

## The Impact of Information and Communication Technology on Human Resource Management and Employee Engagement: A Case Study of Condor Group in Bordj Bou Arreridj in Algeria

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### Abstract:

Our study aimed to identify the impact of information and communication technology (ICT) on human resource management and employee engagement at Condor Company in Bordj Bou Arreridj.

The study sample consisted of 484 employees, and SPSS V26 was used to test the validity and reliability of the study, while AMOS V24 was used to test the study hypotheses.

The study concluded that there is a statistically significant effect for each dimension of information and communication technology (ICT) (individuals, programs and database) on human resource management, and the results showed a negative impact of the networks and communications dimension on human resource management at Condor Company, and no effect of the hardware dimension on human resource management .

Likewise, there is a statistically significant effect for each dimension of information and communication technology (ICT) (individuals, Physical Devices, networks and communications) on employee engagement, and no effect of the programs and database dimensions on employee engagement.

This indicates the institution's reliance on information technology and its contribution to creating creativity and innovation among its employees, which would affect the administrative and technical functions of human resource management and achieve job satisfaction for employees, thus achieving employee engagement at the institution under study.

**Keywords:** Information and communication Technology, human resource management (HRM), work engagement, Condor Company in Bordj Bou Arreridj .

## **1. Introduction:**

Information and communication technology (ICT) plays a pivotal and essential role in empowering entrepreneurs to transform their ambitions into tangible achievements by developing comprehensive business plans covering all aspects of the project.

In a deeply changing economic and social environment, organizations face increasing challenges and evolving management approaches, necessitating the adoption of innovative methods to understand and effectively address these transformations.

With the spread of economic globalization, the need to provide new and superior solutions characterized by high quality, achieved through the integration of expertise with creativity and innovation, becomes paramount.

The increasing reliance on information and communication technology has profoundly impacted organizations in various aspects, whether at the level of organizational form and structure, particularly human resource management, or through the provision of a diverse range of strategic options that contribute to improving and streamlining their operations.

The effects of ICT have positively impacted the organizational performance of institutions, which in turn has led to the integration and immersion of employees in their jobs by enhancing their innovative capabilities and increasing their operational and strategic efficiencies, thereby making the management of administrative, human, and marketing processes more effective and sustainable.

**1.1. Problem Statement:** Based on the foregoing, the following question can be posed:

**- What is the impact of information and communication technology on human resource management and employee job engagement at Condor Company in Bordj Bou Arreridj?**

From this problem, we pose the following sub-questions:

- To what extent are the dimensions of information and communication technology available at Condor Company in Bordj Bou Arreridj?

-Is there significant attention paid to human resource management at Condor Company in Bordj Bou Arreridj?

- Is there significant attention paid to job engagement at Condor Company in Bordj Bou Arreridj?

- Is there a statistically significant effect between information and communication technology and human resource management at Condor Company in Bordj Bou Arreridj?

- Is there a statistically significant effect between information and communication technology and job engagement at Condor Company in Bordj Bou Arreridj?

## **1.2 Hypotheses:**

In light of the previous presentation and in an attempt to answer the questions posed above, the following hypotheses can be formulated for discussion and testing, which can be summarized as follows:

**- First Main Hypothesis:**

**- H1:** There is a statistically significant positive effect between information and communication technology and human resource management at Condor Company in Bordj Bou Arreridj.

It includes five sub-hypotheses:

**- H1.1:** There is a statistically significant positive effect between the Individuals dimension and human resource management at Condor Company in Bordj Bou Arreridj.

- **H1.2:** There is a statistically significant positive effect between the Programs dimension and human resource management at Condor Company in Bordj Bou Arreridj.
- **H1.3:** There is a statistically significant positive effect between Physical Devices dimension and human resource management at Condor Company in Bordj Bou Arreridj.
- **H1.4:** There is a statistically significant positive effect between the database dimension and human resource management at Condor Company in Bordj Bou Arreridj.
- **H1.5:** There is a statistically significant positive effect between the networks and communications dimension and human resource management at Condor Company in Bordj Bou Arreridj.

- **Second Main Hypothesis:**

**H2: There is a statistically significant positive effect between information and communication technology and job engagement at Condor Company in Bordj Bou Arreridj.**

It includes five sub-hypotheses:

- **H2.1:** There is a statistically significant positive effect between the Individuals dimension and job engagement at Condor Company in Bordj Bou Arreridj.
- **H2.2:** There is a statistically significant positive effect between the Programs dimension and job engagement at Condor Company in Bordj Bou Arreridj.
- **H2.3:** There is a statistically significant positive effect between Physical Devices dimension and job engagement at Condor Company in Bordj Bou Arreridj.
- **H2.4:** There is a statistically significant positive effect between the database dimension and job engagement at Condor Company in Bordj Bou Arreridj.
- **H2.5:** There is a statistically significant positive effect between the networks and communications dimension and job engagement at Condor Company in Bordj Bou Arreridj.

### **1.3 Research Objectives:**

Through this study, we aim to achieve the following objectives:

- To provide and clarify the most important scientific concepts for each of information technology, human resource management, and job engagement.
- To reveal the extent to which the dimensions of information technology are available at Condor Company in Bordj Bou Arreridj.
- To identify the impact of information technology on both human resource management and job engagement.

### **1.4 Research Methodology:**

In our study, we relied on the descriptive approach in the theoretical and field aspects, based on various sources and references. We also relied on the use of SPSS V26 software to test the validity and reliability of the study, and on AMOS V24 software to analyze the

### **1.5 Previous Studies:**

- **Study by (Kiarash Fartash et al, 2018): The impact of technology acquisition & Exploitation on Organizational innovation and Organization performance in knowledge-Intensive Organizations (Fartash & al, 2018, pp. 1497-1507).**

This study analyzed the relationship between technology acquisition and exploitation, organizational innovation, and organizational performance in advanced organizations in Iran. The study included managers, executives, and research and development managers, and estimated 280 questionnaires valid for analysis.

The study concluded with a set of results:

- Technology acquisition and exploitation have a positive impact on both organizational innovation and organizational performance.
- Organizational innovation has a significant positive impact on improving organizational performance.
- **Study by (Lamine Allouti, 2008), The impact of information and communication Technology on human resource management in the institution, a thesis submitted for a doctorate in management sciences, university of Algiers (El-Hazzam, 2008).**

In this work, the researcher attempted to address the various applications of information and communication technology, studying the impact of information and communication technology on employment and job creation, and reached a set of results, the most important of which are:

- The existence of a clear impact of the knowledge economy in achieving the competitiveness of institutions, by focusing and preparing human capital and infrastructure on creating innovative management and localizing technology.
- Reconsidering the current applications of management information systems, and adopting a clear strategic vision in designing, building, and applying management information systems in institutions.
- **Study by (Thanaa Abdul Karim, 2018) "The Relationship of Using Technological Techniques to Functional Creativity: A Field Study at the University of Babylon" (Rahim, 2018, pp. 201-223).**

This study demonstrated the relationship between the use of technological techniques and functional creativity. A sample of 70 questionnaires was used, valid for analysis using descriptive and inferential statistical methods, to show the impact of the independent variable on the dependent variable. The study concluded with a set of results:

- There is a correlation between technological techniques and functional creativity.
- High level of use of technological techniques and functional creativity among employees.

## 1.6 Research Gap:

The most important features that distinguish the current study from its predecessors can be clarified as follows:

- **In terms of objective and subject:** Our study aims to test the impact of information and communication technology on human resource management and job engagement in the economic sector, and is distinguished by introducing modern dimensions in the study model such as job engagement instead of general human resource management practices, and this differs from all previous studies.
- **In terms of the field of application:** Our study was applied to the Condor institution in Bordj Bou Arreridj, which is a different society from what some previous studies dealt with, especially since it did not address three variables together on the same study population, where the application was generally on academic university institutions.

## 1.7 Study Model: As illustrated in Figure (01):

**Figure 01:** Study Model.

**Figure 01:** Study Model prepared by the researchers based on previous studies.

## 2. Theoretical Framework of the Study:

### 2.1 Concept of Information and Communication Technology (ICT):

Information and Communication Technology is defined as: "The use of modern technology to collect, process, store, retrieve, and deliver information, whether in the form of digital data, text, audio, or image" (Paquin, 1990).

Information technology is also defined as "the devices, equipment, methods, and means that humans use and may use in the future to obtain audio, visual, and digital information, as well as processing that information in terms of recording, organizing, arranging, storing, possessing, retrieving, displaying, reproducing, broadcasting, and delivering it in a timely manner to those who request it. It includes storage and retrieval technology and communication technology ".

Furthermore, Information and Communication Technology means all types of technology used in the operation, transmission, and storage of information in electronic form, including computer technology, means of communication, networks, fax machines, and other equipment that is heavily used in communication (Souad & Boubakour, 2004).

Information and Communication Technology is also defined as a set of elements and capabilities used to collect, store, and disseminate data and information using computer and communication technology with high speed and efficiency to create something useful that helps in the development of societies (Ebert, 2007).

Information technology is considered "one of the determinants upon which the survival and continuity of organizations are built. It can be functionally defined as the use of advanced technologies in converting data in its various forms into information of various types, which is used by beneficiaries in all areas of life " (Johar, 2013, pp. 207-221), especially decision-makers in institutions to manage change, and everything their organization needs in a highly competitive changing environment, and then invest it in achieving the goals of the organization they manage (Qandilji & Alaa El-Din, 2008, p. 32).

Information and Communication Technology includes technical and ready-made programs, databases, networks, many computers, and other related elements (Al-Kasasbeh, 2011, p. 35).

From the above, we can say that Information and Communication Technology consists of a set of data and information that is processed by many techniques and programs with the aim of making structural changes in the structure of various businesses and services in order to improve and develop performance.

## **2.2 Dimensions of Information and Communication Technology:**

In our study, we will try to focus on five dimensions of Information and Communication Technology, which are (Amara & Atia, 2019, p. 156):

- **Individuals:** They are the individuals who manage and operate Information and Communication Technology, including administrators, specialists, and end-users of the system. Individuals play a significant role in managing and operating the information system, exceeding the importance of physical requirements.

- **Programs:** These are the means by which computers are managed and full control over information is exercised.

- **Physical Devices:** These are all the physical components that include computers and their peripherals used in entering, processing, and outputting data.

- **Database:** It is a collection of logical data elements that are related to each other by mathematical relationships, stored in the computer in an organized manner to facilitate dealing with them (Abdullah, 2016, p. 179).

- **Communications and Networks:** It is the basic infrastructure for communication between computer devices and programs responsible for managing communication between devices. It enables the computer network connected to the network, and is known in the process of exchanging and distributing data between computer systems across the network as data communication.

## **2.3 Concept of Human Resource Management:**

(Ali Al-Salmi) defines it as all the procedures and policies related to selecting, appointing, and training employees at all levels, working to organize the workforce within the institution and increase

its confidence in the fairness of management, creating a cooperative spirit in it, and reaching the highest levels of productivity in the institution (Al-Salmi, 1998, p. 30).

It is the art of attracting, selecting, appointing employees, developing their capabilities, and developing their skills, and creating appropriate organizational conditions in terms of quantity and quality to extract the best in them in terms of energies and encourage them to make the greatest possible effort and giving (Farhati, 2012, p. 22).

- Human resource management is defined as: a set of functions, activities, and programs that aim to achieve both the goals of the individual and the organization (Hassan, 2003, p. 03)

#### **2.4 Importance of Human Resource Management:**

The importance of human resource management is as follows (Al-Amimi, 2017, p. 25):

- A study showed that human resources is a way to achieve short- and long-term goals by emphasizing that employees are a vital part of organizational resources.
- Ensuring the achievement of the required results through others by selecting the right individuals and motivating them, and so on from human resource activities.
- The existence of specialized expertise in human resource management capable and qualified to attract the best employees to fill vacancies, and then maintain these elements will increase the productivity of the institution and enhance its economic position and profits.

#### **2.5 Impact of Information and Communication Technology on the Administrative Functions of Human Resource Management:**

Technology continues to have a significant impact on human resource practices in bringing about clear changes in the traditional functions of management, as they have been transformed into electronic functions, in order to make optimal use of time, money, effort, and energies. In fact, the effects are not limited to the technological dimension only, but also to the administrative dimension represented by the development of administrative concepts that have accumulated for many decades and have become working to achieve greater administrative flexibility in delegation, administrative empowerment, and team-based management.

#### **2.6 Concept of Job Engagement:**

" Al-Maghrabi" defined it as: "Some believe that job engagement represents the degree to which an individual integrates with the job they practice and feels its importance. Therefore, the matter here is related to the individual in both actual and emotional aspects. Engagement is affected by many factors, including the emotional level, which is evident in its positive effects on the individual, such as feelings of happiness, satisfaction, and appreciation. Conversely, when the level of job engagement decreases, the negative impact on the individual's feelings becomes clear, such as anxiety, distress, depression, and a sense of despair" (Al-Maghrabi, 2007, p. 305).

(Sharmila J.V) also defined it as the immersion and commitment of employees towards the organization and its organizational values, and the engagement of employees towards their work through cooperation with colleagues to improve performance at work for the benefit of the organization. Therefore, it is a measure by which the extent of the employee's affiliation with the organization is determined (Shamila J.V, 1982, p. 11).

(Al-Najjar) defined it as the person's employment of himself physically, emotionally, and mentally while performing his role. He also defined it as the organization members' devotion of themselves to performing their work (Al-Najjar, 2017, p. 83).

(Leong et al, 2003) view it as: "A state where an individual perceives a fit between their psychological well-being and their work, provided that the work has the capacity to satisfy the individual's salient and expected needs (Hamouche, boudjellal, LACHACHE , & BENAMAR, 2023, p. 1398).

(Al-Safi) also defined it as the degree to which an individual is psychologically connected to work and his role in shaping the individual's self-perception, and that it is described through the individual's sensory perception towards his job so that the job becomes of utmost importance in his life (Al-Safi, 2017, p. 136).

Based on all the above, job engagement can be defined as: An individual's connection to his work through dedication, sincerity, and immersion in it in order to contribute to achieving the organization's goals and success.

## **2.7 Importance of Job Engagement:**

Job engagement is of utmost importance at the individual or organizational level. Research and studies have shown that job engagement has a fundamental role in creating the quality of life for workers and encourages them to work and continue in the organization

Job engagement is at the heart of the functional relationship, because it deals with what individuals do and how they behave in their roles and what makes them follow behavior in different ways in order to achieve the goals of the organization and their personal goals (Hamama, 2019, pp. 50-51).

(Al-Mantawi, 2007) says that "The interaction between job engagement and job commitment makes the individual engaged in his job have an organizational commitment towards his organization and keen to stay in it and develop it and develop its operations".

(Khan & al, 2011) believe that job engagement "is related to the importance of work in an individual's life. The more important the work, the more loyal the employee is to his work and to his organization, and this in turn is reflected in the individual's performance".

Currently, the issue of job engagement is also receiving increasing attention from many researchers, as many studies and studies have shown that organizations need to focus on this concept and emphasize it, which is an essential feature that leads organizations successfully to achieve high performance.

job engagement can be defined as: "An individual's connection to their work through enthusiasm, dedication, and absorption in order to contribute to the achievement of the organization's goals and its success (Hamouche & Bouzekri, 2022, pp. 422-441).

## **2.8 The Relationship Between Information and Communication Technology and Employee Job Engagement:**

Information and communication technology has become a catalyst for institutions seeking competition and excellence in their production, and for efficiency and effectiveness in their performance, so institutions have rushed to create the ground to apply it and then use it, because this tool creates unprecedented opportunities in several areas, such as raising the level of performance and job satisfaction and thus achieving employee job engagement, improving administrative decisions and simplifying and facilitating procedures and optimal exploitation of the workforce, through the application of a number of procedures and changes (structure, operations, institution management), and training users on how to use, in order to ensure that it works correctly and in a way that achieves the standards of efficient performance that the institution seeks to achieve.

## **3. Field Study and its Methodological Procedures:**

**3.1 Presentation of the study field:** The CONDOR institution was established in 2003 in the state of Bordj Bou Arreridj, where its main activity is the manufacture of electronic and electro-domestic devices. It included about 90 workers at the beginning of its activity, but today it employs more than 4,600 workers.

**-Study sample:** In order to achieve the objectives of the study, 500 questionnaires were distributed to a random sample of workers, where only 484 questionnaires were retrieved and the rest were not filled out.

**-Study limits:**

**-Temporal limits:** The study was conducted during the month of (October, November, December) of the year 2024.

**-Spatial limits:** The study was conducted in the CONDOR institution in the state of Bordj Bou Arreridj.

**- Objective limits:** The methodology of scientific research requires, in order to approach objectivity and facilitate access to logical results, the need to control the analysis related to the nature of the theoretical study, by setting a problem suitable for the topic, and controlling the correct path for its analysis and testing its hypotheses.

**- Study tools:** The questionnaire was relied upon as a main tool in collecting primary data, and this questionnaire was divided into several parts as shown in Table (01):

**Table 01:** Defining the Axes, Dimensions, and Items of the Questionnaire

Latent variables		Coding	Observed variables or (number)
<b>Information Technology (INT)</b>	Individuals (People)	PPL	4
	The Programs (Software)	SFT	4
	Physical Devices (Hardware)	HDR	4
	The Database	DTB	4
	the networks and communications	NEC	4
<b>Human Resource Management (HRM)</b>	Human Resource Management	HRM	5
<b>Job Engagement (JOP)</b>	Job Engagement	JOP	5

**Source:** Prepared by researchers

**Part One:** Contains personal and professional information (gender, job title, educational level, age, and experience).



**Part Two:** Contains the independent variable, Information and Communication Technology (ICT), comprising 20 questions distributed across 05 dimensions (from 01-20).

**Part Three:** Contains the dependent variable, Human Resource Management, comprising 05 questions (from 21-25).

**Part Four:** Contains the dependent variable, Work Engagement, comprising 05 questions (from 26-31).

### 3.2 Statistical Analysis of Questionnaires:

**Validity and Reliability of the Study Instrument:** This study relied on multiple sources in its preparation (books, journals, published research, articles, and theses). Subject matter experts were consulted to establish face validity of the scale, and necessary modifications were made according to their comments and suggestions.

A five-point Likert scale was used as shown in Table No (02).

**Table 02:** Rating Scale for the Five-Point Likert Scale

Category	Response	Weighted average
1	Totally disagree	From 1 - 1.8
2	Disagree	From 1.81- 2.60
3	Neutral	From 2.61- 3.40
4	Agree	From 3.41- 4.20
5	Totally agree	From 4.21 - 5

**Source:** Prepared by researchers

The degree of relative importance for the respondents' answers is determined by using the following equation: (Upper limit of the scale (5) - Lower limit of the scale (1) divided by the number of required categories (3) results in 1.33. Then, we add 1.33 to the lower limit to obtain the upper limit, and so on, resulting in an answer analysis scale as follows:

**Table 3.** The level of relative importance of the respondents' answers

Range	Relative importance of the answer
[1-2.33[	Low level
[2.33-3.66[	Average level
[3.66-5[	High level

**Source:** Prepared by researchers

**-Statistical Processing Methods for Study Data:** SPSS V26 was utilized, and the statistical processing included the following methods: Frequencies and percentages, Cronbach's Alpha test, normality tests (Kolmogorov-Smirnov and Shapiro-Wilk), Variance Inflation Factor (VIF) test, and Tolerance test.

AMOS V24 software was used to test the hypotheses.

**3.3 Study Reliability:** To measure the reliability of the study, Cronbach's Alpha coefficient was calculated using SPSS V26, and the results are as follows:

**Table 4.** Stability coefficient Cronbach alpha

Variables	Number of paragraphs	Cronbach alpha coefficient
Information Technology	20	0.882
Human Resource Management	05	0.911
Job Engagement	05	0.929

**Source:** Prepared by the researchers based on the outputs of SPSS V26.

It is evident from Table No (04) that the reliability coefficient value for the information technology dimension reached 0.882, which is a very high value. The reliability coefficient value for human resources management reached 0.911, which is also a high value. Additionally, the Cronbach's Alpha reliability coefficient value for job engagement reached 0.929, which is a high percentage and greater than the accepted percentage (0.6), indicating that the questionnaire is reliable and can be used for the purpose of the study, and confirms its validity for field application.

**3.4 Characteristics of the Study Sample:** As shown in Table No. (05).

**Table 5.** Study sample characteristics

Variables	Category	Percentage %
Gender	Males	77.4
	Female	22.6
Occupation	Administrative	87.1
	Technical	12.9
Educational level	Bachelor's degree or less	32.3
	University degree	48.4
	Postgraduate	19.4
Experience	Less than 5 years	19
	From 6 to 15 years	68
	From 16 to 25 years old	12
	Over 26 years old	4

**Source:** Prepared by the researchers based on the outputs of SPSS V26.

From Table No. (05), it is clear that the percentage of males reached 84%, and the percentage of females reached 16%. We note that there is a disparity in the percentages between the two variables, which is due to the nature of the institution's activity. It is also clear that the percentage of administrators reached 27.1%, and the percentage of technicians reached 73.1%. We note that there is a disparity in the percentages between the two variables, which is due to the nature of the activity

that is predominantly technical rather than administrative in the institution. Furthermore, it is clear that the percentage of those with a secondary level or less reached 32.3%, and the percentage of university graduates reached 48.4%, while the percentage of those with postgraduate studies reached 19.4%. This explains the employment by CONDOR Company in Bordj Bou Arreridj of executives characterized by skills and competencies. It is also clear that the percentage of those under 30 years of age reached 22.6%. Finally, it is clear that the percentage of those with less than 05 years of experience reached 19%, and the percentage of individuals with experience between 06 and 15 years reached 68%, while the percentage of individuals with experience between 16 and 25 years reached 12%, and the percentage of individuals with experience more than 26 years reached 04%.

### 3.5 Test of Normal Distribution for the Study Instrument: Shown in Table (07).

**Table 6.** Study tool normal distribution test (Kolmengrove and Shapiro)

Axis	Z value	Sample size	Sig
Information Technology	0.236	384	0.249
Human Resource Management	0.207	384	0.186
Job Engagement	0.190	384	0.155

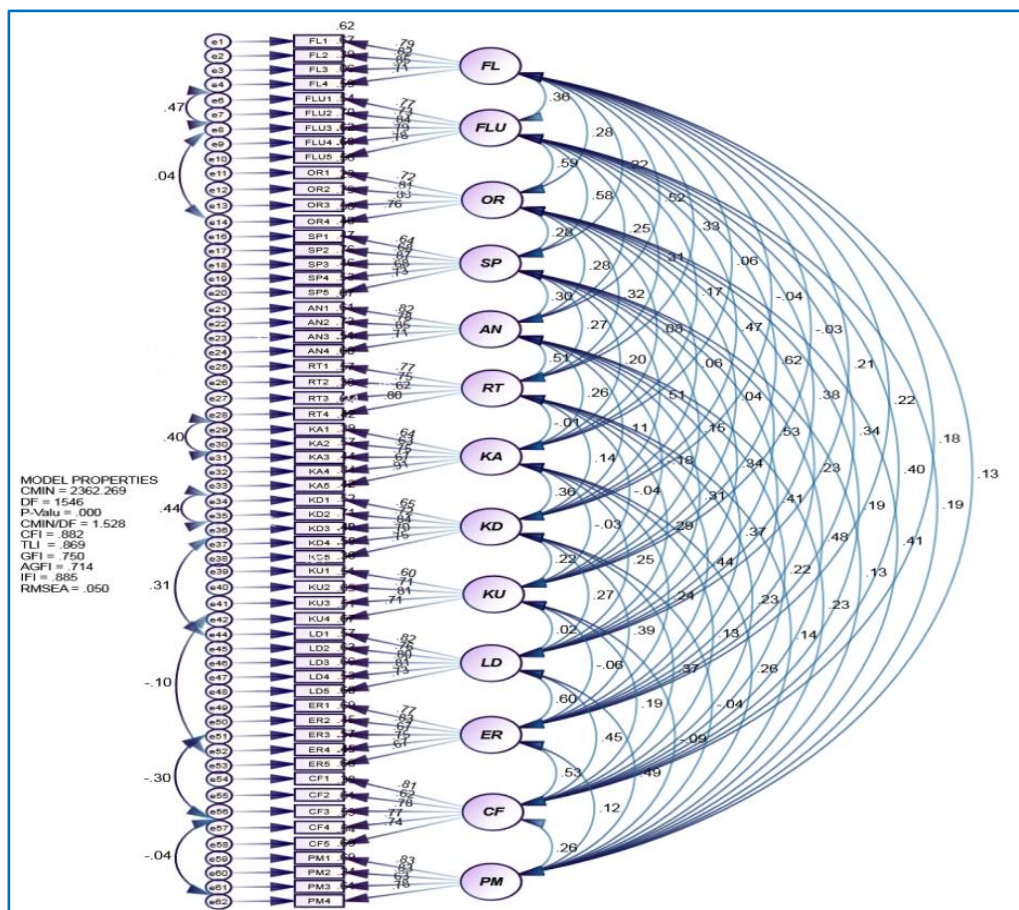
**Source:** Prepared by the researchers based on the outputs of SPSS V26.

Table (07) above shows that the statistical significance level value for the information technology dimension reached 0.249, which is greater than (0.05), indicating that the independent variable data follows a normal distribution. Meanwhile, the significance level value for the human resources management dimension reached (0.186), which is greater than (0.05), also indicating that the dependent variable data, human resources management, follows a normal distribution. Furthermore, the significance level value for the job engagement dimension reached (0.155), which is greater than (0.05), also indicating that the dependent variable data, job engagement, follows a normal distribution

## 4. Analysis and Discussion of Results:

### 4.1 Testing the Standard Model for Study Variables

**Figure 01:** Confirmatory Factor Analysis (CFA) of the study model



Source: Prepared by researchers based on AMOS.V24 output

Figure 01 shows a strong correlation between the observed variables and the latent variables, with path values ranging from [0.60; 0.88]. This indicates the ability of all items to explain the observations loaded on them (dimensions). We also note that the statistical significance value for the Chi-square index ( $0.05 > X^2$ ) is statistically significant within its acceptable range ( $2 < \text{cmin}/\text{df} < 5$ ), indicating that the model is valid and consistent with the data.

Furthermore, we observe that the remaining indices (GFI, AGFI, CFI, IFI, TLI) are well achieved within their acceptance ranges. Therefore, the measurement model is validated and fits the data well, allowing us to proceed to the structural model of the study to analyze the data and test the hypotheses.

## 4.2 Hypothesis Testing:

### 4.2.1 Testing the Independence of the Study's Independent Variables:

**H0:** No correlation, **H1:** There is a correlation

To ensure there is no high correlation between the independent variables, VIF and Tolerance coefficients were used according to:

Variance Inflation Factor **03 > VIF**  $\longrightarrow$  Independence of Variables

Permissible Variance Coefficient **0.20 < Tolerance**

Table 07: Results of Independent Variables Test (VIF, Tolerance)

Variables	VIF	Tolérance
X1	1.134	0.543

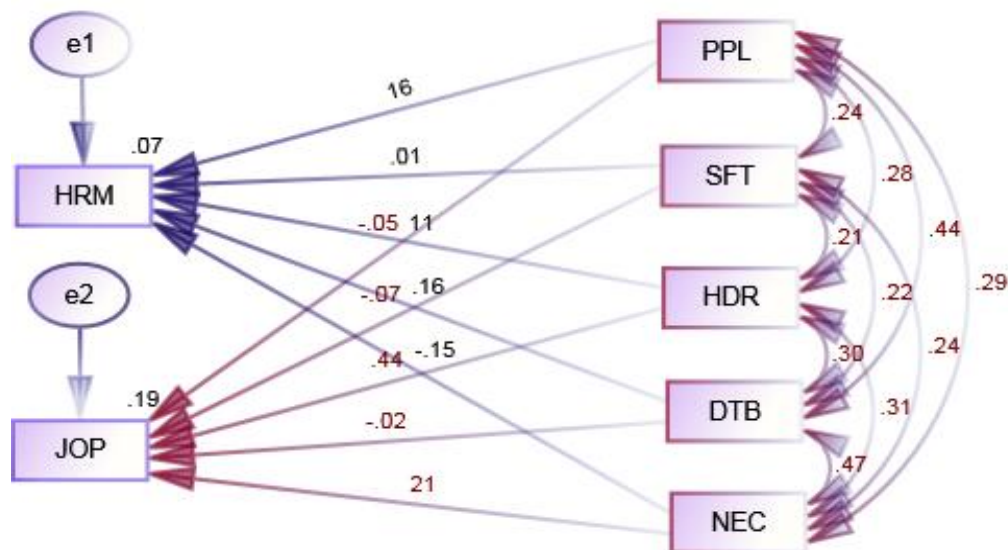
<b>X2</b>	1.665	0.321
<b>X3</b>	2.112	0.398
<b>X4</b>	1.543	0.511
<b>X5</b>	1.321	0.576

**Source:** Prepared by the researchers based on the outputs of SPSS V26.

The results show that the value of VIF for all independent variables is less than 3, and the value of Tolerance for independent variables is greater than 0.2, so we accept the null hypothesis H0 and reject the alternative hypothesis H1.

#### 4.2.2 The direct impact of information technology dimensions on both human resources management and job engagement:

**Figure 02:** Path analysis of the impact of information and communication technology dimensions on human resources management and job engagement



**Source:** Prepared by researchers based on AMOS.V24 output

Figure 02 represents the direct impact of information technology dimensions on both human resources management and job engagement. The values of standardized regression coefficients ranged between -0.07 and 0.15, represented by one-way arrows. Meanwhile, two-way arrows represent the values of shared variances between independent variables, ranging between 0.21 and 0.47. The values 0.07 and 0.19 represent the squared correlation of the two dependent variables, meaning that all dimensions of information and communication technology together explain 7% and 19% of the changes occurring in the dependent variables (human resources management and job engagement). To determine the significance of the direct impact between the variables, we refer to the values shown in Tables 10 and 11.

#### 4.2.3 Testing the First Main Hypothesis: H1: There is a statistically significant positive impact between information and communication technology and human resources management at Condor Company in Bordj Bou Arreridj.

Table 08 below highlights a summary of path analysis values, regression coefficient  $\beta$ , standard error E.S, and C.R, the ratio of standard error to the coefficient  $\beta$ , which represents the critical ratio of the t-statistic. Further details regarding the hypothesis test concerning information technology and human resources management variables are as follows:

**Table 08:** Results of Path Analysis between Information Technology Dimensions and Human Resources Management

Variable	Estimate $\beta$	S.E.		C.R.	P	R Square
hrm <--- ppl	.156	.084		3.160	.005	0.070
hrm <--- sft	.017	.097		2.101	.022	
hrm <--- hdr	.216	.072		.977	.525	
hrm <--- dtb	.157	.096		1.997	.011	
hrm <--- nec	-.152	.081		-1.975	.041	

Source: Prepared by researchers based on AMOS.V24 output

**-First Sub-Hypothesis: H1.1: There is a statistically significant positive impact between Individual's dimension and human resources management at Condor Company in Bordj Bou Arreridj.**

The impact coefficient for the first dimension reached 0.156 with a significance level of 0.005, while the critical ratio of the t-statistic was 3.160, which is greater than the standard value of 0.964. This leads us to reject the null hypothesis and accept the alternative hypothesis, which affirms the existence of a positive impact between the People dimension and human resources management at Condor Company.

**-Second Sub-Hypothesis: H1.2: There is a statistically significant positive impact between the Programs dimension and human resources management at Condor Company in Bordj Bou Arreridj.**

The Software dimension achieved a statistically significant positive impact on the level of human resources management, and the level of this impact was estimated at 0.017 with a significance level of 0.022. Also, C.R exceeded its minimum value by (2.477), therefore, we reject the null hypothesis and accept the alternative hypothesis, meaning there is a significant and statistically significant effect of the Software dimension on human resources management in the organization under study.

**-Third Sub-Hypothesis: H1.3: There is a statistically significant positive impact between the Physical Devices dimension and human resources management at Condor Company in Bordj Bou Arreridj.**

The impact coefficient for the third dimension reached 0.216 with a significance level of 0.525, while the critical ratio of the t-statistic reached .977, which is less than the standard value of 0.964. This leads us to accept the null hypothesis, which affirms the absence of a positive impact between the Hardware dimension and human resources management in the organization.

**-Fourth Sub-Hypothesis: H1.4: There is a statistically significant positive impact between the Database dimension and human resources management at Condor Company in Bordj Bou Arreridj.**

The results of the path analysis for the third dimension revealed a significant impact of the Database dimension on the level of organizational learning in the researched organizations, as reflected in the coefficient  $\beta$  value (0.157) and the significance level (0.011). The C.R value was estimated at 1.997, which is greater than 1.964. This confirms the rejection of the null hypothesis and acceptance of the alternative hypothesis.

**-Fifth Sub-Hypothesis: H1.5: There is a statistically significant positive impact between the Networks and Communications dimension and human resources management at Condor Company in Bordj Bou Arreridj.**

We observe a negative value for the impact coefficient of the fifth dimension (-0.152), with a significance level of 0.041, which leads us to the existence of a statistically significant negative impact of the Networks and Communications dimension on the levels of human resources management.

The AMOS program also provides the value of the coefficient of determination  $R^2$  for all dependent variables in the study model, where this value reached 0.07, which means that 07% of the changes occurring at the level of human resources management are explained by the independent variables that make up information and communication technology combined. The regression equation can be estimated using the least squares method as follows:

$$Y_i = \beta_1 X_1 + \beta_2 X_2 + \beta_4 X_4 + \beta_5 X_5 + \epsilon_i$$

$$OL = \beta_1(PPL) + \beta_2(SFT) + \beta_4(DTB) + \beta_5(NEC) + \epsilon_i$$

$$OL = 0.156 (PPL) + 0.017 (SFT) + 0.157 (DTB) - 0.152 (NEC) + \epsilon_i$$

**-Based on the sub-hypothesis testing, it can be said that: There is a statistically significant positive impact between information and communication technology and human resources management at Condor Company in Bordj Bou Arreridj.**

**4.2.4 Testing the Second Main Hypothesis: H2: There is a statistically significant positive impact between information and communication technology and job engagement at Condor Company in Bordj Bou Arreridj.**

Table 11 highlights a summary of path analysis values related to the information and communication technology and job engagement variables, where their specific hypotheses can be analyzed as follows

**Table 09:** Results of Path Analysis between Information Technology Dimensions and Job Engagement

Variable	Estimate $\beta$	S.E.	C.R.	P	R Square
JOP <--- ppl	.201	.008	2.071	.002	0.186
JOP <--- sft	.115	.054	1.120	.052	
JOP <--- hdr	.012	.023	2.001	.021	
JOP <--- dtb	.213	.082	1.923	.662	
JOP <--- nec	.131	.045	-1.990	.001	

**Source:** Prepared by researchers based on AMOS.V24 output

Table 11 above presents a summary of the path analysis values related to the variables of information and communication technology (ICT) and job engagement. The hypotheses pertaining to these variables can be analyzed as follows:

**- First Sub-Hypothesis 1: H2.1: There is a statistically significant positive effect between Individuals dimension and job engagement at Condor Company in Bordj Bou Arreridj.**

The effect coefficient for the first dimension was 0.201 with a significance level of 0.002. This leads us to reject the null hypothesis and accept the alternative hypothesis, which affirms a positive effect between the people dimension and job engagement at Condor Company.

**- Second Sub-Hypothesis 2: H2.2: There is a statistically significant positive effect between the Programs dimension and job engagement at Condor Company in Bordj Bou Arreridj.**

The effect coefficient for the second dimension was 0.115 with a significance level of 0.520, which is greater than the standard value of 0.05. This leads us to accept the null hypothesis, which

affirms that there is no positive effect between the software dimension and job engagement at the company under study.

**- Third Sub-Hypothesis 3: H2.3: There is a statistically significant positive effect between the Physical Devices dimension and job engagement at Condor Company in Bordj Bou Arreridj.**

The hardware dimension had a statistically significant positive effect on employee job engagement, with an effect level of 0.012, which is statistically significant at a significance level of 0.021. Therefore, we reject the null hypothesis and accept the alternative hypothesis, which affirms that there is a statistically significant effect of the hardware dimension on job engagement at the company under study.

**- Fourth Sub-Hypothesis 4: H2.4: There is a statistically significant positive effect between the database dimension and job engagement at Condor Company in Bordj Bou Arreridj.**

The effect coefficient for the fourth dimension was 0.213 with a significance level of 0.662. This leads us to accept the null hypothesis, which affirms that there is no positive effect between the database dimension and job engagement at the company.

**- Fifth Sub-Hypothesis 5: H2.5: There is a statistically significant positive effect between the networks and communications dimension and job engagement at Condor Company in Bordj Bou Arreridj.**

The effect coefficient for the fifth dimension was 0.131, with a significance level of 0.001, which leads us to conclude that there is a statistically significant positive effect of the networks and communication dimension on job engagement at Condor Company under study.

Based on the testing of the sub-hypotheses, it can be said that: There is a statistically significant positive effect between information and communication technology and job engagement at Condor Company in Bordj Bou Arreridj.

The coefficient of determination  $R^2$  for all variables was 0.186. This means that 18.6% of the changes in employee job engagement are explained by the independent variables comprising information and communication technology as a whole.

The regression equation can be estimated using the ordinary least squares method as follows:

$$Y_i = \beta_1 X_1 + \beta_3 X_2 + \beta_5 X_5 + \epsilon_i$$

$$OL = \beta_1(PPL) + \beta_3(HDR) + \beta_5(NEC) + \epsilon_i$$

$$OL = 0.201 (PPL) + 0.012 (HDR) + 0.186 (NEC) + \epsilon_i$$

## **5. CONCLUSION:**

In pursuit of leadership and growth, organizations are compelled to make significant efforts to enhance the effectiveness of their activities. This is achieved through the continuous adoption of new technologies that can be used to develop their competitive advantages and strengthen their market position, paving the way for achieving a leadership role.

On the theoretical level, the study affirmed the vital role of information technology practices in organizations as a fundamental security base, especially in critical and complex times they may face.

This technology provides a clear strategic vision for the future of the organization and contributes to human resource management in a way that adapts to the continuous changes in the external environment.

The study also demonstrated the strategic importance of human resource management as a necessary element for the survival and progress of the organization. It contributes significantly to dealing with the accelerating changes within the internal and external environment by detecting and correcting errors, developing competencies, acquiring knowledge, investing expertise, and providing a suitable work environment that motivates employees to give their best.



As a result, full job engagement of employees is achieved, ensuring high levels of future success for the organization.

In its practical aspect, the study reached the following results:

**5.1 Results:** Based on the applied study and statistical analysis of the data, several results were obtained, which can be summarized as follows:

- Full confirmation of the two main hypotheses of the study, with confirmation of most of the sub-hypotheses. Therefore, Condor Company has a human resource management that relies on information and communication technology in performing all its administrative and technical functions, enabling it to succeed in generating skills and experiences for all its employees and achieving the highest levels of job satisfaction, allowing employees to integrate and immerse themselves in their work.

The results showed a positive impact of the dimensions of information and communication technology (Individuals, the programs, database and networks) on human resource management, and no impact of the hardware dimension on human resource management at Condor Company.

The results showed a negative impact of the networks and communications dimension on human resource management at Condor Company.

The results showed a positive impact of the dimensions of information and communication technology (Individuals, Physical Devices, networks, and communications) on job engagement, and no impact of the software and database dimensions on job engagement at Condor Company.

## **5.2 Recommendations:**

In light of the results of the study, the following suggestions were developed:

- The necessity of integrating and training the organization's personnel on the various programs that the organization relies on.
- It is essential for human resource management to rely on information technology in order to keep pace with the rapid technological developments and changes that the current era is experiencing.
- Creating a department within the organization specifically for information technology.
- Establishing a special section for creativity to develop specific programs for innovation and innovators working in the organization.

## **5.3 Study Prospects:**

Through our study of the contribution of information technology to achieving human resource management for job engagement, and our knowledge of various aspects related to the subject, we suggest researching and studying several other aspects and delving into them, including:

- The impact of applying information technology on employee performance.
- The role of human resource management in achieving job satisfaction among employees.
- The impact of applying information technology on creativity and innovation.

## **Author contributions**

Authors contributed equally. All authors have read and agreed to the published version of the manuscript.

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