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Examining the Impact of Artificial Intelligence on Employee Engagement and Performance in Tunisian ICT sector

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Abstract **—This study investigates the influence of artificial intelligence (AI) on employee engagement and, indirectly, on job performance within the information and communication technology (ICT) sector in Tunisia. It is based on a quantitative survey carried out among 85 full-time employees working in ICT-related companies, including IT service providers, communication agencies, and telecommunications operators. The collected data were analyzed using SmartPLS 4 software. The results indicate that AI has a significant and positive effect on employee engagement. In addition, employee engagement is found to positively impact employee performance and to act as a mediating variable in the relationship between AI and performance. This research contributes to the ongoing debate on the future of work and digital transformation in the ICT sector by exploring how AI adoption in Tunisian companies affects both engagement and performance. By addressing this issue, the study highlights emerging opportunities linked to evolving work practices, supports organizations in the ethical and effective integration of AI, and offers recommendations for promoting a work environment oriented toward change. Overall, this work enriches the existing literature on artificial intelligence and human resource management by emphasizing its role in shaping employee engagement and performance.**

Keywords—**Artificial intelligence, employee engagement, employee performance, ICT sector, Tunisia.**

I. INTRODUCTION

In recent years, service companies, particularly those operating in the ICT sector, have increasingly adopted advanced information and communication technologies (ICT), especially artificial intelligence (AI) applications. Today, artificial intelligence is widely regarded as one of the most remarkable technological innovations in the field of information technology. Over the past few decades, it has experienced unprecedented growth and development, surpassing most other digital technologies in terms of progress and transformative potential [12]; [8]; [3]. AI is gradually becoming embedded in organizational processes with the aim of automating specific activities, supporting decision-making, and improving operational efficiency. It's demonstrates a high level of effectiveness in executing specific tasks, and its influence on both society and organizational activities has become increasingly significant and undeniable [12]; [8]; [3]; [23]. Beyond its technological benefits, AI has attracted considerable attention due to its potential influence on the human aspects of work, notably employee engagement and performance. Previous studies suggest that AI can strengthen employee engagement by offering enhanced task support, individualized monitoring, and customized reward mechanisms. In this context, [2] report that AI-driven management systems play a significant role in fostering employee engagement. More broadly, the implementation of AI within organizations creates organizational conditions that may affect employees' motivation and level of engagement [13]. Consequently, AI is often viewed as a valuable resource that enables employees to improve both their work efficiency and overall job performance [11]; [2].

While previous studies have explored the effects of artificial intelligence on employee engagement and performance from various perspectives, most of this research has been conducted in developed economies.

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Comparatively, empirical investigations in emerging countries remain scarce. This gap is particularly important because AI implementation in these contexts is still evolving and is influenced by unique organizational, economic, and cultural factors. Therefore, this study seeks to examine the impact of artificial intelligence on employee engagement and performance within the Tunisian context, thereby enriching the existing body of knowledge on the human-related consequences of AI adoption in emerging economies. More specifically, the research focuses on ICT companies in Tunisia and employs a quantitative research approach to investigate these relationships. This choice is driven by the need to assist organizations in managing their transition toward AI technologies while promoting employee well-being, motivation, and performance. Accordingly, the study addresses the following research question: To what extent does the adoption and use of artificial intelligence in the workplace affect employee engagement and performance in Tunisia's ICT sector?

To answer this research question, we begin with a theoretical review of the concepts of artificial intelligence, employee engagement, and employee performance, emphasizing the relationships among them. Based on the existing literature, we subsequently develop the research hypotheses. We then outline the methodology adopted for the empirical investigation. Lastly, we present and discuss the findings, draw their theoretical and managerial implications, and propose recommendations along with avenues for future research.

II. LITERATURE REVIEW AND HYPOTHESES

A. Artificial intelligence and employee engagement

Artificial intelligence (AI) can be defined as a set of computational systems designed to replicate aspects of human intelligence, including learning, reasoning, problem-solving, and decision-making abilities that are commonly associated with intelligent behavior [17].

Employee engagement, on the other hand, reflects a positive and fulfilling work-related state characterized by employees' emotional attachment to their work and organization, as well as their willingness to contribute to organizational goals. Engaged employees tend to demonstrate higher levels of motivation, dedication, and involvement in their work, often exceeding formal job requirements to support organizational success [6], [16].

The relationship between AI and employee engagement can be explained through the Resource-Based View (RBV), which suggests that organizations can leverage valuable resources to enhance employee outcomes and achieve superior performance. As a strategic technological resource, AI can enrich employees' work experiences by providing intelligent support, facilitating access to relevant information, and reducing routine and repetitive tasks. AI-enabled management systems may also foster employee involvement through personalized guidance, continuous feedback, and tailored reward mechanisms [2]. Furthermore, AI-powered tools can support the development of customized learning programs that match employees' individual needs and preferences, thereby accelerating skill acquisition and improving learning outcomes [14], [24]. By providing employees with valuable resources that enhance their capabilities and work experiences, AI is likely to strengthen their engagement and commitment to their jobs. Indeed, initial and continuous training are essential mechanisms for enhancing employees' knowledge and skills [7]. As a result, the integration of AI into organizational practices can contribute to greater employee motivation, commitment, and job satisfaction.

H1: Artificial intelligence has a positive and statistically significant effect on employee engagement.

B. Employee engagement and employee performance

The concept of work engagement was initially introduced by [19], who described it as the extent to which employees bring their physical, cognitive, and emotional selves into the performance of their work roles. Through this process, individuals actively invest their personal resources and express themselves while

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carrying out their professional responsibilities. Following Kahn's seminal work, various perspectives on work engagement emerged, each highlighting different dimensions and characteristics of the construct [21]. Employee engagement refers to a positive and satisfying work-related state of mind that is expressed through vigor, dedication, and absorption, reflecting employees' energy, involvement, and deep focus in their work activities [22]. It's defined by a strong enthusiasm for one's work, a sense of pride and meaningfulness, and a tendency to find it difficult to detach from work-related activities [15]. According to [19] and [20], it is expressed through the investment of physical, cognitive, and emotional energy into professional roles.

Job performance, in turn, refers to the behaviors demonstrated by employees that contribute to achieving organizational objectives in terms of the quality, quantity, and timeliness of work outcomes [10] . According to [4], job quality refers to the extent to which work outputs comply with established standards and requirements across processes such as procurement, production, quality control, and the delivery of goods and services. Job quantity relates to the measurable volume of outputs generated through employees' activities, including indicators such as production levels, waste amounts, and sales performance [4]. Job time, on the other hand, concerns the duration needed to complete work tasks in relation to their complexity. Employees are considered to meet time-related objectives when tasks are completed accurately within a reasonable timeframe and when goods or services are delivered according to schedule [4].

Theoretical research suggests that the different dimensions of engagement play a significant role in enhancing job performance. Physical energy enables employees to maintain sustained effort and actively engage in behaviors that support organizational goals, thereby improving performance outcomes [18]. Cognitive energy promotes greater focus, attention, and vigilance, which facilitate accurate and efficient task accomplishment [4]. Emotional energy, meanwhile, fosters stronger interpersonal relationships and enhances employees' ability to cope with emotional demands, contributing to more authentic and effective performance [1]; [19].

H2: Employee engagement has a positive and statistically significant impact on employee performance.

This study investigates the impact of artificial intelligence (AI) on employee engagement and, indirectly, on job performance, as illustrated in Figure 1 :

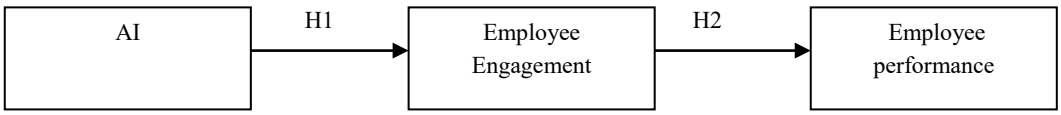

Figure 1. Conceptual model

III. METHODOLOGY

A. Sample and data collection

To test the proposed hypotheses, data were collected from employees working in ICT sector, including IT service providers, communication agencies, and telecommunications operators. The study targeted full-time employees. Questionnaires were administered directly to employees and completed during working hours. Participants were informed that the survey aimed to examine their perceptions of the usefulness and effectiveness of AI systems in their work, as well as their job-related attitudes. They were also assured of the confidentiality of their responses.

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Although respondents were initially selected at random, screening questions were included to ensure their eligibility. These questions assessed participants' familiarity with artificial intelligence and the tools used to support their professional tasks. Only individuals who demonstrated sufficient knowledge in this area were allowed to take part in the survey. After approximately two months of data collection, 85 valid responses were obtained. The respondents presented diverse demographic and professional profiles (see Table I for a summary of sample characteristics). The collected data were analyzed using SmartPLS 4 software.

TABLE I. Sample characteristics

Variable	Percentage
Gender	
• Female	43.5
• Male	56.5
Work experience in the organization	
• Less than 1 year	28.2
• 1-3 years	20.0
• 3-5 years	25.9
• More than 5 years	25.9

B. Measures

A confirmatory factor analysis (CFA) was performed to evaluate the reliability and validity of the study constructs. The findings revealed that all measurement items exhibited factor loadings above the recommended threshold of 0.70. In addition, the average variance extracted (AVE) for each construct was greater than 0.50, confirming adequate convergent validity. As shown in Table II, the square roots of the AVEs were higher than the corresponding inter-construct correlations, providing evidence of discriminant validity. Furthermore, the correlation analysis indicated significant associations among all study variables (see Table II). To assess potential multicollinearity issues, variance inflation factors (VIFs) were examined. Since all VIF values were below 3.0, multicollinearity was not considered a concern in this study.

IV. ANALYSIS AND RESULTS

A. Validity testing

A confirmatory factor analysis (CFA) was conducted to test the reliability and validity of the study variables. The results indicated that each item had a factor loading greater than 0.70, with the average variance extracted (AVE) for each scale exceeding 0.50, suggesting convergent validity. The square root of the AVEs presented in Table II also exceeded the respective pairwise correlations, there by demonstrating discriminant validity. The correlation analysis shows that that the relationships among the study constructs were significantly correlated with one another (see Table II). Multicollinearity was also assessed. The results indicated that all variance inflation factors (VIFs) were below 3.0. Therefore, collinearity was not an issue in this study.

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Table II. The mean, standard deviation, and correlations for the study variables

	Mean	S.D	α	1	2	3
1. AI	3.57	0.54	0.87	0.81		
2. Employee engagement	3.97	0.60	0.90	0.31	0.85	
3. Employee performance	4.00	0.57	0.83	0.28	0.95	0.82

Notes : S.D. = standard deviation ;α = Cronbach's Alpha ; The square root of AVEs were presented on the diagonals ; AVE= Average Variance Extracted.

B. Hypothesis testing

Hypothesis 1 posits that artificial intelligence (AI) has a positive effect on employee engagement. The findings support this assumption, revealing a positive and statistically significant relationship (β = 0.34, S.E. = 0.12, p = 0.004). This result suggests that the implementation of AI contributes to increasing employee engagement within ICT companies.

Hypothesis 2 predicts that employee engagement positively influences employee performance. The results confirm this hypothesis, demonstrating a strong and highly significant effect (β = 0.90, S.E. = 0.03, p = 0.000). This finding indicates that employees who are more engaged in their work tend to exhibit substantially higher levels of performance.

The indirect effect of artificial intelligence (AI) on employee performance through employee engagement was examined using a mediation analysis. To estimate the indirect effect, a bootstrapping procedure with 5,000 resamples was conducted, and 95% confidence intervals (CI) were calculated. As reported in Table 4, the findings reveal a significant indirect effect of AI on employee performance (β = 0.31, 95% CI = [0.10, 0.51]), indicating that employee engagement serves as a significant mediator in this relationship.

Table III. Results of the hypothesis testing

Hypotheses	β	S.E	Results	P-values
H1 : AI →Employee engagement	0.34	0.12	Significant	0.004
H2 : Employee engagement → Employee performance	0.90	0.03	Significant	0.000

Notes : S.E. = standard error ; β = Estimates ; Estimates were standardized.

Table IV. Results of the mediating effect test

Mediation paths	β	S.E	95% Lower CI	95% Upper CI
AI →Employee engagement→Employee performance	0.31	0.10	0.10	0.51

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V. Discussion

Based on a sample of 85 employees employed in Tunisian ICT companies, including IT service firms, communication agencies, and telecommunications operators, this study provides empirical evidence that supports the theoretical assumptions underlying the research. It also contributes valuable insights to the existing literature by examining the impact of artificial intelligence in a context that has received limited scholarly attention.

The findings reveal that artificial intelligence exerts a positive and statistically significant influence on employee engagement. This result reinforces previous theoretical and empirical research highlighting the beneficial role of AI in the workplace. In particular, it is consistent with the work of [2], who contend that AI-driven management systems can enhance employee motivation and commitment by offering clearer guidance, individualized performance monitoring, and reward mechanisms tailored to employees' needs and achievements. Furthermore, the findings align with those of [14], who argue that artificial intelligence fosters higher levels of employee engagement while facilitating continuous learning and accelerating skill development. These results suggest that AI technologies can create a more supportive and stimulating work environment, thereby encouraging employees to become more actively involved in their tasks and organizational objectives.

The findings further demonstrate that employee engagement has a positive and statistically significant impact on job performance, emphasizing its crucial role as a fundamental driver of individual effectiveness in the workplace. This result confirms the view that engaged employees are more likely to invest greater levels of physical, cognitive, and emotional resources in their work activities, which in turn contributes to higher levels of productivity and performance.

Moreover, this finding is consistent with a substantial body of literature examining the link between employee engagement and job performance. Previous studies have shown that when employees are deeply engaged in their work, they tend to perform their tasks more accurately, efficiently, and proactively, leading to improved individual and organizational outcomes [18]; [9]; [1]; [19]. By fostering dedication, concentration, and enthusiasm, employee engagement enables individuals to achieve their work objectives more effectively and to contribute more positively to organizational success.

The analysis of the mediating mechanism indicates that employee engagement plays a significant intermediary role in the relationship between artificial intelligence and employee performance. This result suggests that the positive influence of AI on employee performance is not only direct but also operates indirectly through its capacity to enhance employees' level of engagement at work.

This finding is consistent with the principles of Goal-Setting Theory proposed by [5], which argues that organizational tools, technologies, and management systems can improve performance by providing employees with clear objectives, continuous feedback, and personalized guidance. In this context, artificial intelligence can be viewed as a strategic organizational resource that fosters greater employee involvement, commitment, and motivation. Increased engagement subsequently translates into higher levels of job performance, making employee engagement a crucial explanatory mechanism through which AI contributes to performance enhancement. These results highlight the importance of considering not only the technological benefits of AI but also its capacity to positively influence employees' attitudes and behaviors, ultimately leading to superior work outcomes.

VI. CONCLUSION

This article investigates the impact of artificial intelligence (AI) on employee engagement and its subsequent influence on job performance within the information and communication technology (ICT) sector in Tunisia. More specifically, the study examines whether the adoption of AI technologies contributes to enhancing

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employee engagement and explores the extent to which this physical, cognitive, and emotional factor affects overall job performance.

By analyzing these relationships, the research seeks to deepen understanding of the mechanisms through which AI can create value at the employee level. In doing so, it provides empirical evidence on the role of AI in shaping workplace attitudes and performance outcomes within a strategic and highly competitive sector. Furthermore, the study contributes to the growing body of literature on AI adoption by offering insights from the Tunisian ICT context, an area that remains relatively underexplored despite the increasing importance of digital transformation and intelligent technologies in organizational environments.

The findings reveal that artificial intelligence has a positive and statistically significant impact on employee engagement within Tunisian ICT companies. Furthermore, employee engagement exerts a direct and significant influence on job performance, underscoring its importance as a critical determinant of individual effectiveness in the workplace. These results suggest that AI contributes to improved employee performance not only directly but also indirectly by fostering higher levels of engagement.

This indirect effect may be explained by the distinctive characteristics of the ICT sector, which is strongly oriented toward innovation, technological advancement, and continuous digital transformation. Employees operating in such environments generally exhibit a favorable attitude toward emerging technologies and are more receptive to the adoption of AI-based tools. Their familiarity with digital solutions and their interest in technological innovation encourage them to perceive AI as a valuable resource that supports task accomplishment, enhances productivity, and facilitates decision-making processes. Moreover, employees tend to view artificial intelligence not merely as a tool that simplifies routine activities, but also as an enabler of creativity, learning, and organizational change. This positive perception strengthens their commitment, motivation, and involvement in their work, thereby increasing their level of engagement. As a result, greater engagement translates into higher job performance, highlighting the pivotal role of employee engagement as a mechanism through which artificial intelligence generates positive outcomes for both employees and organizations.

This study provides several meaningful theoretical, managerial, and practical implications. From a theoretical standpoint, it contributes to the growing literature on work engagement by empirically validating the mediating role of employee engagement in the relationship between artificial intelligence and job performance. Additionally, the study extends existing AI adoption frameworks by highlighting the pivotal importance of perceived AI performance, particularly within a highly dynamic and innovation-oriented context such as the Tunisian ICT sector. From a practical perspective, the findings underscore the need for organizations to actively support employees throughout the AI adoption process. This includes providing adequate training, fostering digital skills, and clearly communicating the concrete benefits of AI in enhancing daily work activities and simplifying task execution. It is also essential for firms to continuously monitor employees' perceptions and feedback regarding AI tools in order to refine implementation strategies and maximize levels of engagement and acceptance. From a managerial standpoint, the results suggest that leaders should actively promote a culture of innovation and initiative-taking, while strategically integrating artificial intelligence into human resource management practices. Encouraging openness to technological change and reinforcing a supportive organizational climate are crucial for facilitating effective AI adoption. Such an environment not only enhances employees' willingness to engage with AI systems but also contributes to improving both individual and collective performance outcomes across the organization.

This study is subject to certain limitations. In particular, its exclusive focus on the information and communication technology (ICT) sector in Tunisia limits the generalizability of its findings to other industries and national contexts. As a result, the external validity of the results should be interpreted with caution. Future research is encouraged to broaden the scope of investigation by including other economic sectors and diverse organizational settings in order to enhance comparative insights. Moreover, subsequent studies could integrate additional mediating or moderating variables to provide a more comprehensive understanding of the

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mechanisms through which artificial intelligence influences employee attitudes and performance outcomes. Expanding the conceptual framework in this way would contribute to a deeper and more nuanced exploration of AI's organizational impacts.

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