

CHAPTER II: LITERATURE REVIEW

2.1 Introduction

This chapter provides a comprehensive review of the theoretical and empirical literature on the challenges encountered in implementing digital human resource management within the Sudanese Ministry of Higher Education. It emphasizes efforts to modernize public administrative processes and enhance efficiency through the adoption of digital technologies. Additionally, the chapter discusses key concepts and theories related to digitalization and includes an examination of prior research that addresses similar themes.

According to the study (Gersonskaya, 2020), the digitalization conditions for management services in the public sector, particularly in the provision of digitalization Higher Education services, are not as advanced in developing countries' public sectors. The primary reason for the hampered development of a digital society in service delivery is the lack of policies regarding the availability of digital tools and internet connectivity among the workforce. This deficiency creates significant barriers, preventing effective implementation and utilising digital technologies that could enhance service delivery. To address this, it's crucial to establish comprehensive policies that ensure widespread access to digital tools and reliable internet connectivity. Despite this, the government has introduced a unified identification and authentication system, which offers convenient and secure online identification. This system aims to integrate various channels of access to leading digital services (Zemskova, 2018). The study highlights the benefits of the digital process of delivering the public sector.

The current processes of digital implementation encompass not only the integration of HRM but also constructive modifications to procedures and management styles across government organizations. Successful implementation necessitates careful performance, investment in technology infrastructure, capacity building, and continuous monitoring to ensure desired outcomes. This approach is essential in four key contexts:

- a. Efficiency and beneficial effects Digitalization increases the efficiency and efficacy of providing higher education services by streamlining procedures, automating jobs, and minimising paperwork. Mainly formerly manual processes speed up work and lower rates of error.
- b. Accountability and transparency are enhanced through online platforms, as they enable citizens to access information easily. This easy access allows citizens to monitor administration activities, spending, and performance, thus promoting transparency and ultimately ensuring accountability.
- c. Service Accessibility: Citizens, particularly those living in rural or underserved areas, can rapidly obtain public services due to digital networks. To reduce barriers to use, consumers can quickly access government facilities from everywhere through online portals and smartphone apps.
- d. *Innovation and Cooperation*: By promoting the use of cutting-edge technologies like artificial intelligence, blockchain, and the internet, digitalization stimulates innovation in the public sector. To further successfully solve complicated issues, it also encourages cooperation among agencies of government, business partners, and community organizations.

2.2 Definitions of Digitalization

Historically, the theory of "digitalization" refers to converting to digital to enhance and revolutionize processes, systems, and internet-based activities;(Fedorova et al., 2019). Digitization has transformed the way we work, shop, study, travel, educate, government, manage our health, and enjoy life. The advent of new goods, processes, and techniques has created tremendous opportunities for people in various fields. However, this has also brought about certain risks, especially in the form of new challenges for employees, students, and job seekers due to the adoption of novel approaches to working (Submitted & Kumar, 2018). Furthermore, the expectations from digital are getting ready for a big change. Everything is going to be done on the computer, like at work, school, and even in our personal lives. Some people are worried

because this means some jobs might go away, but it also means that people can start their independent businesses on the internet.

The term “digital HR” encompasses integrating digital technologies in every aspect of human resource management. By utilizing advanced technology such as computing, machine learning, and mobile applications. These optimise HR procedures, improve decision-making, and enhance employee experiences Human Resource Development International (2022 Jan 1;25(1):87-103). It is the aspect that needs to be reformed in higher education institutions in Sudan,(Jane, Indira, 2020). These enterprises can become more profitable by utilizing digital technology to reduce expenses and facilitate communication within administrative processes. According to the research conducted by Aanoun, (2023) and Zhang & Chen, (2023) "human resources" refers to the administrative processes involved in identifying the personnel needs and materials required to facilitate the completion of tasks and objectives, with the ultimate aim of achieving an organisation's goals.

This involves creating opportunities for growth and digitalizing government institutions, ensuring transparency, and implementing digital reforms, especially in developed countries. Further elaborating on the concept of human resource management is Professor Josephat Itika in his book "Fundamentals of Human Resource Public Management", (Dessler, 2020) Professor Itika, who serves as the Dean of the School of Public Administration and Management at Mzumbe University, highlights that human resources management involves empowering of governments to have the right personnel performing the right tasks at the right time.



Figure 1.1 Shows Digitalization activities

Explanation:

The diagram illustrates key strategies for advancing digitization. At the center is “Digitization,” surrounded by five interconnected strategies. These include building skill sets for future youth education, which emphasizes updating educational programs to prepare young people for digital careers. Supporting technology adoption by the private sector aims to enhance businesses’ digital capabilities. Promoting lifelong learning and counteracting brain drain focuses on continuous education and retaining talent. Strengthening regional cross-border digital collaboration encourages cooperation between neighboring regions to share digital advancements. Lastly, improving the ecosystem for startups seeks to create a supportive environment for new digital enterprises. Together, these strategies form a comprehensive approach to fostering a robust digital economy.

Benefits of Digitalization HRM

Digitalization can bring various advantages to human resource management in the public sector of Sudan. These benefits include:

Efficiency

The benefits of digitization in HRM are procedures can simplify administrative work, including managing employment, requesting leaves, and maintaining personnel

information. By integrating systems, HR professionals can focus on employee development and strategic projects instead of manual tasks and paperwork *Mosca, Maria (2020) Digitalization of HRM.*

The advantages of cost reduction

Digitalization has the potential to lower expenses in labour, finances, and storage space by reducing reliance on traditional procedures and documentation. This is essential in resource-constrained settings such as Sudan's public sector HRM effectiveness (Koontz & Weihrich, 2006).

Enhanced Recruitment Performance

The advent of technology has revolutionised the recruitment process by digitising job advertisements, applicant monitoring, and candidate evaluation. As a result, digital HR solutions have significantly expedited the recruitment process while making personnel management activities such as performance reviews, skills evaluations, and future hiring planning more efficient Human Resource Management, 45, 295–308. <https://doi.org/10.1002/hrm.20113>. Furthermore, digital HR has facilitated personnel management activities such as performance reviews and skills evaluations. Therefore, the public sector in Sudan can improve compliance with relevant laws, rules, and policies of HR practices by adopting digital HR tools (Strohmeier 2020: 349). This can lead to several benefits such as increased productivity, improved data handling, better decision-making, higher employee engagement, cost savings, flexibility, compliance, and better recruitment and retention of talent.

2.3 Benefits of Digital HRM

Digital human resource management (HRM) offers numerous advantages, particularly in addressing the challenges faced by the Sudanese Ministry of Higher Education and Scientific Research. The term "(HRM)" encompasses more than just a group of management activities involved in the governmental sector. It also includes a

framework of laws and institutional structures that are deeply rooted in political and administrative traditions and cultures (Becker & Bauer, 2020).

Digital Human Resource Management (HRM) offers numerous benefits, particularly in addressing the challenges faced by the Ministry of Higher Education and Scientific Research in Sudan. By digitalizing HRM processes, the Ministry can streamline administrative tasks, reduce paperwork, and enhance data accuracy, leading to more efficient and effective management of human resources Brown, Kerry (2004). This often involves meticulous adherence to legal and regulatory requirements due to political and economic changes in the country that have likely affected various aspects of governance, including HRM procedures Kutieshat & Farmanesh, (2022). In the benefits human resource management (HRM) involves managing the people who work in governmental and public institutions to align with the organisation's objectives. Political unrest and violence have also hindered effective HRM implementation. However, efforts are being made to reform HRM in the public sector, with programs aimed at increasing responsibility, professionalism, and efficiency. Reforms include improvements in hiring, training, performance management, and compensation structures. However, social, political, and economic problems may impact these reforms and their implementation.

This transformation facilitates better decision-making through real-time data access and analytics, improves employee engagement and satisfaction by providing user-friendly platforms for self-service and communication, and ensures compliance with regulatory requirements through automated tracking and reporting. Additionally, digital HRM supports remote work and flexible scheduling, which are crucial in adapting to modern work environments and overcoming geographical barriers. Overall, the adoption of digital HRM at the Ministry not only addresses existing challenges but also paves the way for a more agile, responsive, and innovative human resources management system.

These actions of implementing digitalization were not effective in ruling the public sector's comprehensive understanding. Along with a significant impact on the

performance, satisfaction, ability, and competitiveness of public sector institutions according to Ashaye and Irani (Ashaye & Irani) (2019); successful administrative reform in public sector management requires the implementation of various strategies. In particular, the government staff utilizes digital platforms for recruitment, as highlighted by Jacobson and Sowa in their 2015 study (Jacobson & Sowa, 2015). by (Lamoureaux & Sureau, 2019) the study delves into the use of digital technologies in reforming the public sector in Sudan and raises concerns about the lack of awareness among management personnel regarding the vulnerabilities of electronic communication. The authors reference the research of (Arbab & Mahdi Abaker, 2018); (Institute of Public Administration, 2018).

In addition, the process of digital transformation within the Sudanese public sector is a multifaceted endeavour that entails a plethora of organisational and cultural factors that need to be considered and addressed. It also requires the acquisition of suitable equipment to ensure successful implementation. Given the complexity of this undertaking, it is crucial to take a structured and strategic approach to ensure that the transformation process is executed efficiently and effectively. The study underscores the significance of a digital framework to sustain digitalization initiatives in reforming civil services, notwithstanding limited funding to ensure a successful digital transformation in the public sector, it is imperative to invest in digital infrastructure and allocate greater funding to civil servants.

The ability of the government to finance essential tasks and provide training for public sector workers may be hindered by certain limitations. In Sudan's public sector management, human resource (HR) practices have traditionally relied on manual methods. This suggests that the management structures and technical aspects of the public sector have not undergone digital reform. As argued by Waxin and Bateman (2021), digitization can transform the way people communicate in their workplaces, anticipate actions from employers and occupations, and determine the places and times of work duties.

Ali, Quasar, and Rahman (2021) conducted digital programs aimed at enhancing public sector operations. However, the current study highlights the ongoing need for training to effectively integrate digital human resource management (HRM) with existing HR practices in the public sector. This integration is crucial for leveraging the full potential of digital tools and ensuring that HR functions are optimized for efficiency and effectiveness. Training programs must address both the technical and strategic aspects of digital HRM to support a seamless transition and to fully realize the benefits of digitalization in public sector HR operations.

On the other hand, the public sector has been a longstanding priority for e-governments' aims. Such a process of digital facilities is a crucial aspect of modernization and is closely linked to rationalization. The emergence of digitalization, especially the internet, has had a profound impact on how individuals, institutions, and governments interact. This impact spans all stages of the policy process, ranging from setting agendas to evaluating policies. Since the mid-1990s, digitalization in the public sector has covered a wide range of topics, including setting agendas and evaluating policies (Terlizzi, 2021).

The introduction shows that the interaction between civil service and public institutions has been greatly affected by the rapid changes in new technologies and services. Government and citizens are no longer just passive recipients of services but have become more active participants in their relationships with governments at various levels. As a result, there has been an exploration into the impact of digitalization on human resources management in the public sector. The use of information and communication technologies has also brought about significant changes in the functioning of public organizations and human resources management. As specialized civil servants are required to possess accurate information-related abilities, the use of digital technology also poses significant challenges for public sector organizations in areas such as recruitment and working relationships (Zouridis 2002).

According to Boselie et al (2021), the digitalization of the public sector is currently regarded as a well-established and independent public policy. Hood and Pe

(Tria & Valotti, 2012) note that this trend has become the focus of specialized higher education studies. However, this has led to many countries facing difficulties in implementing the necessary reforms to address the unexpected outcomes of digital initiatives. The challenges stem from the complexity of integrating new digital processes with existing frameworks, the need for continuous training, and the requirement for adaptable policies that can evolve technological landscapes.

The current times call for a greater understanding of the ever-evolving nature of the public sector and the need to modernize through digitalization practices. It is imperative to gain a comprehensive grasp of the intricate workings and dynamics of the public sector and its role in the public services vision (Basheka, 2017). The public sector needs to effectively navigate the complex challenges that confront us today due to the increasing demands. It is of utmost importance for policymakers, administrators, and practitioners within the public service to have a deep understanding of how digitalization is affecting the field of human resource management (HRM).

2.4 Challenges of Digitalizing the Ministry of Higher Education

Implementing digitalization in the public sector, including sectors like HR management in the Ministry of Higher Education and Scientific Research in Sudan, faces several challenges. These challenges can be broadly categorized into technological, organizational, cultural, and political issues. Building and maintaining a robust IT infrastructure is essential for supporting digitalization initiatives and ensuring the reliability, scalability, and security of public sector systems (Papavasiliou, 2020). One of the initial challenges is to ensure that all stakeholders in public sector organizations - including government representatives, staff members, and the general public - are well-informed about the benefits and objectives of implementing new systems. Insufficient awareness may lead to scepticism, resistance, and misconceptions regarding the purpose and potential outcomes of digitalization projects.

2.5 Technological Infrastructure Challenges

The study conducted by (Eynon & Dutton, 2007) provides valuable insights into the challenges faced by the public sector in implementing digital HR management. The research identifies several barriers that hinder the progress of digitalization, which can be categorized into seven main areas: leadership failure, economic deterrents, digital technology disparities and options, ineffective synchronization, administrative and workplace rigidity, lack of confidence, and inadequate technological design. These obstacles highlight the complex issues that public sector managers in Sudan encounter, such as limited computer skills and restricted access to technology.

To effectively adopt digital systems in the public sector, it is essential to build the capacity of government personnel to use and manage digital tools. This can be achieved through various initiatives, including workshops, technical assistance, and training programs aimed at improving IT proficiency, digital literacy, and change management skills among government employees. By addressing these challenges, the public sector can enhance its digital capabilities and improve overall efficiency.

The table below outlines the different dimensions related to the challenges of digitalization in Sudan's public sector, providing a comprehensive overview of the areas that need attention for successful digital transformation.

Table 1.2 Digitalization Challenges in Higher Education

	Challenges Dimensions	Area Example
1.	Technological Infrastructure	<ol style="list-style-type: none"> 1. Complicated systems of management in the ministry 2. capacity and networks 3. Integration of government initiatives is lacking 4. IT documents records
2.	Digital skills	<ol style="list-style-type: none"> 1. Lack of digitalization 2. a The dearth of proficient and specialized IT

		personnel among the employees 3. workers possessing integration abilities
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Explanation:

The table outlines two primary dimensions of challenges faced in the digitalization of Sudan's public sector:

Technological Infrastructure and Digital Skills.

Under Technological Infrastructure, the challenges include complicated systems of management within ministries, limited capacity and network infrastructure, lack of integration of government initiatives, and issues with IT document records. These factors collectively hinder the efficient implementation of digital systems. On the other hand, the Digital Skills dimension highlights the lack of digitalization, a shortage of proficient and specialized IT personnel among employees, and the need for workers with integration abilities. Addressing these challenges requires a comprehensive approach to enhance both the technological infrastructure and the digital skills of government personnel, ensuring a more effective and cohesive digital transformation in Sudan's public sector.

Digitalization in both Sudan's public sector and higher education faces significant challenges across two primary dimensions: Technological Infrastructure and Digital Skills. Under Technological Infrastructure, the complexity of management systems within ministries, limited capacity and network infrastructure, lack of integration among government initiatives, and issues with IT document records collectively hinder the efficient implementation of digital systems. On the other hand, the Digital Skills dimension highlights a notable lack of digitalization efforts, a shortage of proficient and specialized IT personnel among employees, and the need for workers with integration abilities. Addressing these challenges requires a comprehensive approach

to enhance both the technological infrastructure and the digital skills of personnel, ensuring a more effective and cohesive digital transformation in both sectors.

2.6 Management Barriers

The barriers that government authorities could face when implementing digitalization in HRM include a lack of clear vision and strategy. Without a clear digital strategy and strong leadership, digital initiatives can lack direction and focus including the following:

1. **Authorities' resistance** to change is deeply rooted and unyielding in the public sector, posing significant challenges for Sudanese authorities. Managers and employees often oppose adopting digital technology out of fear for their job security, limited understanding of the benefits, or uncertainty about using new systems.
2. **Leadership backing** and sponsorship are crucial for the success of a digital transformation. In the Sudanese public sector, upper management of HRM digitalization plans lacks support, resulting in insufficient funding, unclear priorities, and lack of guidance for implementation efforts.
3. **Limited Funds:** It may be difficult for Sudan's authorities to set aside enough money for the installation of digital HRM systems due to their potentially constrained budget. This limitation may be applied to resources that are necessary for the accomplishment of digitalization projects, such as trained IT personnel, training programmes, and upgraded infrastructure.
4. **Bureaucratic Processes:** our Sudanese public sector is characterized by bureaucratic processes that can slow down decision-making and hinder the implementation of digital HRM systems. Complex approval processes and rigid regulations may impede agility and innovation in adopting new technologies.
5. **A cultural shift:** may be necessary as a result of the introduction of digital technologies for our employees in the Sudanese public sector. Sudan's public sector should strive to be more inventive, collaborative, and lifelong learners. Overcoming

resistance and fostering a culture that values digital processing and welcomes innovation is necessary for the effective implementation of digital technologies.

2.7 Cultural and Social Challenges

There are three main cultural and social challenges to implementing digitalisation for human resource management in the Sudanese Public Sector. These challenges include a lack of awareness regarding the benefits of digitalization and resistance to change in infrastructure (Amin & Omer, 2018). Addressing these challenges will require a concerted effort from all stakeholders involved in modernising the public sector. By overcoming these obstacles, the Sudanese Public Sector can benefit from improved efficiency and productivity, which can help in achieving the country's development goals.

2.7.1 Attitudes against digitalization

- a. Sudanese workers in the public sector may hold different cultural perspectives about technology; some may support digitization, while others may not.
- b. Adoption of new technology may be hampered by traditional attitudes and beliefs about relationships and work practices, which may also affect how people view electronic solutions.

2.7.2 Workplace Environment

- a. The work culture in the Sudanese public sector may resist digitization due to ingrained procedures and organizational structures
- b. The adoption of digital HR solutions may face hindrances from bureaucratic processes and a preference for in-person contacts over digital communication channels
- c. The resistance to new forms of working, such as receptive or remote arrangements made possible by technological advancements, may stem from a predilection for conventional office-based work environments.

2.7.3 Digital Gaps

- a. Socioeconomic disparities and unequal access to technologies among Sudan's numerous regions or demographic groups may exacerbate the challenges associated with implementing digital HR alternatives.
- b. Insufficient internet connectivity, especially in isolated areas, and disparities in staff members' proficiency with digital technology could pose challenges to the efficient utilisation of digital HR systems.
- c. The unequal access to technology that women experience, particularly those who hold employment, may also be influenced by cultural norms surrounding gender roles and educational opportunities.

2.8 Related Studies

Previous studies have covered various themes in different contexts, highlighting the significance of digital technology in reforming human resource management within the civil service. Further research, such as Neeraj's (Neeraj, 2018), study on the Sudanese public sector, underscores the importance of digital technologies in current public services, concluding that digitalization impacts both employees and human resource management by changing workforce skills. Digitalization plays a crucial role in human resources by promoting diversity and utilizing technology for employee engagement, particularly in higher education establishments.

In contrast, the study concluded that digitalization has impacted both employees and human resource management to change workforce skills. However, the argument is noted that digitalization plays a crucial role in human resources, particularly in terms of promoting diversity and utilizing technology employee engagement within higher education establishments. Similarly, the Journal of Human Development and Education (Development & Development, 2016), discusses how digitalization addresses problems and constraints in higher education development, offering modern methods and techniques to solve various challenges. This research focuses on the role of scientific research and higher education in Sudanese universities, tackling the issues they face. Additionally, studies like Sandoval-Almazán et al (Sandoval-Almazán et al.,

2017) have developed digital government strategies to enhance public services and improve citizens' well-being. Their findings suggest that effective digitalization in the public sector can operate efficiently without extensive human management, arguing that overreliance on human understanding could hinder progress and innovation in technology.

Mensah, Gideon, Kofi Osei-Fosu, Anthony, Nkansah Asante, and Grace (Mensah et al.(2022) reviewed the empirical literature on public management and found that institutions significantly impact digital management in the public sector of sub-Saharan Africa. Their study explores the implications of public management on the economy, society, and culture.

Similarly, Hassan and Kodouda (Hassan & Kodouda, 2023) examined Sudan's civil service reform initiatives following the 2018-19 uprising that ended a 30-year regime. They argued that public service reform is a collective action problem, as no politician is motivated to pursue reform if others are perceived to back down, despite the potential benefits of enhanced administration services. Both studies investigate the prospects of using digital technology to reform the civil service and provide a critical analysis of the current state of digitalization in Sudan's higher education institutions.

2.9 Public Sector Management

Public policy refers to the decisions and actions, that a government adopts to solve problems and address issues related to accessing public services within the HRM the study of *public administration in Germany* (Vidler, 2021) the book is *Edited by Sabine Kuhlmann ·Isabella Propeller*. Morris and Farrell (2007), many governments have adopted certain components of HRM "best practices" to improve competency-based performance. Related to the current policy of Sudan's government has not yet fully embraced these practices. The authors further argue that the reforms that have been introduced often have insignificant negative effects, such as longer working hours during the day, and lower job satisfaction, drawn following a study of ten public services.

The path of policy forward intends to encourage civil service by implementing public administration policies, particularly in dealing with Sudan's complex government agencies (Reddy et al., 2015) according to closely the report of the article, the public sector is accountable for a range of tasks, including budget creation, recruitment, planning, and the effective implementation of public service between two countries. Although each nation is pursuing public management changes differently, they have all followed a similar route (M. F. Waxin & Bateman, 2009). The unique culture and history of the public sector have led to some similar human resource management (HRM) trends. Governments are increasingly competing for their internal resources with those from the private sector, which frequently forces the public sector to adopt new reform-driven viewpoints. In addition, decentralization is one of the challenges because it affects the ability to implement reforms in Sudan's public sector. While a more flexible system may help foster management and better respond to local and sector-specific civil needs. The following policy regarding HRM reform:

1. Recruitment Benefits

Recruitment benefits are a crucial process by which an employer seeks to identify and attract qualified applicants for available positions Lavigna (2002) and Lavigna and Hays (2004). However, in the current study, the recruitment process in the public sector has been characterized by slow progress and unresponsive, bureaucratic, and apathetic practices, which have resulted in a lack of adequate and qualified policymakers. To address this issue, it is imperative to implement procedural and administrative reforms aimed at improving the efficiency and transparency of the public sector's recruitment process.

For instance, the study endeavours to enhance the admission procedures of public services by implementing a series of targeted administrative and procedural reforms. The goal of these reforms is to appeal to a broader range of qualified applicants and streamline the recruitment process in the Sudanese public sector.

2. Training Theories

Training is a systematic approach to modifying the behaviour of employees to align with the goals of higher education institutions. It has a modern outlook that emphasizes meeting the institution's development goals to help workers acquire the

specific competencies needed for the work positions in their required roles, (*Shim, 2001*). Public sector institutions are increasingly prioritizing training and development as a key responsibility for successful HRM in the era of digitalization. In line with standard practices in the public sector, training for the institution's employees has taken on a crucial role in public civil service organizations. This suggests that, with the advent of digitalization, public sector institutions are increasingly empowering Sudan's human resource management by implementing and utilizing authorized training initiatives.

To ensure that service providers have access to qualified staff, it is important to provide proper training. This can be achieved by educating local government representatives about areas of need, addressing the challenges faced by the public sector, analyzing how they affect the issues, obstacles, and capacity gaps of government administration, and taking the lead at the community level. Despite the growing utilization of digitalization services in educational institutions and agency relationships, the connection between HRM performance and public priorities for Sudanese citizens often remains weak or unclear, especially in public service environments.

3. Ministry Policies Regarding Higher Education for the Public Sector

The Ministry of Higher Education and Scientific Research in Sudan is dedicated to enhancing the efficiency and effectiveness of its human resources management through digitalization (Labib, 2022). These Ministry of Higher Education policies focus on improving digital infrastructure, providing training and support for staff, and ensuring an online platform. The policies manage to foster a culture of innovation and continuous improvement, the Ministry aims to streamline administrative processes, enhance service delivery, and ultimately support the development of higher education in the public sector. Through these efforts, the Ministry can be dedicated to creating a more responsive and agile human resources management system that meets the evolving needs of its stakeholders <https://sudan.un.org/en/download/3747/19904>.

The study underscores the critical policies of comprehensive training programs and robust IT infrastructure in enhancing digital literacy and enabling the transition to digital HRM in higher education. It highlights that clear policies, active stakeholder engagement, and adequate funding are essential for a successful transition. Digital capabilities can streamline HR operations, reduce administrative costs, and improve accuracy. However, challenges such as significant investment in technology, employee training, change management, resistance to change, and the digital divide must be addressed. A strategic approach with ongoing evaluation is necessary. The potential impact on HR efficiency and effectiveness at Sudan's Ministry of Higher Education and Scientific Research is substantial, underscoring the importance of digital skills for the future roles of employees. In addition, the political history has been marked by instability, conflicts, and changes in governance. The transition period from 1985 to 1989 saw the overthrow of President Gaafar Nimeiry in 1985, followed by a series of unstable governments and a coup led by Omar al-Bashir in 1989 (Ismail & Soraan, 2015).

Sudan is confronted with a multitude of challenges that encompass various aspects such as politics, institutions, society, and the economy. Unfortunately, the absence of strong institutional frameworks often hinders effective governance and infrastructure development. Public Financial Management (PFM) emerges as a vital tool in tackling economic hurdles and promoting transparency and accountability in public services. PFM encompasses the creation of legislation, regulations, protocols, and systems to effectively handle government finances, allocate resources, and record public expenditures <https://sudan.un.org/en/download/3747/19904>

Therefore, the policies regarding higher education focused on digital literacy and training help educators and researchers develop the skills needed to leverage digital tools fully. therefore, the government policies create an enabling environment that drives the modernization and efficiency of educational and research institutions through digital transformation. On the other hand, government policies were advocating and regulating a crucial role in shaping the digitalization processes within

the Ministry of Higher Education and Scientific Research. These policies are required to provide a strategic framework and allocate necessary resources for technological advancements (A. H. Ibrahim, 2021). By setting regulatory standards and guidelines, government policies should ensure that digital tools and platforms are implemented effectively and securely. The potential impact on HR efficiency and effectiveness at Sudan's Ministry of Higher Education and Scientific Research is substantial, underscoring the importance of digital skills for the future roles of employees (McTaggart & O'Flynn, 2015).

2.10 Transparency of Digitalization

When the public sector undergoes digitalization, it's important to be transparent to achieve, it's essential to consider the target audience and their information needs. It encompasses the prompt and accurate delivery of pertinent information, data, and documents to individuals and stakeholders. To have an effective government and democracy, citizens must have access to information, a voice in decision-making, and the power to hold public servants accountable (Sharma & Vyas, 2012).

Sudan has been facing numerous challenges in its public services, including disputes, corruption, mismanagement of funds, inadequate service, and slow economic growth. Recently immediate policies through the implementation to improve the public sector, increase citizen satisfaction, and restore the state's legitimacy and credibility in the public sector (UNESCO, 2018). It should be noted that the challenges currently faced by the public service including human resources were undeveloped digitalization. However, the ongoing conflict in Sudan has undoubtedly had a significant impact on higher education institutions across the country.

This impact poses several challenges in Sudan and would likely focus on improving various aspects of the education and research sectors to make them more effective, efficient, and relevant to national development goals. While the specific policies may vary depending on the government's priorities and the challenges faced by the ministry, some common areas could be targeted for reform. One such area is

curriculum reform. Updating curricula to align with emerging trends and technological advancements is crucial in meeting the needs of the labour market in the digital age. This may involve introducing new disciplines, incorporating experiential learning opportunities, and adopting interdisciplinary approaches. The key aspects of transparency in public sector policies include:

1. Accessibility

Our public sector should ensure that people can easily obtain information about laws, regulations, policies, spending, public services, and budgets through a range of channels, such as the Internet, information centres, and public hearings.

2. transparent Making Decisions Procedures

Our public sector must be transparent in its decision-making by conducting inclusive, open processes that welcome public input, consultation, and comments. This could entail arranging public gatherings, getting feedback from interested parties, and disseminating meeting agendas and minutes.

3. Openness and comprehensibility

To guarantee openness in the digitalization of the public sector, information must be communicated in a clear, succinct, and comprehensible way, using simple language and easily readable formats for a range of audiences, including those with different educational and literacy backgrounds.

4. Protection

To ensure transparency, it is crucial to protect those who report misconduct, corruption, or wrongdoing in higher education institutions. Implementing policies and practices that safeguard informants fosters a safe environment, allowing individuals to come forward without fear of repercussions. Additionally, promoting openness in public sector policies is vital for building public confidence in government institutions, and fostering transparency, honesty, and trust. This, in turn, strengthens democratic principles and empowers citizens.

2.11 Conceptual Framework of the Study

To better understand the challenges and potential solutions for implementing digitalization strategies for HRM in Sudan's public sector, various conceptual framework can be utilized. The study integrates several theoretical viewpoints and models that are relevant to the adoption and utilization of digital technology in organizational settings Ali, (2022); and Maria, (2020). Through the incorporation of various theoretical perspectives, this study offers a thorough analysis of the obstacles encountered when introducing digitalization in HR management within Sudan's public sector. It sheds light on the intricacies of organizational change processes, the factors that impact employees' willingness to embrace digital tools, and the spread of innovation within a public sector environment.

One of the most widely used theoretical perspectives is the Technology Acceptance Model (TAM), which is further enhanced by incorporating additional concepts from the theories of organizational change and innovation dissemination.

a. Bureaucratic theory

The implementation of digitization projects in the public sector of Sudan faces bureaucratic obstacles, the bureaucracy in labour bureaucratic organizations, the workforce is divided based on specialization and each member is assigned specific tasks and responsibilities (Ali Quaosar & Rahman, 2021).

The adoption of digitalization for human resource management may require employees to learn new skills or take on additional responsibilities. Employees may resist or find it challenging to adapt to digitization if they feel it is disrupting the traditional allocation of work or if it requires them to acquire skills outside their areas of expertise Beckhard RF, Harris RT (1987).

b. HRM practices

This study uses the HRM effectiveness theory to investigate the obstacles faced in implementing digital HRM practices in Sudan's public sector. It examines how factors

like resistance to change, technological limitations, inadequate training, and other issues can hinder the successful adoption of digital HRM practices according to *David Deng Athorbei Minister of Labour, HRD, GoSS Sudan Consortium 21st* (March, 2007). In the specific case of digitalization in the Sudanese public sector, the activities and decisions of employers regarding the implementation of digital HR management.

c. Technological Infrastructure

to aid the public sector in Sudan in effectively navigating and implementing changes, it is crucial to update the digitalization theory. Implementing digitization for HR management necessitates significant leadership changes, such as restructuring processes, updating policies, and training personnel Agostini, L., Galati, F., & Gastaldi, L. (2020). highlight that the digitalization of the innovation process, alongside the theory of change management, can offer valuable insights into how the public sector can successfully manage resistance to change and ensure smooth implementation. Figure 4 below illustrates the model and theories of the adoption of digitalisation.

d. Higher Education Policy

to streamline HR management procedures in Sudan's public sector, the Ministry of Higher Education must invest in upgrading the country's ICT infrastructure as part of its policies. This includes adopting e-government initiatives, enhancing IT platforms in Ministry of Higher Education offices, improving access to digital equipment, and upgrading internet connectivity. These improvements aim to foster information exchange, creativity, and best practices in digital HR management, thereby supporting a more efficient and effective public sector.

e. Funding Public Sector IT

to successfully overcome challenges and promote the implementation of digitalization in Sudan's public sector for human resource management, it is crucial to understand and address public sector funding (M.-F. Waxin & Bateman, 2021). Effective strategies to facilitate a smoother transition to digital HR procedures and minimize resistance include maintaining clear and open communication, offering targeted training programs, involving stakeholders in the process, and fostering a supportive

organizational culture. These approaches were emphasized during the economic conference held in Sudan in 1999.

The study investigates five potential challenges associated with the digitalization of Human Resource Management in Sudan's public sector, specifically within the Ministry of Higher Education. These challenges include bureaucratic policies, government regulation policies, digitalization barriers, and financial constraints in funding the public sector. The research also explores strategies to address these challenges, highlighting a critical issue: the lack of necessary digital skills among many public sector employees in Sudan, which hampers their effective use of technology. The study primarily builds on the conceptual framework developed by Le Tran (2002), with some modifications, as depicted in the accompanying Figure 4 conceptual research framework.

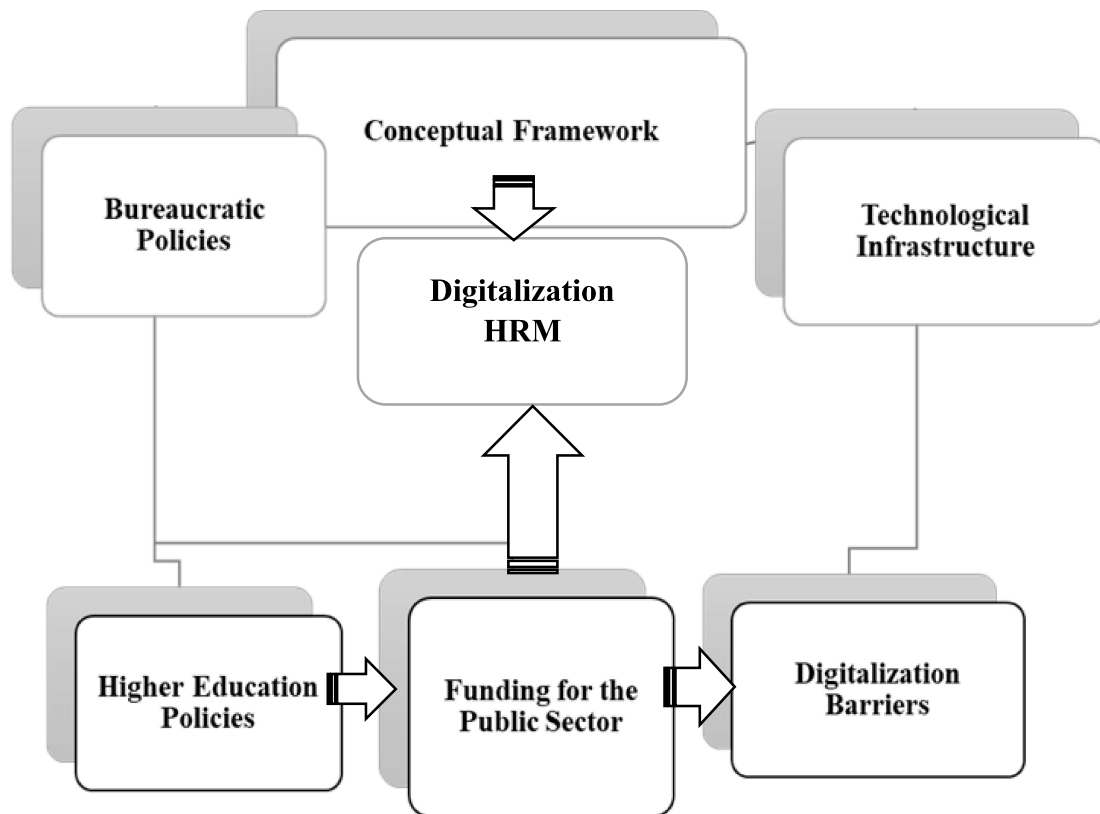


Figure 2.2 Conceptual Framework: Socure of Le Tran (2002, P-5)

The conceptual framework of this research explores various independent variables that could influence the implementation of digital human resource

management (HRM). These variables include bureaucratic policies, higher education policies, and a lack of the initial study, it was found that these factors did not directly impact the digitalization of HRM of technological infrastructure, digitalization barriers, and Funding for public sector HRM(Alford & Greve, 2017). Despite the initial study, it was found that these factors did not significantly impact the digitalization of HRM. However, contrary theories posit that these elements do meaningfully affect the digital HR analysis mentation process. These contrasting viewpoints underscore the necessity for empirical investigation to analyse and verify the relationships between these factors and the adoption of digital HRM. Such studies can help clarify how each variable potentially contributes to or hinders the digital transformation within HR departments, providing a more comprehensive understanding of the digitalization process(Lamoureaux & Sureau, 2019).

The above factors highlight both the independent and dependent variables. By embracing digitalization, Sudan's public sector can effectively transform its HRM practices. This transformation will result in more efficient operations, improved employee management, and enhanced overall performance. However, achieving this transition requires a strategic approach. It involves investing in technology, providing training for HR personnel, and developing supportive policies and frameworks.