Journal of Informatics Education and Research
ISSN: 1526-4726
Vol 5 Issue 2 (2025)

# Unlocking Potential: The Impact of Electronic Management on Human Resource Development

**Souad Nouiouat[1], Abdelkrim Letaief[2], Djihad Bouazzouz[3]**
[1]Laboratory for the Future of Algerian Economy Beyond Hydrocarbures, University of Boumerdes, Algeria.
[2]Laboratory for the Future of Algerian Economy Beyond Hydrocarbures, University of Boumerdes, Algeria.
[3]Laboratory for the Future of Algerian Economy Beyond Hydrocarbures, University of Boumerdes, Algeria.

**Received:** 23/02/2025 **Accepted:** 28/04/2025 **Published:** 08/06/2025

**Abstract:**
This study aims to analyze the role of electronic management in the development of human resources within the Sonatrach research and development center located in Boumerdes, focusing on the challenges related to its implementation and the benefits it can bring. The research problem addresses questions regarding the effectiveness of electronic management in improving HR processes such as recruitment, training, and performance evaluation, as well as the level of employee satisfaction with these systems. A descriptive and analytical approach was adopted, with 120 questionnaires distributed to employees, of which 106 were returned. The results were analyzed using SPSS software. The findings show that electronic management significantly contributes to enhancing the efficiency of human resource management, particularly by streamlining processes, improving information accuracy, increasing employee satisfaction, and boosting performance. However, certain challenges were identified, particularly regarding technological infrastructure and cultural adaptation within organizations. The study recommends strengthening infrastructure and offering specialized training programs to facilitate adaptation to digital transformation.

**Keywords:** Electronic management, Human resource development, Management efficiency, Employee satisfaction, Technological challenges.

## Introduction:

Electronic management plays an increasingly important role in the development of human resources, as it is considered a modern technology aimed at enhancing the efficiency and effectiveness of human resource management through the use of technology in various administrative processes [1]. With the rapid advancements in digital technologies, organizations are increasingly relying on electronic management to achieve their strategic objectives, highlighting the need to study its impact on human resource development.

Electronic management encompasses a set of tools and applications that enable organizations to enhance human resource management by automating various processes such as recruitment, training, performance evaluation, and payroll management. These tools not only help reduce time and costs but also provide organizations with accurate and reliable data to make more effective decisions.

Electronic management is gaining importance in the context of rapid changes in the global business environment,[2] where organizations must quickly adapt to technological and social developments. Thus, studying the impact of electronic management on human resource development becomes crucial, as it plays a key role in enhancing operational efficiency, strengthening internal communication, and supporting the continuous development of employees.

Electronic management significantly contributes to enhancing transparency within the organization by providing effective mechanisms for tracking and monitoring processes. It also enables

companies to respond quickly to market changes and challenges by analyzing data and making informed decisions.

In light of these technological advancements, electronic management has become an essential tool for achieving a competitive advantage and ensuring sustainable business growth. Consequently, studying the impact of electronic management on human resource development is not only a scientific necessity but also a practical imperative to enable organizations to achieve their strategic objectives in a dynamic business environment.

In a context of rapid digital transformation, companies face significant challenges regarding how their departments, particularly human resources, adapt to technological advancements [3]. Electronic management is one of the innovative solutions that enhance the efficiency of these departments, but its implementation raises several fundamental questions: how can electronic management effectively contribute to the development of human resources within the company?

The hypotheses of this study focus on the impacts and challenges of electronic management in human resource development. Firstly, electronic management is assumed to greatly facilitate administrative processes, leading to a significant improvement in task execution efficiency. Moreover, it simplifies training and professional development processes for employees, contributing to enhanced skills and improved job performance. Additionally, electronic management is seen as a lever for optimizing human resource performance by increasing productivity and reducing errors, thereby enabling the achievement of organizational goals more effectively. However, certain challenges are also anticipated, including the difficulty some employees may face in adapting to new systems and the high costs associated with their implementation, which could hinder the full adoption of these technologies.

This study aims to explore the impact of electronic management on the efficiency and effectiveness of human resource management. It also seeks to analyze employees' interactions with electronic systems and assess how these interactions influence their professional performance. Furthermore, the study aims to identify the challenges and opportunities organizations face when implementing electronic management in the field of human resources, with the goal of proposing suitable solutions to maximize the benefits of these systems.

## 1. Theoretical Framework

### 1.1. Electronic Management

The origin of electronic management as a modern concept is the result of a qualitative evolution driven by modern communication technologies within the context of the information revolution and the growing need to use these technologies to manage relationships between citizens and institutions [4]. This concept enables the connection of public administrations and ministries through modern technological tools, leading to a radical transformation and development of traditional management concepts.

The emergence of this concept dates back to 1992 during the election campaign of U.S. President Bill Clinton, who promised to make the "information highway" an essential element of the national infrastructure, comparable to the interstate highway system. This idea was later transferred to the administrative domain, offering the government apparatus an opportunity for change through its working methods and public services. Several European countries, such as the Netherlands, Canada, Sweden, Norway, Denmark, and Italy, followed this trend by adopting electronic governance systems [5].

Electronic management is the result of advancements in technical and informational fields, enabling public administrations to adopt advanced technical means to accomplish and execute tasks efficiently [6]. Globally, the United States was a pioneer in the field of government electronic management, followed by the United Kingdom and Austria in the last decades of the 20th century. In the Arab world, the United Arab Emirates, particularly Dubai, has made significant progress in this area.

### 1.1.1. Definition of Electronic Management

The concept of electronic management emerged recently in response to technical advancements and the rise of information and communications. It is based on the use of electronic means to carry out administrative tasks and exchange information. This includes technologies such as computers, computer networks, and email, as well as devices like phones and fax machines to facilitate task execution [7]. It can also be defined as an integrated electronic system aimed at transforming traditional management into digital management using robust information systems.

According to the World Bank, electronic management is a concept that involves the use of information and communication technologies to alter the way citizens and businesses interact with decision-making processes, facilitating better access to information, increasing transparency, and strengthening civil society [8].

In summary, electronic management, according to the researcher, is the use of modern technology and information systems in administrative processes and services, transforming traditional administrative procedures into electronic operations.

### 1.1.2. Elements of Electronic Management

The developed world's interest in leveraging information technologies stems from the numerous benefits they offer, prompting nations to adopt electronic management in their institutions. Key advantages include the simplification of administrative procedures, enhancing service delivery to citizens; significant reductions in the time needed for administrative transactions; decreased reliance on paper, fostering efficient and eco-friendly practices; and improved accuracy and objectivity in institutional operations, ensuring better outcomes and transparency. As a result, electronic management consists of the following elements:

**Paperless management**: A massive reduction in paper usage, replaced by electronic tracking.
**Location-independent management**: Based on the concept of virtual reality and remote work.
**Time-independent management**: Provides access to services at any time.
**Management without rigid structures**: Operates through networked institutions and knowledge-based intelligent organizations, requiring various software, communication systems, and qualified personnel.

### 1.1.3. Objectives of Electronic Management

The primary goal of electronic management is to transform public administration into a service-oriented platform for individuals and businesses [9]. This approach seeks to reduce administrative complexities by minimizing bureaucracy and simplifying transaction steps, promote transparency in administrative processes and information, accelerate the execution of transactions, and lower costs through the adoption of electronic systems in place of manual ones Additionally, electronic management plays a crucial role in combatting bureaucracy and corruption, further enhancing institutional efficiency and integrity.

### 1.1.4. Importance of Electronic Management

Electronic management has become indispensable in addressing the growing complexity of administrative tasks across various levels. It reduces errors and accelerates transaction processing by digitizing administrative processes, thereby streamlining interactions between individuals and administrations [10]. This system enables citizens to track their requests online, positioning electronic administration as a viable alternative to traditional human-led administration. Furthermore, it aligns with the demands of globalization and the digital economy, reinforcing its relevance in modern governance.

## 1.2. Human Resource Development

### 1.2.1. Historical Evolution of the Concept of Human Resource Development

Human resource development is rooted in a historical context of administrative practices that are still recognizable today. The development of human resources in the United States and the United Kingdom during the 20th century occurred in four main phases:

- From the early 20th century to the 1970s, classical management theories, such as scientific management and human relations, left a complex legacy of ideas about the nature of work.
- In the 1980s, international competition and the growing interest in strategic approaches led to the emergence of disciplines often perceived as vague, such as human resource management.
- From the late 1970s to the 1990s, organizational learning and knowledge management highlighted the importance of human resources, or human capital.
- The contemporary organizational model is characterized by its focus on efficiency, job security, integration of policies, and the distinction between ideal and real organizations [11].

Knowledge of industrial history is essential for understanding current organizational conditions and for acquiring the necessary wisdom through reflection and gaining informed perspectives [12]. Since the early 20th century, management techniques and methods have been examined more closely, particularly in industrial societies like the United Kingdom and the United States. Human resource development thus takes place in a context of tensions between individual and organizational needs, and between different approaches to establishing harmonious working relationships in an ever-changing work environment. Although historical differences have shaped current conditions, modern managers around the world must avoid the mistakes of the past and invest in long-term sustainable development.

### 1.2.3. Definition of Human Resource Development

Human resource development is defined as "the proper preparation of the human element according to the needs of society. With the increase in human knowledge and abilities, the exploitation of natural resources improves, while also enhancing the strength and efforts of the individual" [13]. It is a process aimed at increasing the knowledge, abilities, and skills of the workforce in various fields, selected based on various criteria. Human resource development is also described as "a phase that occurs after the appropriate people have been obtained for a job. Its goal is to improve their skills and expertise through training tailored to the work to be done" [14].

According to Ahmed Mansour, human resource development represents one of the essential pillars for energizing, refining, preserving, and developing human skills in their scientific, practical, technical, and behavioral dimensions. It is an educational process that transmits knowledge, theories, principles, values, and philosophies to increase an individual's ability to work and produce

In summary, human resource development is one of the most important actions that institutions seek to adopt to achieve excellence and distinction in their fields. It is a comprehensive process aimed at increasing and improving the knowledge, skills, abilities, and qualifications of employees through organized and planned activities.

**1.2.4. Mechanisms of Human Resource Development**: Nowadays, organizations seek to attract and retain their human resources, as these represent the fundamental pillar of the organization's success, stability, and growth. To achieve this goal, they must implement a number of mechanisms to develop and enhance these resources. Here are some of them [15]:

**Training:** Continuing education plays a crucial role in improving the effectiveness of institutions by refining employees' skills and abilities, enabling them to enhance their performance and keep up with new trends and developments in their internal or external work environment. Training has become an essential requirement for institutions seeking to improve the quality of their services.

**Education:** Education is one of the key elements of economic progress, as it helps increase the productive efficiency of employees. It is not just education in the broad sense, but training in

modern production techniques to enable workers to master the scientific and technical aspects of their profession.

**Continuous Training:** This mechanism is of great importance for organizations, as the resources allocated to training are not a waste, but an investment, especially in an era where economic, social, and technological developments have a major impact on the objectives of organizations.

**Salaries and Incentives:** Salary plays a key role in motivating employees, especially when it is linked to productivity. A well-designed system of economic and moral incentives helps meet employees' needs and fosters competition among them.

**Strategic Planning:** This is a crucial concept for modern organizations. They must constantly anticipate their staffing needs and prepare plans to maximize the use of their current and future human resources. This facilitates the recruitment process and allows for aligning resources with the organization's goals.

**1.2.5. Human Resource Development in the Knowledge Era**: Today, the importance of human resources in knowledge-related sectors continues to grow in comparison to resources tied to material and industrial production. Employees with skills in programming and systems analysis, for example, are in increasing demand. The success of modern businesses therefore depends on the quality of their human capital.

The knowledge era is characterized by the increasing importance of human resources as a key competitive advantage for businesses, emphasizing the value of skilled and innovative personnel. Organizational structures are evolving, with a shift toward smaller, more agile teams and a focus on investing in knowledge development. Additionally, informational components have become predominant in production processes, surpassing material components, reflecting the transition to a knowledge-driven economy where information and expertise are central to value creation.

## 2. Materials and Methods

### 2.1. Operational Analysis of the Field Study

**2.1.1. Data Collection Methods**: Several data collection methods were used in this study to ensure the acquisition of accurate and complete information, reflecting the impact of electronic management on human resource development in the institution under study. Here are the data collection methods used:

- **The Questionnaire**: The questionnaire was the primary data collection tool. A questionnaire based on a five-point Likert scale was designed to measure employees' opinions on the impact of electronic management on the development of their skills and professional performance. The questionnaires were distributed to a random sample of employees from the institution.
- **Individual Interviews**: Semi-structured interviews were conducted with certain managers and supervisors within the institution to gather their views on how the use of electronic management has improved the training and professional development processes for employees.
- **Direct Observation**: Direct observation was used during training sessions based on electronic systems. These observations helped assess how digital technology was used to enhance employees' skills and improve communication between departments.
- **Official Documents**: Documents and internal reports from the institution regarding the use of electronic management in training, development, and performance evaluation processes were collected. These documents provided essential information to understand how electronic management enhances human resource performance.

To better clarify the situation, a conceptual model was developed to illustrate the study's variables and their relationship, as shown in the following figure:

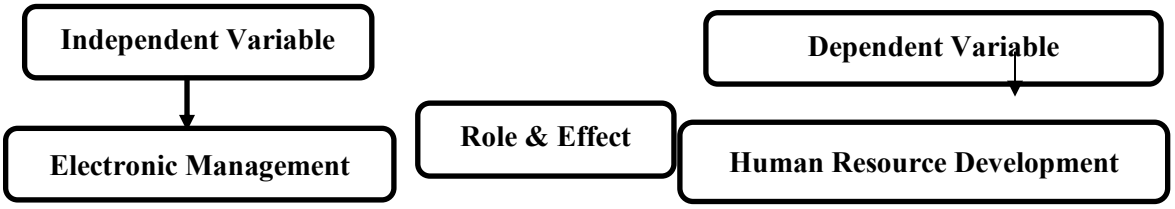


**Figure 1.** Conceptual Model of the Study (Source: Prepared by the Researchers)

**2.1.2. Study Methodology:** The study relies on the descriptive and analytical method, one of the most widely used methods in social and administrative studies. This method involves describing phenomena as they exist in reality and analyzing them to draw precise and understandable conclusions. In this study, the descriptive and analytical method was used to understand the role of electronic management in the development of human resources within institutions. This method is suitable for topics requiring a deep understanding of current phenomena and their impacts, especially when analyzing systems and modern technologies like electronic management. It allows for a comprehensive description of the phenomenon under study, as well as an analysis of the collected data to draw conclusions and make recommendations.

### 2.2. Population and Sample of the Study

The population of the study represents the entire group of elements or individuals concerned with the research or study topic. In other words, it includes all the elements related to the research problem. This study was conducted on a group of workers performing their tasks at the research and development center of the company Sonatrach in the Boumerdes region. The sample, on the other hand, is a subset of the studied population, selected in a specific way to conduct the study, and the results obtained are then generalized to the entire initial population. The sample of the study included the distribution of 120 questionnaires, of which 106 were returned and deemed valid for statistical analysis, as shown in Table 1.

**Table 1.** Number of Questionnaires Distributed and Collected

| Number of Questionnaires Collected | Number of Questionnaires Distributed |
|---|---|
| 120 | 106 |

**Source:** Prepared by the researchers

### 2.2. Distribution of Sample Individuals by Gender

To analyze the distribution of the sample by gender, frequencies and percentages were used. The results are presented as follows:

**Table 2.** Distribution of the Sample by Gender

| Gender | Frequency | Percentage (%) |
|---|---|---|
| Male | 38 | 35.0 |
| Female | 68 | 65.0 |
| Total | 106 | 100% |

**Source:** Compiled from the questionnaire results

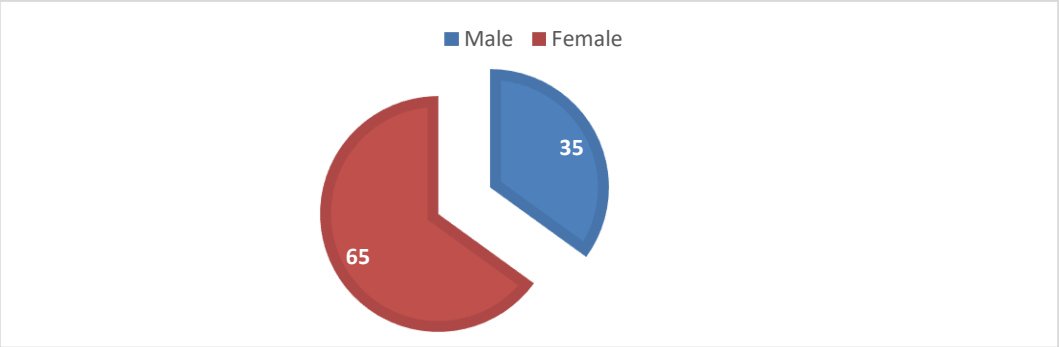


**Figure 2.** Graphical representation of the sample distribution by gender

The distribution of sample individuals by gender. Women represent 65% of the sample, while men represent 35%, indicating a majority of women in this study.

## 3. Results

### 3.1. Distribution of the sample by age

**Table 3.** Distribution of the Sample by Age

| Age Group | Frequency | Percentage (%) |
|---|---|---|
| 25 to 35 years | 47 | 44.0 |
| 36 to 45 years | 41 | 38.0 |
| 46 to 55 years | 18 | 18.0 |
| Total | 106 | 100% |

**Source:** Compiled from the questionnaire results

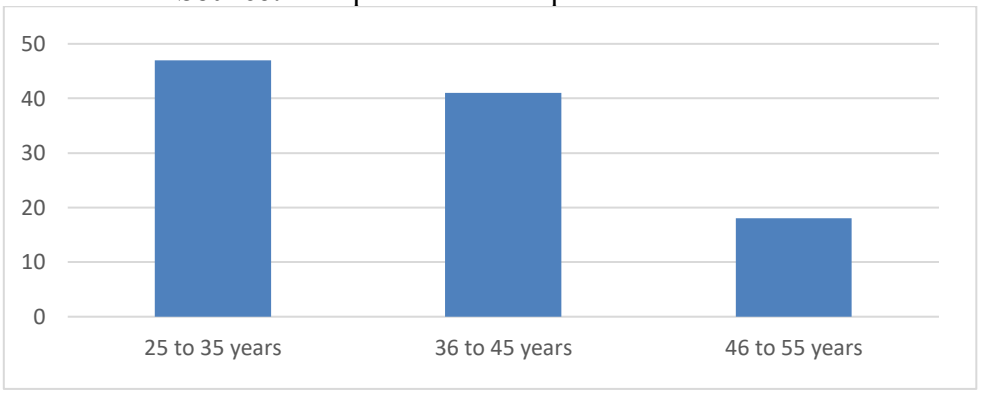


**Figure 3.** Distribution of the Sample by Age

The figure shows that the majority of participants (44%) are between 25 and 35 years old, followed by those aged 36 to 45 years (38%), and 18% are between 46 and 55 years old.

### 3.2. Distribution of the sample by education level

**Table 4.** Distribution of the sample by education level

| Education level | Frequency | Percentage (%) |
|---|---|---|
| Middle and Secondary Level | 37 | 37,0 |
| University Level | 41 | 41,0 |
| Higher Degree | 22 | 22,0 |
| Total | 100 | 100 % |

**Source:** Prepared from the results of the questionnaire

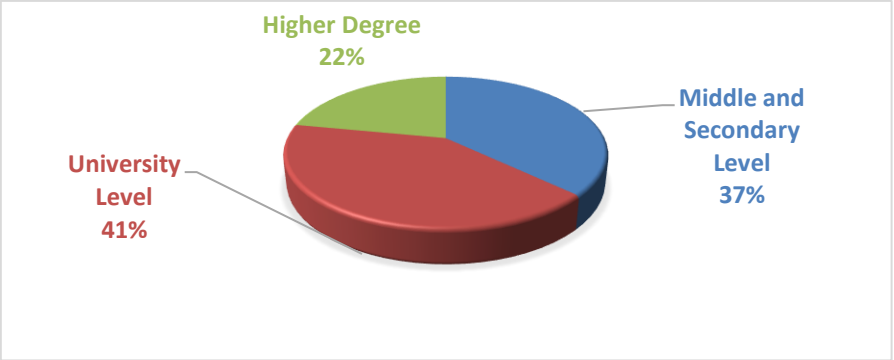


**Figure 4.** Distribution of the sample by education level

The figure shows that 41% of the participants hold a university degree, followed by those with a middle and secondary education level (37%), while 22% hold a higher degree.

### 3.3. Distribution of the sample by marital status

**Table 5.** Distribution of the sample by marital status

| Marital Status | Frequency | Percentage (%) |
|---|---|---|
| Single | 56 | 56,0 |
| Married | 44 | 44,0 |
| Total | 100 | 100 % |

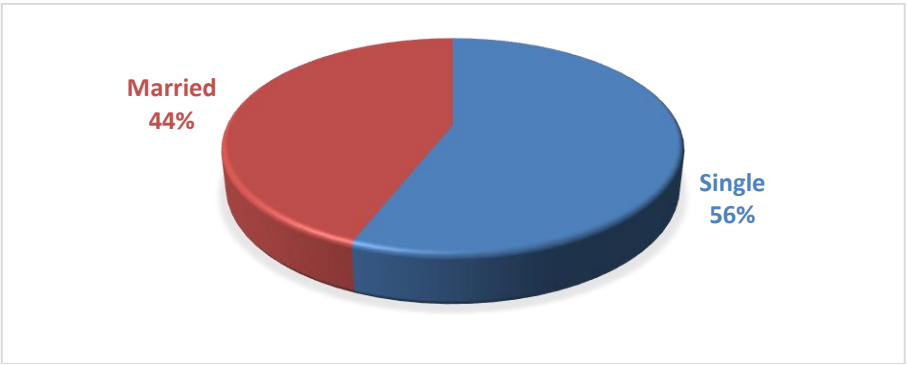


**Figure 5.** Distribution of the sample by marital status

The figure shows that 56% of the individuals in the sample are single, while 44% are married.

### 3.4. Distribution of the sample by years of experience

**Table 6.** Distribution of the Sample According to Years of Experience

| Years of experience | Frequency | Percentage (%) |
|---|---|---|
| Between 5 and 10 years | 53 | 53,0 |
| Between 10 and 15 years | 31 | 31,0 |
| More than 15 years | 16 | 16,0 |
| Total | 100 | 100 % |

**Source:** Prepared from the results of the questionnaire

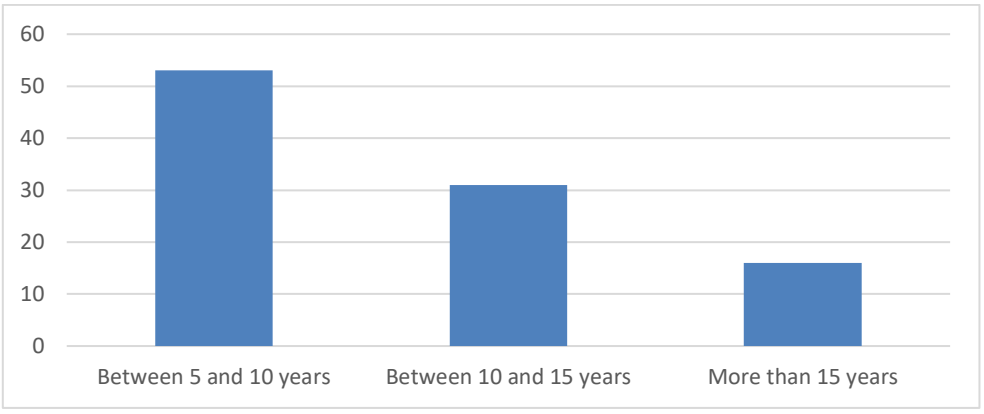


**Figure 6.** Distribution of the Sample According to Years of Experience

According to the table and figure above, the majority of the study participants (53%) have between 5 and 10 years of professional experience, while 31% have between 10 and 15 years of experience. The category with more than 15 years of experience represents 16%.

### 3.5. Study Scale

The study scale was designed based on the five-point Likert scale, used to measure the degree of agreement or disagreement of participants with the statements included in the questionnaire. The scale includes the following ratings:

**Table 7.** Evaluation Scale and Grading Distribution

| Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree | Evaluation |
|---|---|---|---|---|---|
| **Grade** | **5** | **4** | **3** | **2** | **1** |

This scale aims to measure the impact of electronic management on the development of human resources through axes such as: improving employee skills, increasing functional efficiency, and facilitating training and development processes.

### 3.6. Validity of the Tool

• **Face Validity**: The questionnaire was presented to a group of experts in electronic management and human resources to verify the clarity of the questions and their relevance to measuring the impact of electronic management. The experts provided their feedback, and some questions were modified to ensure the face validity of the tool.

• **Construct Validity**: A construct validity analysis was conducted to ensure that the questions in the questionnaire accurately measure the various aspects of electronic management and human resource development. A factor analysis was performed to determine the consistency of the questions with the axes and hypotheses posed.

### 3.7. Reliability of the Study Tool

**Cronbach's Alpha Coefficient**: To ensure the reliability of the tool, Cronbach's alpha coefficient was calculated to measure the consistency of responses to the various questions in the questionnaire. If the value of Cronbach's alpha exceeds 0.70, the tool is considered sufficiently reliable.

**Table 8.** Results of the Cronbach's Alpha Coefficient

| **Cronbach's Alpha** | **Variables** |
|---|---|
| 0.80 | Role of electronic management in human resources development |
| 0.82 | Improvement of functional efficiency |
| 0.79 | Facilitation of training and development processes |

**Source:** Prepared by the researchers

These values indicate that the study tool demonstrates a high degree of reliability, which enhances the credibility of the results.

### 3.8. Statistical Methods Used

This study relies on several statistical methods to analyze the data and test the hypotheses, including:

• **Cronbach's Alpha Test**: This test was used to verify the reliability of the measurement tool. If the value of Cronbach's alpha exceeds 0.70, it means the tool is sufficiently reliable, indicating that the results are reproducible if the study is repeated.

• **Pearson Correlation Coefficient**: The Pearson correlation coefficient was used to measure the strength of the relationship between the use of electronic management and the development of employee skills, as well as the improvement of functional efficiency. This coefficient determines the strength and direction of the relationship; if it is positive and close to 1, it indicates a strong positive relationship between the two variables.

• **Coefficient of Determination ($R^2$)**: The coefficient of determination ($R^2$) was calculated to measure the percentage of variance in the dependent variable (employee skills development and functional efficiency improvement) that can be explained by the independent variable (use of electronic management).

## 4. Discussion

### Analysis and Testing of the Study Hypotheses

**First Hypothesis**: Electronic management significantly contributes to facilitating administrative processes, leading to an increase in the efficiency of administrative task execution.

• **Appropriate Statistical Test**: We will use the Pearson correlation coefficient to measure the relationship between electronic management (independent variable) and efficiency in the execution of administrative tasks (dependent variable). After entering the data into the statistical analysis software (SPSS), the results are as follows:

**Table 9.** Correlation Coefficient Between Electronic Management and Efficiency in Performing Administrative Tasks

| Significance Level (p) | Correlation Coefficient (r) | Variables |
|---|---|---|
| 0.000 | 0.80 | Electronic Management |
| | | Efficiency in Performing Administrative Tasks |

**Source:** Prepared by the researchers

Based on the analysis of Table No. 8, which presents the results of the Pearson correlation test between electronic management (independent variable) and efficiency in the execution of administrative tasks (dependent variable), we can conclude the following points:

- **Correlation coefficient (r = 0.800):** This figure indicates a very strong positive relationship between electronic management and increased efficiency in the execution of administrative tasks. In other words, as the use of electronic management within the organization improves, the efficiency in executing administrative tasks also increases. The correlation coefficient of 0.800 shows that the relationship is strong and close to the maximum possible value.
- **Significance level (p = 0.000):** This significance level shows that the results are statistically very significant because the p-value is well below 0.05 ($p < 0.05$). This means that the relationship between electronic management and administrative efficiency is not due to chance but is real and supported by the data. Therefore, the hypothesis that electronic management contributes to facilitating administrative processes and increasing efficiency in task execution can be accepted.

These results confirm that the application of electronic management improves administrative efficiency by facilitating processes, reducing human errors, and accelerating task execution. Electronic management provides an automated work environment that allows employees to access information quickly, collaborate efficiently, and make decisions faster and with greater accuracy. Furthermore, automation and digital transformation technologies reduce operational costs and increase the quality of work, which has a positive impact on the overall performance of the organization.

Based on these results, it is recommended to adopt more electronic management technologies within organizations and train employees to use them effectively in order to maximize the benefits related to efficiency in business management.

**Second hypothesis:** The use of electronic management contributes to facilitating the training and professional development processes of employees, which enhances their skills and professional performance.

- **Appropriate statistical test:** We will use the Pearson correlation coefficient to measure the relationship between electronic management (independent variable) and the professional development of employees (dependent variable). After entering the data into the statistical analysis software (SPSS), the results are as follows:

**Table 10.** Correlation Coefficient Between Electronic Management and Employees' Professional Development

| Significance Level (p) | Correlation Coefficient (r) | Variables |
|---|---|---|
| 0.002 | 0.75 | Electronic Management |
| | | Employees' Professional Development |

**Source:** Prepared by the researchers

Based on the analysis of Table 10, which presents the results of the Pearson correlation test between electronic management (independent variable) and the professional development of employees (dependent variable), we can conclude the following points:

• Correlation coefficient ($r = 0.75$): This figure shows that there is a strong positive relationship between electronic management and the improvement of training and professional development processes for employees. This means that an increase in the use of electronic management is associated with a significant improvement in the training and development processes for employees. The strength of the relationship at 0.75 indicates a strong correlation between the two variables.

• Significance level ($p = 0.002$): This significance level ($p < 0.05$) indicates that the results are statistically significant, meaning that the observed relationship between electronic management and the professional development of employees is not due to chance, but is real and confirmed by statistical data.

The results indicate that the use of electronic management plays a key role in facilitating and organizing training and professional development processes within organizations. Through electronic management, employees can easily access electronic training programs, whether offered via online learning platforms or human resource management systems. These tools contribute to providing opportunities for continuous training, which improves employee skills and directly influences their professional performance.

Moreover, electronic management allows for personalized training guidance by monitoring performance and identifying training needs through data analysis. This helps improve functional efficiency and increase the professional performance levels of employees.

Based on these results, it is recommended that organizations adopt electronic training systems supported by electronic management to enhance the effectiveness of continuous professional development for employees, leading to improved overall performance and increased productivity.

**Third Hypothesis:** Electronic management improves human resource performance by increasing productivity and reducing errors, which helps achieve organizational goals more efficiently.

• **Appropriate statistical test:** We use simple linear regression to measure the impact of electronic management on human resource performance (productivity and error reduction).

**Results of the statistical analysis (SPSS):**

**Table 11.** Coefficient of Determination for the Impact of Electronic Management on Human Resources Performance

| Significance Level (Sig) | Coefficient of Determination ($R^2$) | Variables |
|---|---|---|
| 0.65 | 0.000 | Impact of Electronic Management on Human Resources Performance |

**Source :** Prepared by the researchers

- **Coefficient of determination ($R^2$ = 0.65):** This coefficient indicates that 65% of the variations in human resource performance can be explained by electronic management. This shows a strong relationship between the use of electronic management and the improvement of human resource performance. It means that the adoption of electronic management systems has a significant and visible impact on improving productivity and reducing errors within human resources.
- **Significance level (Sig = 0.000):** This level shows that the results are not due to chance. With such a low significance level (Sig < 0.001), there is a very high confidence in the results, confirming that electronic management has a significant and statistically meaningful effect on human resource performance.

The results show that companies that adopt electronic management systems are likely to experience substantial improvements in employee performance. The increase in productivity and reduction in errors are tangible outcomes achieved through the increased use of digital technologies in human resource management.

**Fourth Hypothesis**: There are challenges related to the implementation of electronic management in human resource development, such as the difficulty of adapting some employees and the high costs of implementing the systems.

- **Appropriate statistical test:** We use simple linear regression to measure the impact of challenges (such as difficulty in adaptation and high costs) on the implementation of electronic management.

**Results of the statistical analysis (SPSS):**

**Table 12.** Coefficient of Determination for the Impact of Challenges on the Implementation of Electronic Management

| Significance Level (Sig) | Coefficient of Determination ($R^2$) | Variables |
|---|---|---|
| 0.000 | 0.50 | Impact of Challenges on the Implementation of Electronic Management |

**Source:** Prepared by the researchers

• **Coefficient of determination** ($R^2$ = 0.50): This coefficient indicates that 50% of the variations in the success of the electronic management implementation can be explained by challenges, such as employee adaptation difficulties and high implementation costs.

• **Significance level** (Sig = 0.000): With such a low significance level (Sig < 0.001), it is clear that these challenges have a significant impact on the implementation of electronic management. This suggests that organizations must take these challenges into account to successfully implement electronic management systems.

succeed in implementing electronic management systems. The results show that obstacles such as adaptation difficulties and high costs have a significant impact on the implementation of electronic management. Therefore, it is recommended that organizations:

• Provide adequate training to facilitate employees' adaptation to new systems. • Seek solutions to reduce costs, such as using cloud computing or collaborating with IT service providers to ease initial investments.
These measures can help overcome challenges and ensure the success of electronic management in improving human resource performance and achieving organizational goals.

**General Discussion**:
The results obtained in this study show a clear positive impact of the implementation of electronic management on the efficiency and performance of human resource management, in line with the study's initial hypotheses. Comparing these results with previous studies, it can be stated that electronic management has greatly contributed to improving administrative performance and increasing employee satisfaction, while highlighting the challenges related to infrastructure and cultural adaptation.
The results confirm that electronic management improves the efficiency of human resource management by enhancing the accuracy of information and accelerating task execution. This supports the conclusions of Boussaourine Firoz's (2022) study, which stated that the implementation of electronic management helps reduce administrative procedures and improves the quality of decisions through precise and easily accessible data. Electronic management facilitates decision-making processes within organizations by providing tools that allow for faster and more accurate access to information.Haut du formulaire
The results also show that the implementation of electronic management plays an important role in improving employee satisfaction and performance. This finding is consistent with the study by Belkremi Sihem (2020), which emphasizes that electronic management contributes to enhancing job satisfaction by improving the work environment and providing tools that clarify professional roles. These results suggest that organizations that adopt electronic management are able to create a work environment that motivates employees to improve their performance and increase their job satisfaction.
On the other hand, the results highlight the challenges related to technological infrastructure and cultural adaptation to electronic systems. These challenges align with the study by Khesou Mostapha and Ben Abbo El Djilali (2021), which explored the obstacles faced by Algerian organizations in this area. Infrastructure-related challenges include the need to develop technological systems that meet the requirements of electronic management, while cultural adaptation emerges as a key factor for ensuring the success of digital transformation. These results confirm that the transition to electronic management is not only reliant on the availability of technology but also requires efforts to develop an organizational culture open to change.

**Conclusion**
In light of the results obtained in this study, it can be concluded that electronic management is an effective tool that significantly contributes to improving the efficiency of human resource management within organizations. The study successfully addressed the main question raised in the introduction, namely how electronic management contributes to the development of human resources. It appears that digital transformation enhances the accuracy of information, speeds up task execution, and increases employee satisfaction, ultimately improving their professional performance.
However, it has been demonstrated that challenges remain, particularly those related to technological infrastructure and cultural adaptation within organizations, confirming that the implementation of electronic management cannot succeed without effective management of these challenges. Furthermore, electronic systems promote internal communication between departments and facilitate the decision-making process, thereby strengthening the overall performance of the organization.

Based on this study, several recommendations are proposed to enhance the adoption of electronic management. Organizations should prioritize improving their technological systems to support a seamless transition to electronic management. Employee training programs are essential to build familiarity with new technologies and enhance adaptability. Promoting a digital culture within organizations is crucial to fostering acceptance of change and encouraging innovation. Additionally, strengthening the use of electronic tools can significantly improve internal communication and ensure an efficient flow of information, contributing to overall organizational effectiveness.

This study represents a first step in understanding the impact of electronic management on human resource development. However, many aspects still require further research. Theoretically, it would be useful to expand the research scope to include the study of cultural and organizational factors that could facilitate or complicate the implementation of electronic management. Additionally, a deeper study of the psychological and social factors related to employees' adaptation to these new systems is necessary.

From a practical perspective, the research could be extended to different types of organizations, whether public or private, to understand how electronic management impacts various contexts. Comparative studies between countries that have successfully implemented electronic management and those still facing challenges could also provide additional insights on how to overcome infrastructure and cultural adaptation barriers.

Finally, the role of future technological advancements, such as artificial intelligence and the Internet of Things, could be explored to assess their contribution to improving electronic management and the efficiency of human resource management. These studies would help organizations better adapt to rapid digital transformations and achieve better outcomes.

**References**

[1] A. AlHamad et al., "The effect of electronic human resources management on organizational health of telecommuni-cations companies in Jordan," International Journal of Data and Network Science, vol. 6, no. 2, pp. 429-438, 2022.

[2] A. Botha, D. Kourie, and R. Snyman, Coping with continuous change in the business environment: Knowledge management and knowledge management technology. Elsevier, 2014.

[3] A. Bansal, T. Panchal, F. Jabeen, S. K. Mangla, and G. Singh, "A study of human resource digital transformation (HRDT): A phenomenon of innovation capability led by digital and individual factors," Journal of Business Research, vol. 157, p. 113611, 2023.

[4] S. C. Certo and S. T. Certo, Modern management: Concepts and skills. Pearson, 2019.

[5] M. Zioło et al., "E-government development in European countries: Socio-economic and environmental aspects," Energies, vol. 15, no. 23, p. 8870, 2022.

[6] P. C. Franks, Records and information management. American Library Association, 2013.

[7] L. L. Peterson and B. S. Davie, Computer networks: a systems approach. Morgan Kaufmann, 2007.

[8] E. Yonazi, T. Kelly, N. Halewood, and C. Blackman, The transformational use of information and communication technologies in Africa. World Bank, 2012.

[9] S. Khoshafian, Service oriented enterprises. Auerbach Publications, 2016.

[10] D. F. Kettl, The transformation of governance: Public administration for the twenty-first century. Jhu Press, 2015.

[11] M. F. Guillén, Models of management: Work, authority, and organization in a comparative perspective. University of Chicago Press, 1994.

[12] H. L. Wilensky, Organizational intelligence: Knowledge and policy in government and industry. Quid Pro Books, 2015.

[13] P. A. David, "Knowledge, capabilities and human capital formation in economic growth," New Zealand Treasury Working Paper, 2000.

[14] W. J. Rothwell and H. C. Kazanas, Improving on-the-job training: How to establish and operate a comprehensive OJT program. John Wiley & Sons, 2004.
[15] U. S. Sheikh, "Human Resource Development Mechanisms and Organizational Performance: Measuring a Causal Link," Pacific Business Review International, vol. 10, no. 7, 2018.