learning and workflow will be essential.

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2. **Office Heads:** Individuals in leadership positions overseeing specific units or teams within the Employee Training Sub-Department. Their insights into the organizational impact of digitization on their teams' workflows, efficiency, and overall performance will be valuable.
3. **Director:** The individual holding the highest leadership position within the Employee Training Sub-Department. Their strategic overview of the digitization initiative, its goals, perceived successes and challenges, and future direction will provide a high-level perspective.
4. **IT Manager/Developer:** The individual or lead of the team responsible for the development, implementation, maintenance, and technical support of the digital training platforms and tools. Their expertise on the technical aspects, implementation process, system performance, and any technical challenges encountered will offer a crucial technical dimension to the study.

**Procedure:** Semi-structured interviews will be conducted using an interview guide with open-ended questions. This approach allows for flexibility in exploring participants' experiences and perspectives in detail while ensuring that key areas related to the research questions are covered. (Rubin & Rubin, 2012)The interview guide will be developed based on the research questions and the theoretical framework, focusing on:

- Experiences with workflow before and after digitization.
- Perceptions of the digital training tools implemented (e.g., perceived usefulness, ease of use).
- Observed benefits and drawbacks of digitization.
- Challenges encountered during the implementation and use of digital tools.
- Suggestions for improvement and future considerations.

Interviews will be conducted face-to-face, where feasible, to facilitate rapport and allow for observation of non-verbal cues. With the participants' consent, interviews will be audio-recorded to ensure accurate transcription and detailed analysis. Each interview is anticipated to last between 45 minutes to 1 hour.

**Sampling Strategy:** A **purposive sampling** strategy will be employed to select participants who possess relevant knowledge and experience related to the digitization of employee

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training within the sub-department (Patton, 2015)The aim is to obtain a diverse range of perspectives from individuals in different roles and with varying levels of experience with the digital tools. Initial contact will be made through relevant departmental heads to identify and recruit potential participants. The sample size will be determined by the principle of **data saturation**, where data collection continues until no new significant themes or insights emerge from the interviews (Guest & Bunce, 2006)It is anticipated that 5 interviews will be conducted to reach saturation.

### 2.2.2- Ministry Documents :

In addition to interviews, relevant documents from the Ministry of Higher Education will be analyzed to provide contextual information and corroborate the interview data. These documents may include:

- Strategic plans and reports related to digitization and employee training.
- Policy documents and guidelines on the implementation of digital tools.
- Records and reports on training activities and workflow processes (both pre- and post-digitization).
- Internal communications and memos related to the digitization initiatives.
- Technical documentation related to the digital training platforms and tools.

**Procedure:** Document analysis will involve systematically reviewing these materials to identify key themes, patterns, and information relevant to the research questions. This will involve techniques such as content analysis to identify recurring themes and narrative analysis to understand how digitization is portrayed and discussed within the organizational context (Braun & Clarke, 2006)

### 2.2.3- Non-Participant Observation :

**Purpose:** Non-participant observation will be employed to gain a firsthand understanding of the actual workflow processes within the Employee Training Sub-Department, particularly after the implementation of digital tools. This method allows the researcher to observe behaviors, interactions, and the physical environment without directly participating in the activities being observed (Kawulich, 2005)Observation can provide valuable contextual data and help to corroborate or challenge information gathered through interviews and document analysis. (Creswell & Poth, 2018) It can reveal nuances in how digital tools

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are actually being used in practice and identify potential discrepancies between stated procedures and actual workflows.

**Procedure:** Observations will be conducted in relevant settings within the Employee Training Sub-Department, such as training rooms, administrative offices, and areas where staff utilize digital training platforms or manage digital records. The focus of the observations will be on:

- **How digital tools are integrated into daily workflow:** Observing how employees interact with the new software, hardware, and online platforms.
- **Communication patterns:** Noting how digitization has affected communication among staff, between staff and trainees, and with other departments.
- **Use of physical space and resources:** Observing any changes in the use of physical documents, filing systems, and training facilities as a result of digitization.
- **Challenges and inefficiencies:** Identifying any apparent difficulties or bottlenecks in the workflow related to the use of digital tools.
- **Informal interactions and workarounds:** Observing any informal practices or alternative methods employees have developed in response to the digital systems.

Detailed field notes will be taken during and immediately after each observation session. These notes will be descriptive, capturing specific details about the environment, activities, interactions, and any notable observations related to the research questions. Where appropriate and with prior permission, photographs or brief video recordings (focused on processes, not individuals) might be used to supplement the field notes, ensuring ethical considerations regarding privacy are strictly adhered to.

**Sampling Strategy:** Observation sessions will be strategically planned to capture a range of activities and times within the sub-department. This might involve observing different teams, various stages of the training process, and different times of the day. The duration and frequency of observation sessions will be determined based on access and the ongoing data collection and analysis, aiming to provide a comprehensive picture of the digitized workflow. The goal is to observe typical routines and any variations that might provide insights into the impact of digitization.

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**Integration with Other Methods:** Data from the non-participant observations will be analyzed in conjunction with the interview transcripts and Ministry documents. This triangulation of data sources will enhance the credibility and trustworthiness of the findings, providing a more holistic understanding of the impact of digitization on workflow. For example, observations of how employees navigate a new digital platform can provide context for interview responses about its ease of use, and discrepancies between documented procedures and observed practices can highlight implementation challenges

### **Ethical Considerations Specific to Observation:**

- **Transparency:** While non-participant, the researcher will be transparent with the relevant departmental heads about the purpose and scope of the observations.
- **Minimizing Intrusion:** Efforts will be made to be as unobtrusive as possible during observation sessions to minimize any impact on the normal workflow and behavior of the staff.
- **Privacy:** Care will be taken to avoid focusing on or recording any sensitive personal information or activities unrelated to the research focus. Any visual documentation will be carefully managed to protect the privacy of individuals.

By incorporating non-participant observation, this research will gain a richer, more contextualized understanding of how digitization is affecting the daily realities of workflow within the Employee Training Sub-Department, complementing the insights gained from interviews and document analysis.

### **2.3- Data Analysis :**

The qualitative data collected from the interviews and will be analyzed using **thematic analysis**. (Braun & Clarke, 2006) This involves the following steps:

1. **Transcription:** Audio-recorded interviews will be transcribed verbatim to create a written record of the data.
2. **Familiarization:** The researcher will become deeply familiar with the data by reading and re-reading the transcripts and reviewing the documents.
3. **Initial Coding:** Meaningful segments of the data will be identified and assigned initial codes that capture their essence. This will be an inductive process, allowing themes to emerge from the data itself.

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4. **Searching for Themes:** The initial codes will be examined and grouped together based on similarities and differences to identify broader themes related to the impact of digitization on workflow, employee perceptions, and implementation challenges.
5. **Reviewing Themes:** The identified themes will be reviewed and refined to ensure they are coherent, distinct, and accurately reflect the data.
6. **Defining and Naming Themes:** Clear definitions and descriptive names will be developed for each theme.
7. **Producing the Report:** The final stage involves writing up the findings, supported by illustrative quotes from the interview transcripts and evidence from the document analysis.

The document data will be analyzed in conjunction with the interview data to triangulate findings and provide a richer understanding of the research topic. NVivo or similar qualitative data analysis software may be used to assist with the organization and coding of the data.

### 2.4- Ethical Considerations :

Ethical considerations will be paramount throughout the research process. The following measures will be taken:

- **Informed Consent:** Participants will be fully informed about the purpose of the research, the data collection methods, their right to withdraw at any time, and the measures taken to ensure their anonymity and confidentiality. Written consent will be obtained before conducting any interviews.
- **Anonymity and Confidentiality:** All data will be anonymized, and any identifying information will be removed during transcription and analysis. Confidentiality will be maintained in the storage and reporting of the data.
- **Voluntary Participation:** Participation in the study will be entirely voluntary, and participants will be assured that their decision to participate or not will not have any negative consequences.
- **Data Security:** All collected data (transcripts, and documents) will be stored securely and accessed only by the researcher.
- **Institutional Approval:** Approval from the relevant ethical review board or authorities within the researcher's institution will be sought before commencing data collection. Permission to access Ministry documents and conduct interviews within the Ministry will also be formally obtained through the appropriate channels.

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By adhering to these ethical principles and employing rigorous qualitative methods, this research aims to provide valuable insights into the impact of digitization on workflow within the Employee Training Sub-Department of the Ministry of Higher Education in Algeria.



**CHAPTER III:  
Results and Discussion**

This chapter presents a comprehensive analysis of the findings obtained from the semi-structured interviews conducted with key stakeholders within the Employee Training Sub-Department of the Ministry of Higher Education. Building upon the conceptual framework established in the preceding chapter, which explored the theoretical underpinnings of digitalization and its impact on public sector workflows, this chapter directly addresses the central research problem: "How has the adoption of digitization impacted workflow efficiency and employee adaptation in the Employee Training Sub-Department of the Ministry of Higher Education, and what key barriers hinder its optimal implementation?"

### **Section1: Initial Results :**

The subsequent sections will systematically present the results organized around the key themes identified through the qualitative analysis of the interview data in NVivo. For each theme, illustrative quotes and patterns will be presented, followed by a thorough discussion that interprets these findings in relation to the research questions. This chapter will not only detail the perceived changes in workflow efficiency and employee adaptation following the implementation of digital tools but will also critically examine the barriers that have impeded a more seamless and comprehensive digital transformation within the sub-department. By providing a detailed account and interpretation of the empirical data, this chapter aims to offer valuable insights into the practical realities of digitalization within the specific context of the Algerian Ministry of Higher Education's employee training processes.

#### **1.1- Settings :**

To ensure a comprehensive understanding of the impact of digitization on employee training, the interviewees were strategically selected to represent a range of positions within the Employee Training Sub-Department of the Ministry of Higher Education. This purposeful sampling aimed to capture diverse perspectives, from those directly involved in daily training tasks to those responsible for overseeing and managing training initiatives. The participants included employee, office heads, IT Manager, and a Director, allowing for a holistic view of how digitization affects various levels of responsibility and decision-making within the department. The following table provides an overview of the interviewees' general information, including their occupation, years of experience, and degree, further illustrating the breadth of experience and expertise contributing to this research

## 1.2- Analysis :

Following the first step of reflexive thematic analysis, the researcher familiarized with the data by transcribing the interview transcripts. After completing the transcription process, the researcher took time to read through the interview transcripts to get a general understanding of the information provided by the interviewees.

After familiarizing with the data, the researcher proceeded to the second step of reflexive thematic analysis, which is generating initial codes. The initial codes generated in Nvivo 15 are shown in the table below.

*Tableau 2: The initial codes table*

<b>Name</b>	<b>Files</b>	<b>References</b>
Manual Tasks	1	1
Time-Intensive Operations	2	3
Resource-Intensive Operations	1	1
Logistical Challenges	1	1
Document Management Issues	2	2
Digital Information Exchange	1	1
Digital Document Handling	1	2
Automation	2	2
Expedited Communication and Feedback	1	1
Enhanced Data Accessibility and Searchability	2	2
Streamlined Framework	1	1
Partial Digital Integration	1	3
Fundamental Transformation	1	1
Increased Efficiency	3	4
Time Savings	2	3
Reduced Errors	1	1
Improved Accessibility	2	2
Streamlined Workflows	1	1

Enhanced Data Handling	1	3
Connectivity Issues	2	2
Infrastructure Limitations	1	1
Adoption Difficulties	2	2
Digital Literacy Concerns	1	1
Information Quality	1	1
Support Issues	1	2
Increased Workload	1	1
Efficiency Gains	3	5
Streamlining	3	4
Automation	1	2
Improved Data Analysis	1	1
Enhanced Data Visibility and Measurability	1	3
Data-Driven Approach	1	1
Infrastructure Limitations	1	1
Connectivity Problems	2	2
Digital Literacy Gaps	1	1
Resistance to Change	1	1
Support Deficiencies	1	3
Information Quality Issues	1	1
Need for Upgrades	1	1
Initial Support	2	2
Ongoing Support	2	4
Overall Effectiveness	1	1
Adequacy	1	1

Support for External Stakeholders	1	2
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Elaborated by the student

After the initial codes had been generated, the researcher took time to review the codes and explore any emerging patterns and relationships in the codes. Related codes were subsequently grouped together to generate initial themes, which represented the third step of the reflexive thematic analysis process. The fourth step of reflexive thematic analysis included reviewing the initial themes and revising the themes in a way that they answered the research questions related to the study. The fifth step of the reflexive thematic analysis process included coming up with the final names of every theme in a way that related to the research questions and the research objectives. The final themes that emerged in the research are shown in the table below.

*Tableau 3: General themes list*

Name	Files	References
Theme 1. The Digital Transformation of Employee Training Workflows	3	21
Theme 2. Impact of Digitization on Efficiency and Productivity	3	49
Theme 3. Barriers and Facilitators to Digital Adoption	3	20
Theme 4. The Role of Support and Training in Digital Implementation	3	10
Theme 5. Data and Decision-Making in the Digital Era	3	39

Elaborated by the student

The sixth and final stage of the reflexive thematic analysis process involved producing the report. The report represented the different codes and how they came together to form themes that answered the research questions posed in the study. The report also included excerpts representing the statements of different interviewed participants as evidence of different codes and themes. The table below shows the final codes and themes.

*Tableau 4: detailed themes content*

<b>Name</b>	<b>Files</b>	<b>References</b>
<b>Theme 1. The Digital Transformation of Employee Training Workflows</b>	<b>3</b>	<b>21</b>
A1. Pre-Digitization Processes	2	8
A1.1. Manual Tasks	1	1
A1.2. Time-Intensive Operations	2	3
A1.3. Resource-Intensive Operations	1	1
A1.4. Logistical Challenges	1	1
A1.5. Document Management Issues	2	2
A2. Post-Digitization Processes	2	9
A2.1. Digital Information Exchange	1	1
A2.2. Digital Document Handling	1	2
A2.3. Automation	2	2
A2.4. Expedited Communication and Feedback	1	1
A2.5. Enhanced Data Accessibility and Searchability	2	2
A2.6. Streamlined Framework	1	1
A3. Degree of Digital Integration	2	4
A3.1. Partial Digital Integration	1	3
A3.2. Fundamental Transformation	1	1
<b>Theme 2. Impact of Digitization on Efficiency and Productivity</b>	<b>3</b>	<b>49</b>
A2. Post-Digitization Processes	2	9
A2.1. Digital Information Exchange	1	1
A2.2. Digital Document Handling	1	2
A2.3. Automation	2	2
A2.4. Expedited Communication and Feedback	1	1
A2.5. Enhanced Data Accessibility and Searchability	2	2
A2.6. Streamlined Framework	1	1
B1. Positive Impacts	3	14
B1.1. Increased Efficiency	3	4
B1.2. Time Savings	2	3
B1.3. Reduced Errors	1	1
B1.4. Improved Accessibility	2	2

B1.5. Streamlined Workflows	1	1
B1.6. Enhanced Data Handling	1	3
B2. Negative Impacts or Challenges	3	10
B2.1. Connectivity Issues	2	2
B2.2. Infrastructure Limitations	1	1
B2.3. Adoption Difficulties	2	2
B2.4. Digital Literacy Concerns	1	1
B2.5. Information Quality	1	1
B2.6. Support Issues	1	2
B2.7. Increased Workload	1	1
C1. Enabling Factors	3	16
C1.1. Efficiency Gains	3	5
C1.2. Streamlining	3	4
C1.3. Automation	1	2
C1.4. Improved Data Analysis	1	1
C1.5. Enhanced Data Visibility and Measurability	1	3
C1.6. Data-Driven Approach	1	1
<b>Theme 3. Barriers and Facilitators to Digital Adoption</b>	<b>3</b>	<b>20</b>
B2. Negative Impacts or Challenges	3	10
B2.1. Connectivity Issues	2	2
B2.2. Infrastructure Limitations	1	1
B2.3. Adoption Difficulties	2	2
B2.4. Digital Literacy Concerns	1	1
B2.5. Information Quality	1	1
B2.6. Support Issues	1	2
B2.7. Increased Workload	1	1
C2. Hindering Factors	3	10
C2.1. Infrastructure Limitations	1	1
C2.2. Connectivity Problems	2	2
C2.3. Digital Literacy Gaps	1	1
C2.4. Resistance to Change	1	1
C2.5. Support Deficiencies	1	3
C2.6. Information Quality Issues	1	1

C2.7. Need for Upgrades	1	1
<b>Theme 4. The Role of Support and Training in Digital Implementation</b>	<b>3</b>	<b>10</b>
D1. Support Provided	2	6
D1.1. Initial Support	2	2
D1.2. Ongoing Support	2	4
D2. Support Evaluation	1	4
D2.1. Overall Effectiveness	1	1
D2.2. Adequacy	1	1
D2.3. Support for External Stakeholders	1	2
<b>Theme 5. Data and Decision-Making in the Digital Era</b>	<b>3</b>	<b>39</b>
A2. Post-Digitization Processes	2	9
A2.1. Digital Information Exchange	1	1
A2.2. Digital Document Handling	1	2
A2.3. Automation	2	2
A2.4. Expedited Communication and Feedback	1	1
A2.5. Enhanced Data Accessibility and Searchability	2	2
A2.6. Streamlined Framework	1	1
B1. Positive Impacts	3	14
B1.1. Increased Efficiency	3	4
B1.2. Time Savings	2	3
B1.3. Reduced Errors	1	1
B1.4. Improved Accessibility	2	2
B1.5. Streamlined Workflows	1	1
B1.6. Enhanced Data Handling	1	3
C1. Enabling Factors	3	16
C1.1. Efficiency Gains	3	5
C1.2. Streamlining	3	4
C1.3. Automation	1	2
C1.4. Improved Data Analysis	1	1
C1.5. Enhanced Data Visibility and Measurability	1	3
C1.6. Data-Driven Approach	1	1

Elaborated by the student

## **1.2.1- Theme 1: The Digital Transformation of Employee Training Workflows**

### **Introduction :**

This section presents the findings related to the theme of "The Digital Transformation of Employee Training Workflows," which primarily addresses Research Question 1: "How has digitization improved workflow efficiency in employee training?" This theme explores the changes in employee training processes before and after the adoption of digital tools, focusing on the extent and nature of the transformation.

### **Findings :**

The data reveals a significant shift in workflows following the introduction of digital tools, although the extent of this transformation varies.

#### **1- Pre-Digitization Processes:**

Participants consistently described pre-digitization workflows as heavily reliant on manual processes. These included tasks such as physical report exchange, laborious paper review, and manual data analysis. Logistical challenges, like material distribution and attendance tracking, were also reported as time-consuming.

Mrs Meriem emphasized the time-intensive nature of these operations, stating that the workflow was "heavily reliant on time-consuming and resource-intensive manual processes".

Furthermore, challenges in physical document management and prolonged feedback loops were identified as key characteristics of the pre-digitization era.

#### **2- Post-Digitization Processes:**

In contrast, the introduction of digital tools has enabled streamlined digital information exchange, efficient digital document review, and automated data analysis.

Participants also highlighted the benefits of expedited communication and feedback, improved digital archiving, and enhanced accessibility and searchability of data.

The adoption of computer-based systems has specifically improved the speed and efficiency of tasks like trainee registration, learning material distribution, and attendance tracking.

### **Extent of Transformation:**

While the overall trend indicates a move towards digitization, the data suggests that the transformation is not always complete. Some participants noted that the introduction of digital tools has offered help, but a significant portion of their work remains non-digital.

This has resulted in a partial transformation of workflows, with limited efficiency gains in some cases.

However, other interviewees emphasized the fundamental nature of the change, stating that digital tools have "fundamentally transformed the workflow".

### **Discussion :**

The findings indicate that digitization has brought about significant changes in employee training workflows. The shift from manual and paper-based processes to digital tools has streamlined information exchange, document handling, and data analysis. This aligns with the broader literature on the benefits of digitization in increasing efficiency and reducing time-intensive tasks.

However, the data also highlights that the transformation is not uniform across all areas. The persistence of partial digital integration suggests that there are ongoing challenges in fully adopting digital tools. This could be due to factors such as infrastructure limitations, resistance to change, or varying levels of digital literacy among employees.

The varied experiences of participants, with some reporting a partial transformation and others a fundamental change, underscore the importance of considering the specific context and the degree to which digital tools have been implemented in different roles and departments.

Further analysis is needed to explore the factors that facilitate or hinder the complete digitization of workflows and to understand the implications of partial digitization for overall efficiency and employee satisfaction.

## **1.2.2- Theme 2: Perceived Impacts of Digitization**

### **Introduction :**

This section presents the findings related to the theme of "Perceived Impacts of Digitization," which primarily addresses Research Question 2: "What are the key benefits and drawbacks of digital training tools?" This theme explores the positive and negative effects of digital

tools on employees' work experiences and the overall functioning of the Employee Training Sub-Department.

### **Findings :**

The interview data reveals a range of perceived impacts from the adoption of digital tools, encompassing both benefits and challenges.

### **Positive Impacts :**

Participants frequently highlighted the increased efficiency brought about by digitization. Digital tools were seen as streamlining work, automating manual tasks, and leading to faster processes.

For example, Mrs kioua stated that "Digital tools significantly streamlined work by automating manual tasks, leading to faster processes and fewer errors".

Time savings were another significant benefit, with employees reporting a reduction in the time required for various tasks and the elimination of time previously spent searching for documents.

As Mrs Meriem noted, "Accessing necessary information is now quicker and more convenient, saving time previously spent searching for documents...".

Improved accessibility of information was also emphasized, with digital tools revolutionizing how employees retrieve and utilize data.

IT Manager described this as "Information accessibility was revolutionized, allowing for easy and immediate retrieval of necessary data, improving responsiveness and efficiency".

Furthermore, participants perceived that digitization enhanced data handling capabilities, providing for enhanced measurability of data and enabling a more data-driven approach to training.

### **Negative Impacts/Challenges**

Despite the benefits, participants also identified several challenges associated with digitization.

Connectivity issues and infrastructure limitations were frequently cited as hindering consistent access and full utilization of digital platforms.

For instance, Mrs hamadi mentioned "Unreliable internet connectivity sometimes and limitations in existing infrastructure" as a problem.

Adoption difficulties, particularly in achieving widespread and consistent use of digital tools by supervised institutions, were a recurring concern.

Participants noted the difficulty in "Communicating the use and benefits of new digital tools to supervised institutions".

Digital literacy concerns among external stakeholders were also raised as a barrier to effective implementation.

Information quality, specifically the accuracy and timeliness of information received from external users, was identified as a challenge.

Support issues, including inadequate support for both internal staff and external stakeholders, were mentioned as a concern.

In some cases, the deficiency in external support indirectly increased the internal team's workload.

### **Discussion :**

The findings suggest that digitization has had a significant impact on employees' perceptions of their work environment. The perceived benefits, such as increased efficiency, time savings, and improved accessibility, align with the anticipated advantages of digital transformation in enhancing productivity and streamlining operations (cite relevant literature).

However, the challenges identified by participants highlight the complexities of implementing digital tools in a real-world setting. Connectivity issues, infrastructure limitations, and adoption difficulties can hinder the full realization of digitization's potential.

The concerns raised about digital literacy and information quality underscore the importance of addressing human factors and ensuring adequate support and training during the digitization process.

The finding that support deficiencies can indirectly increase the internal team's workload points to the interconnectedness of different challenges and the need for a holistic approach to digital implementation.

### **1.2.3- Theme 3: Barriers to Optimal Implementation**

#### **Introduction :**

This section addresses Research Question 3: "What barriers exist in adopting digitization in the training sub-department?" It examines the factors that have hindered the full and effective implementation of digital tools within the Employee Training Sub-Department.

#### **Findings :**

The interview data reveals several key barriers that have impeded the optimal adoption of digitization.

##### **1- Technological Barriers:**

**Infrastructure Limitations:** Participants across interviews highlighted limitations in the existing technological infrastructure. Mr. Abdelhak noted "a significant challenge is the need for a comprehensive upgrade to extend digital integration across all employees' workflows".

**Connectivity Problems:** Unreliable internet connectivity was a recurring issue. Mrs. Kioua mentioned "Unreliable internet connectivity sometimes...", and this was echoed as hindering consistent access and full utilization of digital platforms across the board.

##### **2- Organizational Barriers:**

**Resistance to Change (implied):** While not explicitly stated as "resistance to change," the difficulty in achieving widespread adoption, particularly among supervised institutions as noted in multiple interviews, implies an underlying resistance or difficulty in transitioning to new digital methods.

**Support Deficiencies:** The inadequacy of support for digital tools was a significant barrier. Mr. Abdelhak stated that "Overall effectiveness of support for digital tools could have been significantly better". Mrs. Kioua's interview also pointed to a lack of comprehensive support, with the PDF manual being primarily for supervised institutions.

**Increased Internal Workload (due to lack of external support):** Mr. Abdelhak specifically mentioned that "This deficiency in external support has indirectly increased the internal team's workload due to the need to assist external users".

##### **3- Human Factors:**

Digital Literacy Gaps: The varying digital literacy among supervised institutions was identified as a key challenge in achieving consistent digital adoption, as mentioned in Mrs. Kioua's interview regarding difficulties in receiving necessary work due to a lack of understanding.

#### **4- Information-Related Barriers:**

Accuracy and Timeliness of Information (from external users): Mrs. Kioua's interview highlighted that "The accuracy and timeliness of information from external users can be compromised by a lack of understanding of digital requirements".

#### **Discussion :**

The barriers identified in the data suggest that while the Ministry has made progress in adopting digital tools, several significant obstacles hinder its optimal implementation. The technological limitations, particularly regarding infrastructure and connectivity, provide a fundamental challenge to consistent and effective use of digital platforms.

Organizational factors, such as the implied resistance to change and the clearly stated deficiencies in support, further complicate the adoption process. The lack of adequate support, especially for external stakeholders, not only impedes their effective use of the tools but also places additional strain on the internal team.

Human factors, specifically the varying levels of digital literacy, represent another critical barrier that needs to be addressed through targeted training and support initiatives. Finally, the challenges related to information quality highlight the importance of ensuring that all stakeholders understand the requirements for accurate and timely digital reporting.

Addressing these multifaceted barriers will be crucial for the Ministry to fully leverage the potential benefits of digitization in its employee training sub-department.

#### **1.2.4- Theme 4: Support and Training**

##### **Introduction :**

This section examines the support and training provided to employees and supervised institutions during the adoption of digital tools, and evaluates its perceived effectiveness and adequacy. This theme is crucial for understanding the human and organizational aspects of the digitization process.

##### **Findings :**

The interview data reveals information about the initial and ongoing support provided, as well as evaluations of its effectiveness.

### **1- Initial Support:**

Mrs. Kioua mentioned that "Initial support included introductory meetings explaining platform functionalities"

Mrs. Meriem described "Initial support involved collaborative meetings for explanation and feedback", suggesting a more interactive approach in some instances.

### **2- Ongoing Support:**

Mrs. Kioua noted that "A PDF manual was created and distributed, primarily for supervised institutions". This indicates a reliance on written documentation for external stakeholders.

Mrs. Meriem highlighted that "Constant communication among employees was a significant aspect of support", suggesting a focus on internal communication.

Peer-to-peer support also played a role, with Mrs. Meriem stating that "Peer-to-peer support played a crucial role in navigating the learning curve" and that "Easy communication with colleagues facilitated knowledge sharing and troubleshooting".

### **3- Support Evaluation:**

Mr. Abdelhak expressed a critical view, stating that "Overall effectiveness of support for digital tools could have been significantly better".

He further elaborated that "Support mechanisms inadequately addressed challenges with supervised institutions".

The difficulty in ensuring external stakeholders effectively use digital tools was also highlighted by Mr. Abdelhak, suggesting "a potential gap in training/support for external institutions or lack of dedicated resources"

### **Discussion :**

The findings indicate that initial support was provided through meetings and documentation. However, the evaluation of the support's effectiveness reveals significant shortcomings, particularly concerning supervised institutions. The reliance on a PDF manual for external stakeholders might not have been sufficient to address their varying levels of digital literacy and understanding.

The emphasis on internal communication and peer-to-peer support among employees suggests a more organic learning process within the Ministry. While valuable, this might not have adequately addressed the specific challenges faced by external partners in adopting the digital tools.

Mr. Abdelhak's critical assessment of the support's overall effectiveness and its inadequacy for supervised institutions underscores a potential area for improvement. The identified gap in dedicated resources or tailored training for external stakeholders likely contributed to the difficulties in achieving widespread adoption and effective utilization of the digital platforms.

These findings highlight the importance of a comprehensive and differentiated support strategy that addresses the specific needs of both internal employees and external stakeholders to ensure a successful digital transformation.

### **1.2.5- Theme 5: Enhanced Data Handling and Decision-Making**

#### **Introduction :**

This section explores how digitization has influenced data handling practices and its role in decision-making within the Employee Training Sub-Department. It examines the impact of digital tools on data accessibility, measurability, analysis, and the adoption of a data-driven approach.

#### **Findings :**

The interview data indicates a significant shift towards enhanced data handling capabilities with the introduction of digital tools.

##### **1- Enhanced Data Visibility and Measurability:**

Mrs. Meriem highlighted that "Enhanced obtainability and measurability of data within the platforms have been particularly impactful". This suggests that digital platforms provide improved access to and quantification of training-related data.

She further noted that "Accessibility to clear metrics and performance indicators allows for more focused efforts and better progress monitoring". This implies that digitization facilitates the tracking of key performance indicators, enabling more targeted interventions and evaluations.

##### **2- Improved Data Analysis:**

Mrs. Kioua pointed out that "Data analysis time has dramatically reduced from up to two weeks to just one to two days due to integrated analytical capabilities". This demonstrates a substantial improvement in the efficiency of data analysis, enabling quicker insights and faster decision-making.

### **3- Data-Driven Approach:**

Mrs. Meriem emphasized that "Improved visibility into training outcomes enables a more data-driven approach to development". This signifies a move towards using data to inform the design and implementation of training programs and strategies.

Mrs. Meriem also noted that this "facilitates the acquisition of more accurate information for refining training programs and strategies".

### **Discussion :**

The findings reveal that digitization has significantly enhanced data handling practices within the Employee Training Sub-Department. The increased visibility and measurability of data have empowered employees to monitor progress more effectively and make more informed decisions.

The dramatic reduction in data analysis time, as highlighted by Mrs. Kioua, underscores the efficiency gains enabled by digital tools. This allows for more timely and responsive decision-making, which is crucial in a dynamic training environment.

The shift towards a data-driven approach, as emphasized by Mrs. Meriem, signifies a fundamental change in how training programs are developed and evaluated. By leveraging data on training outcomes, the sub-department can refine its strategies and improve the effectiveness of its training initiatives.

Overall, the findings suggest that digitization has not only streamlined workflows but has also transformed the way data is used to inform and improve employee training practices.

## **2. Observations from Non-Participative Observation :**

In addition to the qualitative data gathered through interviews, non-participative observation was conducted over 18 days, from 10 AM to 4 PM daily, spanning various offices within the Employee Training Sub-Department. This observational period was designed to minimize contact with employees while gaining a direct, empirical understanding of their interactions

with digital tools, the physical environment of their workstations, the flow of communication, and instances of technical difficulties, all aimed at measuring the real-world impact of digitalization on their workflow.

Several key insights emerged from these direct observations:

- **Familiarization and Peer Support:** It was evident that employees were progressively becoming more familiar with the digital tools over time. This learning process was significantly supported by the IT manager's assistance and, notably, through peer-to-peer collaboration. Instances were observed where employees, encountering difficulties with specific digital tasks, would actively reach out to colleagues for help, leading to shared learning and improved understanding of the tools' functionalities. This directly aligns with the findings from Theme 4 (Support and Training), emphasizing the crucial role of both formal (IT manager) and informal (peer) support in digital adoption.
- **Improving Efficiency in Practice:** The observations visibly confirmed an increase in efficiency over time. As employees gained proficiency with the digital platforms, their ability to deliver work faster improved with each repetition. This practical demonstration of increased speed and productivity directly supports the perceived efficiency gains highlighted in Theme 2 (Perceived Impacts of Digitization) and Theme 3 (Enabling Factors) from the interview data.
- **Persistent Challenges:** Despite the observed improvements, the physical environment and the functionality of digital tools still presented noticeable challenges. Instances of missing infrastructure or material problems (e.g., slow computers, intermittent internet access) were observed hindering employee performance. These direct observations corroborate the interviewees' concerns regarding "infrastructure limitations" and "connectivity problems" mentioned in Theme 3 (Barriers to Optimal Implementation), underscoring these as tangible and ongoing obstacles.

## Section 2 : Deep analysis

### 2.1- Cross-Theme Analysis :

The analysis of the five themes reveals several interconnected relationships that provide a more nuanced understanding of the digitization process within the Employee Training Sub-Department.

- **Workflow Transformation and Perceived Impacts:** The transformation of workflow processes (Theme 1) is closely linked to the perceived impacts of digitization (Theme 2) also (supported by Observations). While the shift from manual to digital processes has led to increased efficiency and time savings, challenges such as connectivity issues and infrastructure limitations have hindered the full realization of these benefits. This suggests that the success of workflow transformation is contingent on addressing the technological challenges that affect employees' ability to effectively use digital tools.
- **Enabling Factors and Barriers:** The factors enabling digital implementation (Theme 3) (supported by Observations) and the barriers to optimal implementation (Theme 3) highlight the dual forces at play in the digitization process. Efficiency gains and streamlined workflows have driven the adoption of digital tools, but these gains are often undermined by infrastructure limitations, connectivity problems, and digital literacy gaps. This underscores the importance of a holistic approach that not only focuses on the benefits of digitization but also proactively addresses the challenges that can impede its successful implementation.
- **Support and Training and Adoption:** The effectiveness of support and training (Theme 4) (supported by Observations) has a significant impact on the adoption and utilization of digital tools. Inadequate support, particularly for supervised institutions, has led to difficulties in achieving widespread adoption and has indirectly increased the workload of the internal team. This highlights the crucial role of effective support and training in facilitating the successful integration of digital tools and ensuring that all stakeholders can fully benefit from the digitized workflow.
- **Data Handling and Efficiency:** The enhancement of data handling and decision-making (Theme 5) is closely related to the efficiency gains observed in Theme 2 and Theme 3. Digital tools have not only streamlined workflows but also improved data accessibility, measurability, and analysis, leading to more informed decision-making

and more efficient training programs. This suggests that the ability to leverage data effectively is a key driver of the positive impacts of digitization.

## **2.2- Summary of Key Findings :**

The key findings of this chapter reveal that digitization has brought about significant changes in employee training workflows, offering benefits such as increased efficiency, time savings, and enhanced data handling. However, the optimal implementation of digital tools has been hindered by technological, organizational, and human factors, including infrastructure limitations, connectivity problems, digital literacy gaps, and inadequate support. Effective support and training, along with addressing the identified barriers, are crucial for fully realizing the potential of digitization and ensuring its successful adoption across all stakeholders.

## **2.3- Linkage of the Findings to review of literature :**

### **2.2.1 - Technology Acceptance Model (TAM)**

TAM explains technology adoption based on perceived usefulness and perceived ease of use.

- **Perceived Usefulness:**

The transformation of workflows from manual to digital (Theme 1) demonstrates perceived usefulness. Digital tools are seen as enablers of "streamlined digital information exchange, efficient digital document review, automated and dynamic data analysis".

Positive impacts like "Digital tools significantly streamlined work by automating manual tasks, leading to faster processes and fewer errors" (Theme 2) and "Digital platforms have significantly increased the efficiency of the employee training workflow" (Theme 3) strongly indicate that employees perceive the tools as useful for enhancing their job performance.

Enhanced data handling (Theme 5), with "Enhanced obtainability and measurability of data" and the shift towards a "more data-driven approach to development", further reinforces the perceived usefulness of digital tools in improving data-related tasks and decision-making.

- **Perceived Ease of Use:**

Barriers to implementation (Theme 3) directly relate to perceived ease of use. "Unreliable internet connectivity sometimes and limitations in existing infrastructure" create frustration and make the tools harder to use.

Digital literacy gaps, as seen in the difficulty of "Communicating the use and benefits of new digital tools to supervised institutions due to their lack of understanding", also contribute to lower perceived ease of use. If users struggle to understand how to use the tools, they will perceive them as less easy to use.

Support and training (Theme 4) are crucial for enhancing perceived ease of use. "Initial support included introductory meetings explaining platform functionalities" and "Peer-to-peer support" are efforts to improve users' understanding and confidence, thereby increasing perceived ease of use.

Conversely, "Overall effectiveness of support for digital tools could have been significantly better" suggests that inadequate support diminishes perceived ease of use.

### **1.2.6- Institutional Theory**

Institutional theory explains how organizations adopt practices to conform to their environment.

- The adoption of digital tools can be interpreted as a response to various institutional pressures:

**Normative Pressures:** The emphasis on "Efficiency Gains" (Theme 3) and "Streamlined Framework" reflects a normative pressure to adopt modern management practices that prioritize efficiency and optimization. The Ministry may be adopting digital tools to align with prevailing norms in public sector administration.

**Mimetic Pressures:** The desire to implement "automated and dynamic data analysis" and a "more data-driven approach to development" could be driven by mimetic pressures, as the Ministry seeks to emulate leading organizations that use data analytics to improve training outcomes.

**Coercive Pressures:** While not explicitly detailed, the "need for a comprehensive upgrade to extend digital integration across all employees' workflows" might stem from coercive pressures, such as government mandates or regulations requiring public sector organizations to adopt specific digital technologies or meet certain digital transformation targets.

### **1.2.7- Diffusion of Innovation Theory**

Diffusion of Innovation Theory explains how innovations spread.

- The findings relate to several key concepts of this theory:

**Relative Advantage:** The perceived benefits of digitization highlight its relative advantage. "Digital tools significantly streamlined work by automating manual tasks, leading to faster processes and fewer errors" and the "revolutionized" information accessibility demonstrate the clear advantages of digital tools over previous methods.

**Compatibility:** Challenges with "Achieving widespread adoption and consistent use of digital tools by supervised institutions due to varying digital literacy" indicate issues of compatibility. The innovation (digital tools) is not fully compatible with the existing skills and knowledge of some users.

**Complexity:** "Unreliable internet connectivity" and "limitations in existing infrastructure" increase the perceived complexity of the digital tools. Users face technical hurdles, making the innovation seem complex.

**Observability:** Enhanced data handling (Theme 5) increases observability. "Enhanced obtainability and measurability of data" and "Improved visibility into training outcomes" make the results of the innovation more visible, which can encourage further adoption.

**Trialability:** "Initial support included introductory meetings explaining platform functionalities" can be seen as an attempt to enhance trialability by providing users with an initial opportunity to learn and experiment with the tools.

*Figure 4: Doi model adapted to the case study*

**Adoption of Digital Workflows in Public Institutions –  
Based on Rogers' Diffusion of Innovations Model**

<b>Innovation Adoption Curve</b>	<b>Inderal.Unt</b>
Innovators	Pilot Departments (e.g., IT, HR digitization units)
Early Adopters	Digitally progressive divisions within the Ministry
Early Majority	Departments adopting under strategic plans
Late Majority	Departments adopting due to peer pressure or mangadates
Laggards	(فارج) Manual/traditional workflow-dependent units

**Elaborated by the student**

By analyzing the findings through these three theoretical lenses, we gain a more comprehensive understanding of the factors influencing the adoption and implementation of digital tools in the Employee Training Sub-Department.

**Chapter Conclusion :**

This chapter has provided a comprehensive analysis and discussion of the findings from the semi-structured interviews conducted within the Employee Training Sub-Department of the Ministry of Higher Education. The analysis was structured around five key themes: the transformation of employee training workflows, the perceived impacts of digitization, the barriers to optimal implementation, support and training, and enhanced data handling and decision-making.

The findings reveal that the adoption of digital tools has led to significant changes in workflow processes, shifting them from time-consuming manual tasks to more streamlined digital operations. This transformation has brought about perceived benefits such as increased efficiency, time savings, and improved accessibility of information. For instance, the automation of manual tasks has streamlined work and reduced errors, and digital platforms have significantly increased the efficiency of the employee training workflow.

Moreover, the ability to obtain and measure data has been enhanced, enabling a more data-driven approach to training development.

However, the study also identified several challenges that have hindered the optimal implementation of digital tools. These include technological barriers such as infrastructure limitations and connectivity problems, organizational barriers like difficulties in achieving widespread adoption and inadequate support mechanisms, and human factors such as varying levels of digital literacy among stakeholders. These barriers have, in some cases, limited the extent of workflow transformation and impeded the full realization of the anticipated benefits of digitization.

The theoretical frameworks employed in this analysis – the Technology Acceptance Model (TAM), Institutional Theory, and Diffusion of Innovation Theory – have provided valuable lenses for understanding the complexities of digital adoption within the Ministry. TAM has illuminated the importance of perceived usefulness and perceived ease of use in shaping individual employees' acceptance of digital tools, with factors like efficiency gains and enhanced data handling contributing to perceived usefulness, and infrastructure limitations and support deficiencies affecting perceived ease of use. Institutional Theory has highlighted the influence of normative, mimetic, and coercive pressures on the Ministry's decision to adopt digital technologies. Finally, the Diffusion of Innovation Theory has offered insights into the characteristics of digital tools that facilitate or hinder their diffusion, such as relative advantage, compatibility, complexity, observability, and trialability.

This study contributes to the literature by providing empirical evidence of the multifaceted impacts of digitization in the context of employee training within the Algerian public sector. It underscores the need for a holistic approach to digital transformation that addresses not only the technological aspects but also the organizational, human, and institutional dimensions.

The following chapter will build upon these findings to draw key conclusions, offer practical recommendations for the Ministry of Higher Education, discuss the limitations of the study, and suggest directions for future research.

# **Conclusion and Recommendations**

## Conclusion and Recommendations

This Part synthesizes the key findings from the analysis and discussion presented in the previous chapter. It revisits the central research problem and research questions, drawing definitive conclusions based on the empirical evidence. Furthermore, this chapter offers practical recommendations for the Employee Training Sub-Department of the Ministry of Higher Education, aimed at enhancing the effectiveness and sustainability of its digital transformation efforts. Finally, it acknowledges the limitations of this study and suggests potential avenues for future research.

### 1- Limitations of the Study

While this study provides valuable insights into the impact of digitization on employee training within the Ministry of Higher Education, it is important to acknowledge certain limitations that may affect the generalizability and scope of the findings:

1. **Qualitative Approach:** The study employed a qualitative approach, relying primarily on semi-structured interviews. While this approach allowed for in-depth exploration of employee experiences and perceptions, it does not provide statistical generalizability. The findings may not be representative of the entire population of employees within the Ministry of Higher Education.
2. **Sample Size:** The number of interview participants was limited. Although the participants were selected to represent diverse roles within the Employee Training Sub-Department, a larger sample size could have provided a broader range of perspectives and potentially revealed additional nuances in the data.
3. **Context-Specific Findings:** The study focused specifically on the Employee Training Sub-Department of the Ministry of Higher Education in Algeria. The findings may be context-specific and may not be directly transferable to other departments within the Ministry or to other organizations or countries with different cultural, organizational, or technological contexts.
4. **Researcher Bias:** As the researcher, I have my own perspectives and assumptions, which may have influenced the data collection and analysis process. While efforts

## Conclusion and Recommendations

were made to maintain objectivity and rigor, complete elimination of researcher bias is impossible in qualitative research.

5. **Self-Reported Data:** The data was collected through self-reported interviews, which may be subject to recall bias or social desirability bias. Participants may have provided responses that they believed were socially acceptable or that they thought the researcher wanted to hear.

These limitations should be considered when interpreting the findings of this study. Despite these limitations, the study offers valuable insights into the complexities of digital transformation in a public sector setting and provides a foundation for future research in this area.

### 2. Conclusion :

Based on the analysis of the interview data, the following conclusions can be drawn regarding the impact of digitization on workflow efficiency and employee adaptation in the Employee Training Sub-Department:

1. **Digitization has yielded tangible improvements in workflow efficiency in specific areas of employee training.** The adoption of digital tools has streamlined processes such as information exchange, document handling, and data analysis, leading to faster task completion and reduced manual effort. The automation of certain tasks has also contributed to a decrease in errors.
2. **The perceived benefits of digital training tools are significant but are accompanied by notable drawbacks.** Employees recognize the potential for increased efficiency, time savings, and improved accessibility of information. However, challenges related to unreliable connectivity, infrastructure limitations, and varying levels of digital literacy among supervised institutions hinder the full realization of these benefits.
3. **Several key barriers impede the optimal adoption of digitization within the training sub-department.** These barriers encompass technological limitations (infrastructure, connectivity), organizational challenges (difficulties in achieving widespread adoption, support deficiencies), and human factors (digital literacy gaps) [cite: Mr.abdelhak.docx, Mm.kioua.docx]. Addressing these barriers is crucial for

## Conclusion and Recommendations

maximizing the return on investment in digital tools and ensuring their effective utilization.

4. **The provision of support and training has been a critical factor influencing the success of digital implementation, but its effectiveness has been perceived as uneven.** While initial support was provided, ongoing support mechanisms, particularly for supervised institutions, appear to be inadequate. Peer-to-peer support has played a valuable role internally, but a more structured and targeted approach to training and support is needed.
5. **Digitization has enhanced the sub-department's capacity for data handling and has facilitated a move towards a more data-driven approach to training development.** The improved obtainability and measurability of data, coupled with enhanced analytical capabilities, have enabled better progress monitoring and more informed decision-making.

These conclusions provide a clear overview of the impact of digitization on the Employee Training Sub-Department, directly addressing the research questions posed at the outset of this study.

### 3. Recommendations :

Based on the findings and conclusions of this study, the following recommendations are proposed to the Employee Training Sub-Department of the Ministry of Higher Education to enhance the effectiveness and sustainability of its digital transformation initiatives:

1. **Invest in Robust Technological Infrastructure:**
  - Prioritize upgrading the technological infrastructure to ensure reliable internet connectivity and consistent access to digital platforms.
  - This may involve increasing bandwidth, improving network stability, and providing necessary hardware and software updates.
2. **Develop a Comprehensive Digital Literacy Program:**
  - Implement targeted training programs to address the varying levels of digital literacy among employees and supervised institutions.

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- These programs should focus on basic digital skills, effective use of digital tools, and best practices for digital information exchange.

### 3. Enhance Support and Training Mechanisms:

- Provide ongoing and accessible support to both internal staff and external stakeholders.
- This could include a combination of online resources, workshops, personalized assistance, and dedicated support personnel.
- Develop tailored training materials and delivery methods to meet the specific needs of different user groups.

### 4. Promote a Culture of Digital Adoption:

- Implement strategies to encourage the active and consistent use of digital tools across the sub-department and supervised institutions.
- This may involve change management initiatives, communication campaigns highlighting the benefits of digitization, and incentives for digital participation.

### 5. Strengthen Data Management Practices:

- Establish clear guidelines and protocols for data collection, storage, and sharing to ensure data accuracy, timeliness, and security.
- Provide training on data analysis and interpretation to empower employees to effectively utilize the enhanced data handling capabilities of digital tools.

These recommendations are designed to address the key challenges identified in the study and to support the Ministry in maximizing the benefits of its digital transformation efforts.

## 4. Future Research Directions

This study offers a foundation for understanding the impact of digitization on employee training within the Ministry of Higher Education. Building upon its findings and limitations, several avenues for future research can be explored:

## Conclusion and Recommendations

1. **Quantitative Validation:** Future research could employ quantitative methods, such as surveys and statistical analysis, to validate the qualitative findings of this study and provide a broader statistical generalization of the results.
2. **Longitudinal Analysis:** A longitudinal study could be conducted to examine the long-term impacts of digitization on employee training outcomes, including changes in employee performance, knowledge retention, and career advancement over time.
3. **Comparative Studies:** Comparative research could explore the implementation and effectiveness of digital training initiatives across different departments within the Ministry of Higher Education or compare the strategies of different ministries or public sector organizations.
4. **Technology Integration and User Experience:** Further investigation is needed to explore the optimal integration of various digital technologies within the training programs and to assess the impact of user experience on the adoption and effectiveness of these technologies.
5. **External Stakeholder Engagement:** Additional research could examine strategies to enhance the engagement and digital literacy of external stakeholders, such as supervised institutions, to improve their collaboration and information exchange within the digitized training environment.

By pursuing these future research directions, a more comprehensive understanding of the complexities and potential of digitization in employee training can be achieved.

### Chapter's conclusion:

In **conclusion**, this chapter has synthesized the key findings of the study, presented actionable recommendations for the Ministry of Higher Education to optimize its digital training initiatives, and outlined potential avenues for future research. The findings have demonstrated that while digitization has led to positive outcomes such as improved workflow efficiency and enhanced data handling, its successful implementation is contingent upon addressing challenges related to technological infrastructure, digital literacy, and organizational support. The recommendations provided aim to guide the Ministry in overcoming these challenges and fully leveraging the transformative potential of digital tools to enhance employee training and development. It is hoped that this study will contribute to

## **Conclusion and Recommendations**

more effective digital transformation strategies within the Ministry and provide valuable insights for other public sector organizations embarking on similar initiatives.

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# Appendices

### Interview guide:

#### A- To the employees / office heads

##### Introduction :

Good morning/afternoon. My name is Dhiaeddine Chikh, and this presentation marks the culmination of my Master's thesis in E-government at the Ecole Nationale Supérieure de Management, Koléa. My research focuses on the impact of digitization on workflow within the public sector, and for this study, I've conducted a case study on the Employee Training Sub-Department of the Ministry of Higher Education and Scientific Research. I will be presenting my findings, analysis, and recommendations regarding the implementation and effects of digital tools on their training processes.

Thank you for participating in this interview. The purpose of this interview is to understand your experiences and perspectives on the changes in employee training due to the introduction of digital tools.

- Your responses will be kept confidential and used for research purposes only.

##### A. Background and Current Role:

1. "Could you describe your role and responsibilities within the Employee Training Sub-Department?"
2. "How long have you been working in this department?"
3. "What type of training have you participated in or delivered in the past?"

##### B. Workflow Changes Due to Digitization:

1. "Before the introduction of digital tools, how was employee training typically conducted?" (Probe for details on processes, materials, communication, etc.)
2. "What digital tools or platforms are currently being used for employee training?"
3. "How have these digital tools changed your daily workflow related to training?" (Probe for specific tasks, time spent, efficiency, etc.)
4. "Can you give specific examples of how digitization has improved or hindered your training-related tasks?"
5. "What are the main benefits of using digital tools for training, in your opinion?"
6. "What are the main challenges or drawbacks you've experienced with digital training tools?"

### **C. Perceptions of Digital Tools:**

1. "How easy or difficult do you find it to use the digital training tools?" (Relate to TAM's Perceived Ease of Use)
2. "Do you believe that digital training tools have made your training more effective or efficient?" (Relate to TAM's Perceived Usefulness)
3. "Has your attitude towards training changed since the introduction of digital tools?"  
If so, how?
4. "To what extent did the digital tools meet your needs and expectations?"

### **D. Support and Training:**

1. "What kind of support or training did you receive when the digital tools were first introduced?"
2. "How effective was this initial support/training?"
3. "What kind of ongoing support is available to you?"
4. "Is the support and training adequate? What improvements would you suggest?"

### **E. Challenges and Barriers:**

1. "Have you encountered any challenges in adopting or using the digital training tools?" (Probe for technical, organizational, or personal challenges)
2. "What factors, in your opinion, have hindered the successful implementation of digital training?"
3. "How could these challenges or barriers be overcome?"

### **F. Suggestions for Improvement:**

1. "What suggestions do you have for improving the use of digital tools for employee training?"
2. "What additional features or support would be helpful?"
3. "Do you have any other comments or feedback on the digitization of employee training?"

### **B- Interview guide for the Director:**

#### **Introduction:**

Good morning/afternoon. My name is Dhiaeddine Chikh, and this presentation marks the culmination of my Master's thesis in E-government at the Ecole Nationale Supérieure de Management, Koléa. My research focuses on the impact of digitization on workflow within the public sector, and for this study, I've conducted a case study on the Employee Training Sub-Department of the Ministry of Higher Education and Scientific Research. I will be presenting my findings, analysis, and recommendations regarding the implementation and effects of digital tools on their training processes.

Thank you for participating in this interview. The purpose of this interview is to understand your experiences and perspectives on the changes in employee training due to the introduction of digital tools.

- Your responses will be kept confidential and used for research purposes only.

#### **A. Overview of Digitization Initiatives:**

1. "What were the main goals and objectives for implementing digital tools in the Employee Training Sub-Department?"
2. "What digital tools or platforms have been introduced, and why were they chosen?"
3. "Can you describe the implementation process of these digital tools?"
4. "What were the key drivers for digitization? (Probe for institutional pressures - coercive, mimetic, normative)"

#### **B. Impact on Workflow and Efficiency:**

1. "How has digitization changed the overall workflow of the Employee Training Sub-Department?"
2. "Has digitization improved the efficiency of training processes? If so, how?" (Probe for specific metrics or examples)
3. "What are the main benefits and drawbacks of digitization from an organizational perspective?"
4. "How has digitization affected the roles and responsibilities of employees?"

### **C. Employee Adoption and Acceptance:**

1. "What has been the general response of employees to the introduction of digital tools?"
2. "What factors do you believe have influenced employee acceptance or resistance to these tools?" (Relate to TAM and DOI)
3. "How has the department addressed any challenges related to employee adoption?"

### **D. Support and Training:**

1. "What support and training have been provided to employees for using the digital tools?"
2. "How effective has this support and training been?"
3. "What challenges have been encountered in providing adequate support and training?"
4. "What improvements have been made or are planned for support and training?"

### **E. Challenges and Barriers:**

1. "What have been the main challenges in implementing and managing digital training?" (Probe for technological, organizational, financial, etc.)
2. "What barriers have hindered the optimal implementation of digitization?"
3. "How has the department worked to overcome these challenges and barriers?"

### **F. Future Directions:**

1. "What are the future plans for digitization in the Employee Training Sub-Department?"
2. "How can technology be further leveraged to improve employee training?"
3. "What lessons have been learned from the digitization process so far?"

