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Research Article

Role of Artificial Intelligence in Human Resource Management in the Middle East Countries

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Abstract.

The primary goal of this article is to contribute to the field of technology adoption research by providing researchers, organizations, HR leaders, service providers, and decision-makers with advanced understanding and valid inputs on the development of AI-based HR solutions and the determinants of adoption. The overall objective of this research is to determine the general attitude of HR managers toward the adoption of AI in HRM and to assess the factors that determine the adoption of AI from the perspective of HR managers. The proposed adoption factors were grouped into four constructs, innovation characteristics, trust, technology-organizational-environment (TOE) factors, and emphasized HR roles within the organization.

The research was conducted among HR managers in Middle Eastern countries, specifically Jordan, Kuwait, Saudi Arabia, and Qatar. An online questionnaire was used to collect data from a total of 389 respondents.

The results showed that respondents were largely positive toward AI applications in HRM. This positive attitude can be inferred from the mean values of two variables, relative advantage and attitude toward the application of AI in HRM. The research results showed that HR managers have a positive attitude and confidence that emerging AI applications can contribute to supporting the efficiency, effectiveness, and quality of HRM. In addition, the results showed a constructive perception of the relative benefits of AI.

Researchers, policymakers, and service providers are also recommended to investigate the phenomenon from two perspectives, first, the impact of attitudes on actual adoption decisions and second, the factors that influence this impact.

Keywords: artificial intelligence, HRM, technology adoption, HR leaders, technological-organizational-environmental

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1. INTRODUCTION

The function of human resource management (HRM) has undergone multiple transformations, which have reshaped its fundamental contribution at micro-organisational and

macroeconomic levels. These transformations have been observed to shift the HRM function towards an increased strategic emphasis. The HRM function has emerged as a result of the labour movement and the emergence of human resource (HR) rights legislation to regulate the relationship between employers and employees [7, 8]. There-fore, the early traditional focus was on managing human resource management and union relations. However, it is generally agreed that today, driven by rapidly changing economic and business factors, HRM plays a much more important role in organisations and in different segments, whether private or public, profit or non-profit. Globalisation, information technology, social trends, political power and competitiveness are among the factors that have had a significant impact on HRM methodology and behaviour. While all of these factors are said to be important, digital transformation and its rapid evolution has had a broad and significant impact on the redefinition of most organisational functions, of which HRM is one. Contemporary economic change, driven by information technology (IT) innovations, is more intense and rapid when compared to other factors. Behind this distinctive impact lies the revitalised nature of the science of IT. It is evolving so rapidly that many organisations and business sectors have been driven out of business because they have not kept pace [15]. From an HRM perspective, it is quite clear that IT and the internet have had a significant impact in transforming the way organisations manage HR. This rapidly changing IT environment has fundamentally reshaped traditional HRM and has resulted in a technological dependency. It also redefines the core competencies of HRM. The severity of these changes is largely related to the characteristics of IT innovations. For example, the early digitisation of the HR function from traditional paper-based methods to the emergence of the Human Resources Information System (HRIS) [9], [10], [26] has played a significant role in reducing the administrative burden of HR tasks. Later, the invention of the internet extended the geographical reach of HRM and the emergence of electronic human resources (e-HR) improved the efficiency of the HRM function by virtually connecting all stakeholders.

HRIS and e-HR are among the most significant factors that have ensured the current strategically changing relevance of HRM and have become indispensable for achieving the strategic goals of organisations in attracting, developing, motivating and retaining skilled talent in an increasingly competitive environment[24]. While the significant strategic impact of HRIS and e-HR is undoubted, especially in the areas of communication, process efficiency, cost management, knowledge management and HR branding [16], it has been mostly targeted at tactical HR applications. In other words, the mainstream technological transformation of HRM has focused on managing administrative HR tasks

to improve the efficient use of resources, save time and costs, and increase productivity, thereby gaining a competitive advantage. However, the era of Industry 4.0 we are experiencing today is simply overwhelming and radically different. Industry 4.0 refers to a new era of the industrial revolution that relies heavily on connectivity, automation, artificial intelligence (AI), machine learning, big data and real-time data [18]. The trend relying on automation, connectivity and AI is advancing at a dramatic pace and is not going back anytime soon. Private investment worldwide has reached $70 billion, of which $37 billion in startup investment in AI. From an academic perspective, 3% of peer-reviewed journal publications and 9% of published conference presentations are related to AI [19]. This is no longer an argument, such rapid reliance on machine learning and AI technologies is sure to change jobs, functions, organisational structures and ways of doing business, leading to inevitable competition. Today, almost most organisational functions are incorporating or considering the use of AI to achieve better results, with engineering, telecommunications, customer service, financial services, healthcare, pharmaceuticals and medical manufacturing, for example, among the highest AI-adopting industries.

2. Research aims

This research attempts to fill the research gap on the adoption and acceptance of AI and intelligent applications in HRM. It aims to contribute to the field of technology adoption research by providing researchers, organisations, HR leaders, service providers and decision-makers with an advanced understanding and valid inputs on the development of AI-based HR solutions and the drivers of adoption.

2.1. Research objectives

The key objectives of this research are as follows:

1. Develop a thorough conceptual framework model [11] to evaluate the influence of research factors have with HR leaders on the adoption of AI in HRM.

2. Identify the general attitude of HR leaders toward the adoption of AI in HRM.

3. Understand the relationship between the AI tools' innovation characteristics and the HR leaders' attitude toward its adoption.

4. Evaluate the influence of technology reliability, credibility, and technological competence on HR leaders' trust in AI usage within HRM.

5. Evaluate HR leaders' Trust in AI-based technology and its relationship with their attitude toward its adoption.

6. **Assess the influence of predefined specific technological, organizational, and environmental factors namely: firm size, technological readiness, top management support, and competitive pressure on HR leaders' attitude toward the adoption of AI in HRM.**

In this article, we focus on research objective 6.

2.2. Research questions

This research attempts to attain the objectives by answering the following research questions:

1. What is the perception and attitude of HR leaders toward adopting AI within HRM?

2. What is the relationship between AI-based HR applications innovation characteristics such as relative advantage, complexity, and compatibility with HR leaders' attitude toward the adoption of AI in HRM?

3. What are the main determinants of AI technology trust from HR leaders' perspective?

4. To what extent do HR leaders trust AI in processing their HRM tasks and what relationship does it have with their attitude toward it?

5. **What is the association between firm size, technological readiness, top management support, and competitive pressure on HR leaders' attitudes toward the adoption of AI in HRM?**

6. What is the relationship between the emphasized HR Roles within the organization and the HR leaders' attitude toward the adoption of AI in HRM?

In this article, we focus on research question 5.

2.3. Research hypotheses

To answer the research question 5, the research has four main research hypotheses. The hypotheses reflect the four main research constructs with their underlying sub-hypotheses which are explained furtherly in the next part "Conceptual framework".

H2.Technology-Organization-Environment (TOE) factors have a significant influence on the HR leaders' attitude toward the adoption of AI in HRM.

1. **H2.1**: Top Management Support has a significant positive influence on the HR leaders' attitude toward the adoption of AI in HRM.

2. **H2.2**: Technological Readiness has no significant influence on the HR leaders' attitude toward the adoption of AI in HRM.

3. **H2.3**: Firm Size has a significant positive influence on the HR leaders' attitude toward the adoption of AI in HRM.

4. **H2.4**: Competitive Pressure has a significant positive influence on the HR leaders' attitude toward the adoption of AI in HRM.

3. CONCEPTUAL FRAMEWORK

To achieve the research objectives, the focus of the research oscillated between an initial focus on internal dynamics and business processes, the emergence of the Internet and the shift to external factors, and an initial focus on the power of individual perception. To achieve a comprehensive, enhanced understanding of the research topic, a valid conceptual framework was developed to guide research efforts toward achieving the research objectives. The conceptual framework provides an integrative overview that links factors that are hypothesized to be related to HR managers' attitudes towards the adoption of AI applications in HRM. The factors considered can be grouped into the following four main constructs:

1. Innovation Characteristics

2. Technology-Organization-Environment (TOE)

3. Technology Trust

4. HR-Roles

The constructs under study were selected based on their influence on HR managers' attitudes towards the adoption of AI in HRM. The fact that the adoption of AI within HRM is still in the early stages of knowledge and persuasion diffusion is consistent with previous studies that have emphasized that in the early stages of adoption with low external pressures, the greater emphasis is on internal constructs[22]. Therefore, in addition to competitive pressures, the main focus of this study is on the factors that characterize innovation, individuals' trust in technology and internal organizational

structure. The proposed conceptual framework presented below (Figure 1) was developed to understand and examine the predicted relationships between these factors and the impact of the proposed variables on HR managers' attitudes towards the adoption of AI applications in HRM. We believe that this conceptual framework best serves the research objectives. This conceptual framework builds on the theoretical foundations of previously validated and recognized IT innovation diffusion theories, namely the diffusion of innovation theory (DOI), the technology-organization-environment (TOE) framework and [31] the HR roles theory. It is important to note that all the factors identified in this study have been proposed in the previous literature and have been used previously to explain well-established IT diffusion research. However, there was no consensus on their order of importance and the results showed that when comparing different research contexts, their importance varied.

3.1. Technology-Organization-Environment (TOE)

3.1.1. Top Management Support

Among internal organisational factors, the researchers recognised the importance of senior management support in influencing the adoption and implementation of IT innovation. Senior management is exemplified by those individuals who are potential decision-makers within the organization [20]. In the context of IT adoption, it refers to those who are directly or indirectly involved in influencing the IT strategies of the organization. The literature on IT innovation identifies top management support as critical to the adoption and successful implementation of IT technology [23], [25]. Top management support is argued to drive the technological progress of the organization through early adoption of IT innovation, while weak management support hinders the adoption response [1], [3].

3.1.2. Firm Size

The size of an organization can be defined in several ways, including the organization's capital, physical resources, transaction volume, geographic spread, or the number of employees [8]. Organizational size has consistently been identified as a strong determinant of the adoption of IT innovation[13]. HRIS research [2], [4], [6], [28], have supported this hypothesis and found a significant positive relationship between organisational size and HRIS adoption. Furthermore [25], investigated the factors influencing cross-national

organizational adoption of e-HRM [32] in Europe and argued that the only consistent finding concerning IT adoption was the organizational size as a determinant of adoption.

3.1.3. Technological Readiness

While the compatibility factor discussed earlier represented the normative aspect of an organisation's compatibility with the introduction of artificial intelligence, the context of technological readiness deals with technological compatibility. This refers to the organizational technology characteristics available for the adoption of the new technology being introduced [14], [27]. Technology readiness, proposed as a technology factor within the TOE model, addresses several technological aspects of organizations, including technology infrastructure, IT human resource expertise and competencies, and technology maturity level [12], [34]. It is argued that the suitability of these technological characteristics with the new technology introduced positively influences its adoption.

3.1.4. Competitive pressure

The uptake of artificial intelligence in human resource management is at an early stage, especially in developing countries. For this reason, this research puts more emphasis on internal factors, but competitive pressures are seen as a powerful force shaping attitudes and decision-making in all modern companies. Competitive pressure refers to the degree of pressure perceived by an organization from its competitors [13]. Among other external factors, competitive pressure is a strong predictor of IT innovation adoption and diffusion research [13]. As the world moves towards a knowledge-based and free-market economy, experts and research suggest that competitive pressure will continue to increase.

4. Research and methodology

This research aims to provide empirically supported evidence on the predictive power of predetermined factors on HR managers' attitudes towards the adoption of AI in HRM, to achieve this goal, this research asks research questions that are interrelated and guide the research methods used. A conceptual framework is introduced to guide the factual measurement of variables and to examine the theoretical facts underlying
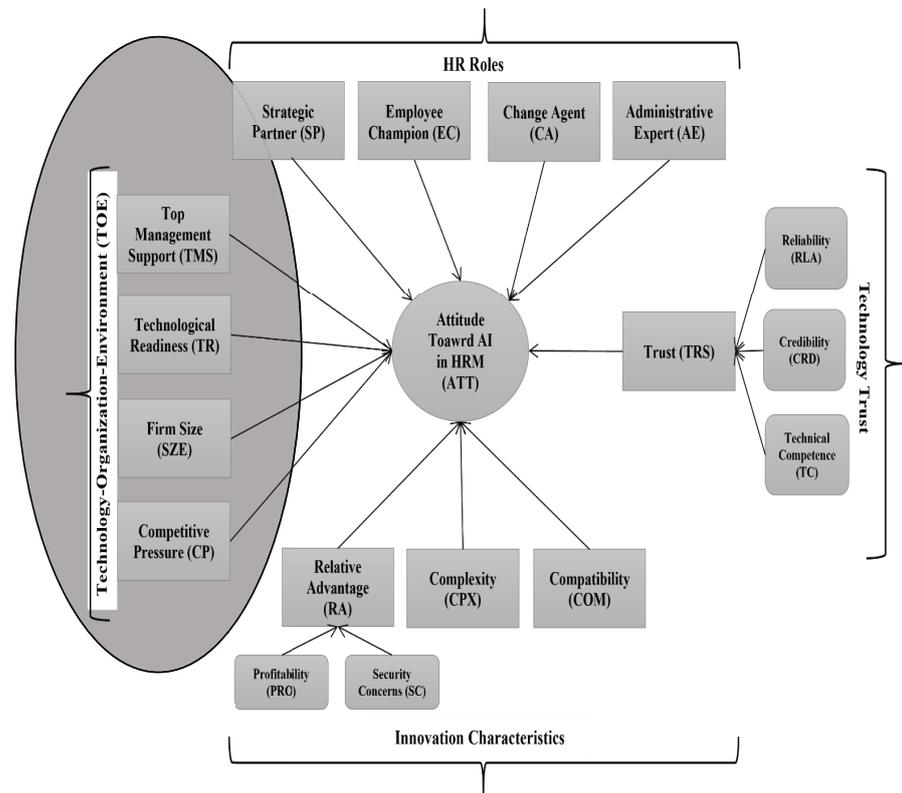
Research and Source: Author's Construction

Figure 1: Research Conceptual Framework.

the hypothesized relationships. The research aims to investigate hypothesized relationships; therefore, it is an exploratory study that adopts a positivist research paradigm and uses a deductive quantitative methodology. This research is based on primary data. An online questionnaire (see Table 1) is used to collect primary data for this research from HR managers in Middle [29] Eastern countries, specifically Jordan, Kuwait, Saudi Arabia and Qatar. The survey used systematic, disproportionate, stratified, random sampling and a sample of 389 respondents. Data was collected via an online survey using the Linkedin network over two days in July 2020 to ensure that no significant changes occurred in the estimated population. The data were analysed using several statistical techniques to test the research conceptual model, which included descriptive data analysis, exploratory factor analysis, reliability analysis, regression matching analysis and multiple regression analysis. The technology-organization-environment part of the model is addressed.

The analysis is conducted using SPSS 25 software to modify, transform and evaluate the data to obtain meaningful results that answer the research questions. To achieve

the research objectives, several statistical analyses are employed, firstly, demographic analysis is conducted to describe the basic characteristics of the data in the survey and provide a snapshot of the demographic characteristics of the respondents. The next step was to assess the validity and reliability of the instrument, to do this, the adequacy and appropriateness of the sample for factor analysis were analysed by item rating, and communality, Kaiser Meyer Olkin (KMO) and total explained variance were measured. After confirming the adequacy, factor analysis is performed using principal component analysis (PCA), where component analysis and common factor analysis are performed to assess the validity of the instrument. Eight items had to be removed and the administrative expert variable (AE) had the worst effect in terms of gross loading on multiple factors, the entire variable had to be removed to obtain acceptable validity results for the research items. After eliminating the validity issues, all scale measures met the standardized acceptable factor loading. In addition, convergent validity was confirmed by showing the high reliability of the scales in measuring the constructs. Cronbach's alpha measures of all research variables met the acceptable level of Cronbach's alpha measurement, thus supporting convergent validity. The Cronbach's alpha values for TOE ranged from 0.732 (firm size) to 0.917 (top management support).

Furthermore, before regression analysis was conducted to test the predicted relationships hypothesized by the research. Several hypotheses were tested to assess the appropriateness of regression analysis on the data collected, in particular normality, multicollinearity and homoscedasticity[5].

5. RESEARCH FINDINGS AND THEIR EVALUATION

Multiple regression analyses were conducted to assess the relationship between the predicted dependent variables Size (SZE), Technological Readiness (TR), Competitive Pressure (CP), Top Management Support (TMS), and Attitude (ATT). Table 2 shows the results of the multiple regression analysis, which reveals that only three of the predictor variables are significant predictors of attitude towards adopting AI in HRM. Namely, relative advantage, complexity and trust. While relative advantage and confidence have a significant positive relationship with attitude, complexity has a significant negative relationship with attitude. The β-value for the trust factor ranged from the highest value of 0.504 to the lowest value of 0.004 for the HR role responsible for the change.

Based on the above statistical data our hypotheses are the followings:

TABLE 1: Instrument Measures. Source: Author's Construction.

Construct	Variables	Scale of Measurement	Based on (sources)
Classifications	Country of Employment	Multiple options	Own Construct
	Age	Multiple options	[16]
	Academic Level	Multiple options	[16]
	Experience	Multiple options	[16]
	Job Title	Multiple options	Own Construct
Technological Organizational Environmental (TOE)	Top Management Support	Likert Scale (1= Strongly disagree; 5= strongly agree)	[12], [14], [17], [33]
	Technological Readiness		[14], [15]
	Firm Size	Multiple options	[14], [28]
	Competitive Pressure	Likert Scale (from 1 to 5)	[14], [28]

TABLE 2: Predictors of ATTITUDE Coefficients. Source: Author's Construction.

Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
SIZE	0.060	0.031	0.075	1.953	0.052
TOP MANAFEMENT SUPPORT	0.071	0.040	0.077	1.777	0.076
TECHNOLOGICAL READINESS	-0.015	0.050	-0.013	-0.295	0.768
COMPETITIVE PRESSURE	0.044	0.046	0.041	0.964	0.336
a. Dependent Variable: ATTITUDE					

TABLE 3: Hypotheses, which are rejected and supported.

2. Technology-organization-Environment (TOE)	
H2.1: Top Management Support has a significant positive influence on the HR leaders' attitude toward the adoption of AI in HRM.	Rejected
H2.2: Technological Readiness has no significant influence on the HR leaders' attitude toward the adoption of AI in HRM.	**Accepted**
H2.3: Firm Size has a significant positive influence on the HR leaders' attitude toward the adoption of AI in HRM.	Rejected
H2.4: Competitive Pressure has a significant positive influence on the HR leaders' attitude toward the adoption of AI in HRM.	Rejected

6. Conclusions

This research deals with the phenomenon of the application of artificial intelligence in human resource management. Through the development of a conceptual framework and analytical tools based on Rogers' diffusion theory of innovation [22], TOE [30], HR role theory [31] and previous studies of AI adoption, the results of this research provided empirical evidence on HR managers' attitudes towards the adoption of AI applications in HRM. Nowadays the recruitment industry use the AI based Professionals Networking Platforms (PNPs) or othore online outsourcing tools. Another tool is AI-powered Applicant Tracking Systems (ATS), which provides recruiters with the opportunity to conduct instantaneous talents search based on the defined job rerequirements. For example "Beamery" and "Workable", an AI-based self-styled recruitment marketing software that read the vacant specification and employs data mining algorithms and other AI techniques to conduct online screening throughout csocial media and PNPs to locate active and passive candidates and notify matching result about the new vacant. The research results show that managers have positive attitudes and confidence in the potential contribution of emerging AI applications to support HRM efficiency, effectiveness and quality. In addition, the results showed a constructive perception of the relative benefit of AI, which foreshadows continued future reliance on AI in HRM processes and supports the premise of augmented intelligence. This confidence represents a distinct appreciation of the role of AI in HRM and will have a significant impact on HRM behaviour and core competencies. Furthermore, it is concluded that the high predictive power of innovation characteristics and technology trust factors, the low predictive power of TOE factors, and the lack of HR roles factors in HRM are related to attitudes towards AI adoption. The traditional picture of the strength of adoption factors is changing, with the predictive power shifting from situational, structural and TOE factors to product attributes and trust.

The novelty of the research is based on three levels, the research topic, the design and the findings of the factors investigated. At the research topic level, while [21] qualitative research has investigated HR professionals' attitudes and perspectives on AI technology in the hiring process, no previous quantitative research has been conducted to investigate the phenomenon of adoption of AI applications in HRM.

The novelty of the research design lies within the selected target research population. To obtain more reliable and credible results on the attitudes towards the adoption of AI in HRM, this research population is limited to decision-makers and decision-makers within the HRM hierarchy (specifically CHRO, HR Directors, HR Managers, Senior HR

Managers and HR Executives). In addition, the geographical element of the research population is novel in that there has been no previous research evaluating the adoption of AI in HRM in the Middle East.

In terms of research findings, no previous research has empirically investigated the relationship between innovation characteristics, technology trust, and TOE factors and emphasized HR roles in attitudes towards the adoption of AI in HRM.

The novel finding of this research is that the determinants of TOE adoption, namely firm size, top management support, technology readiness and competitive pressures, are not empirically significantly associated with HR managers' attitudes towards the adoption of AI in HRM.

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