Adoption of Artificial Intelligence in Human Resource Management: A Conceptual Model

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The advent of Artificial Intelligence Technologies (AIT) has a transformational impact on HRM domain. This research proposes an integrated model related to factors that impact the adoption of Artificial Intelligence in the HR function. The study deploys a framework of the Technology-Organization-Environment model enhanced by Technology-Adoption-Model. The proposed model provides key insights to support researchers to enhance assimilation, and forge ahead in the research on the organizational perspective of the adoption of AIT in HRM. The model is appropriately linked to the decision-makers and HR professionals. The research provides a foundation for detailed empirical studies related to the factors impacting the adoption of AIT

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Introduction

By adopting Artificial Intelligence Technologies, the Human Resources function has transitioned to being acknowledged as a strategic contributor to the business. Human Resource Management (HRM) has gone through a notable transformation influenced by technological changes (Bondarouk et al., 2017). The advancement of HRM, to "Intelligent HR", as put forth by Yabanci (2019), is delved into specifically the application of Artificial Intelligence technologies. Matsa & Gullamajji (2019) emphasize that for organizations to be competitive, they need to adopt innovative HR practices, which move HR away from administrative functions to areas that help redefine and reshape employee experience, through advanced functionalities of artificial intelligence (AI) technologies. Highlighting how AI has contributed in the strategic development of HR, Zehir et al. (2020) elaborate on the influence that the technological evolution of the HR function has on an organization's performance.

Organizations can leverage strategic advantage by managing talent - a key

differentiator, with the implementation of AIT related to all aspects of the HRM function. There is adequate literature available, on AI applications that can be deployed in all functions of HRM, but there are very limited insights on the adoption of AI in HRM. Though it is such a key aspect of HR transformation that impacts business, there is a huge variance, in the adoption of AIT in HRM function, across organizations. There is no model available, on factors that impact the deployment in the HR function, of the technology of Artificial Intelligence. Consequently, there do not exist many studies, neither much empirical research has been conducted on the adoption of Artificial Intelligence in HR. This is identified as a research gap. This study intends to contribute and provide inputs to this relatively lesser researched field.

This research addresses the need to formulate a comprehensive model, to provide an integrated view of the factors impacting the decision of adoption of AI in HR. This research proposes a comprehensive framework, related to the AI technology adoption in HR, based on the integration of Technology-Organization-Environment (TOE) model and Technology-Adoption-Model (TAM). The study provides insights that are beneficial to multiple stakeholders. Top management, employees, managers, AI developers, and HR application vendors are some of the key impacted parties, who can leverage this study.

Literature Review

There are very limited insights on a model that supports the adoption of AIT in HRM, while there are a few studies of adoption of AI technology in different contexts. Upadhyay & Khandelwal (2018), conducted research in the recruitment function regarding the extent of adoption of AI, based only on secondary data. Nankervis et al. (2019), research was based on inputs received from focus groups and surveys, on the levels of preparedness for AI of the HR professionals, it did not focus on the adoption of AIT in HRM function overall. Bringing forth a case study, Gulliford & Dixon (2019) traced the implementation of AI, from preliminary to present day, based on the experience of an organization, though it did not bring forth any insights on the topic of adoption of AI. Pillai & Sivathanu's (2020) study related to AI adoption in HR was limited to only the recruitment domain in HR in technology/ technology-enabled service sectors in Pune and Mumbai cities in India. Niehueser & Boak (2020) conducted a study in a recruitment organization, to study the impact on the adoption of AI, due to the attitudes of employees on initiation of implementation of AI in the HR processes. Thus, the review of existing literature on the adoption of AIT in HR highlights very limited empirical studies existing, which are based on technology models to study adoption based on various parameters. There is not much research on the model of adoption of AI in HR. Though it is such a key aspect of HR transformation that impacts business, the lack of a technology model for

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the adoption of AIT in HRM function, across organizations is a research gap.

Theoretical Background

Khasawneh (2008) in his research, has explained the adoption of technology as "the first use or acceptance of a new technology or new product". Theoretical frameworks modeled to understanding and predicting components that influence technology adoption in organizations along with their authors are : Theory of Reasoned Action (TRA) designed by Fishbein & Ajzen (1975), Technology Acceptance Model (TAM) designed by Davis (1989), TOE Model designed by Tornatzky & Fleischer (1990), Theory of Planned Behavior (TPB) designed by Ajzen (1991), Innovation Diffusion Theory (IDT) designed by Rogers (1995) while Venkatesh et al. (2003) proposed the Unified Theory of Acceptance and use of Technology (UTAUT).

Tornatzky & Fleischer (1990) had put forth, the Technology-Organizational-Environmental (TOE) framework, to explore the organizational-level adoption of technology services and products. Zhu et al. (2004) shared that the TOE framework is now positioned as a universally acknowledged theory of technology adoption. The incorporation of variables related to technology, organization, and environment, has made TOE preferable, in comparison to other technology adoption models (Hossain & Quaddus, 2011). An aspect related to technology factor elaborates on both external and internal relevant technologies for the organization. The organizational aspect and its attributes are related to the size, scope, and structure of the organization. Factors concerning the environment refer to the surroundings, where the organization does business and it includes business partners, competitors, the industry, and the government. Cooper & Zmud (1990), in their research highlight the framework of TOE being a well-acknowledged framework, related to the adoption of technology, as per the research indicated, in the empirically supported studies conducted. Thus, to study the adoption of AIT in the Human Resources function, the TOE framework has been well adapted.

The TOE model has been called out to have certain drawbacks/ limitations of not representing a comprehensive conceptual framework, as it constitutes a set of variables, so is not a robust model to understand organizational adoption (Dedrick & West, 2003). Low et al., (2011) in their research referred to the TOE framework that it lacks key constructs and adequate variables in each context. Wang et al. (2010) highlighted that the framework of TOE has key factors, which are not well defined and thus impact the variables, to differ with context. Thus, TOE framework requires to be combined with additional variables to build a robust framework.

The Technology Adoption Model (TAM) targets to forecast acceptance of technology by the user and describe the behavior of a specific individual. The model theorizes two factors impacting the user's decision to adopt a technology. One is "perceived usefulness" and

the second is the "perceived ease of use" (Davis 1989). The TAM provides insights, on the variance related to a user's behavioral intent to the adoption of IT and deployment, across large types of contexts (Alam et al., 2006).

Ajibade (2018) shared that the TAM could be more appropriate for individual use of technology, which could be influenced by friends or colleagues. In contrast, the technology used at the workplace is influenced by the organization guidelines which impact the employee's behavior, related to the use of the technology. The TAM, as is limited in the context of practicality, is not the appropriate model (King & He, 2006). TAM reflects to be more of a theoretical artifact, based on the assumption of an attitude regarding utilizing a certain technology, is determined by the user exhibiting a degree of "ease of use" and "perceived usefulness" of that technology (Armenteros et al., 2013). Some of the researches conducted with the TAM have had inconsistent results, thus, highlighting the need to identify and include significant factors in the models, emphasizing the requirement of combining the model related to TAM along with appropriate technology adoption models (Legris et al., 2003).

Integrating TOE with TAM

The TOE theory is considered inadequate, as it consists of unclear major constructs and broad (Riyadh et al., 2009). Thus, the need exists to consolidate the TOE framework by integrating it with a model which has well-defined constructs. Research has proposed incorporating the TOE model with the TAM to mitigate the shortcomings of TOE model, as it leverages and complements the constructs of the framework of the TOE and overcomes the limitations reflected of the TOE framework when used in isolation (Riyadh et al., 2009; Zhao et al., 2010). Integration of TAM with TOE model offers an enhanced theoretical framework to help understand, explain, and predict the user behavior, in the context of technology being adopted in an organization (Zhao et al., 2010). Therefore, the resultant model, built by the incorporation of the TOE framework with the TAM, complements each other. The integrated model of TOE and TAM is strongly advocated, as being a robust model, to measure the factors impacting technology adoption.

Integration of TAM with TOE model offers an enhanced theoretical framework to help understand, explain, and predict the user behavior, in the context of technology being adopted in an organization.

The model proposed is appropriately linked to the decision-makers (organization) and the end-users (HR professionals) who are AIT adopters in HRM function. To design an integrated model, the approach followed by this study is to include both the significant variables and the insignificant variables of framework related to TAM and TOE, as being identified basis multiple similar research conducted, having these two models as frameworks. Based on the review of lit-

erature on the existing research, it has been observed that there are hardly any studies conducted at an organizational level, that addresses the impact of specific factors, which are key to AI – Complexity, Compatibility, Security and Privacy. These factors, contribute largely in terms of impact, being key to the adoption of AI in Human Resources function and are required, as part of a proposed technology model. The components of the TAM provide insights related to the interconnectedness of the acceptance by an individual of technology and their adoption of the technology and the ensuing behavioral intent to utilize the technology (Gangwar et al., 2015). In the proposed model, specifically from the lens of HR Professionals, the impact of "perceived ease of use" and influence of "perceived usefulness", has been incorporated. This study proposes a framework to comprehend the adoption of AI in relation to the organization, as well as with the perspective of user's acceptance and intention to adopt.

Research Framework

This study is built by referencing key technology adoption models, namely the TAM and TOE framework. Both the models have been used for research in relation to organizations. Thus, the TAM's postulates have been improved, adding new constructs, with the integration of the TOE model. The model aims to include adoption of technology and user acceptance; thus, it considers two levels of analysis - organization level and individual level. This model builds and substantiates the research framework to examine the factors under five key categories, namely - technological, organizational, environmental, and an HR professional's input on "perceived usefulness" and "perceived ease of use". This study puts forth the framework, to study those factors that have a positive and negative effect, on the adoption of AI technology, for the HRM function. The model proposed is appropriately linked to the decision-makers (organization) and the end-users (HR professionals) who are AIT adopters in HRM function in the organization. Therefore, to build a comprehensive framework, this study builds a model of the TOE framework combined with TAM. The framework being proposed is depicted in Fig.1.

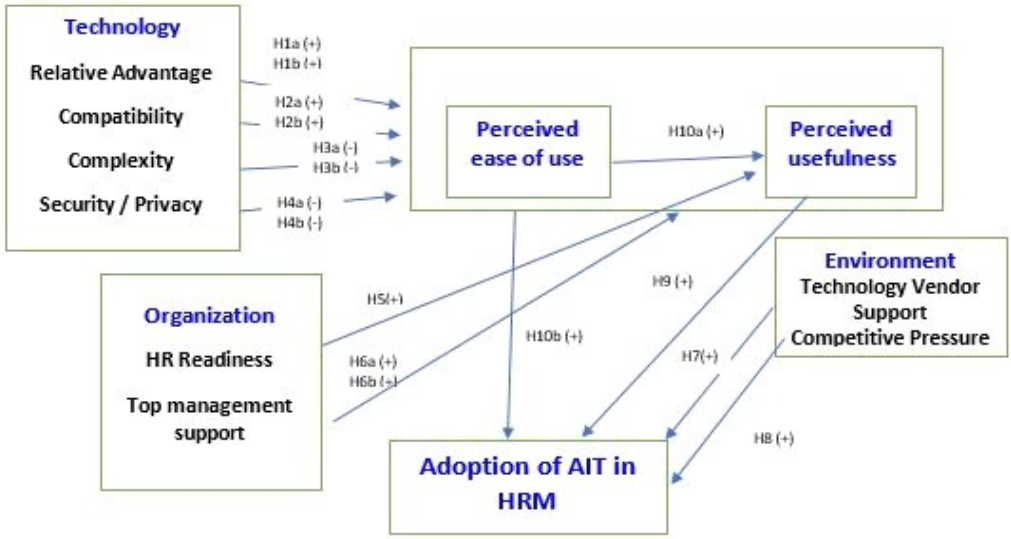
Based on the proposed combined conceptual framework of the TOE and TAM model, the following hypotheses have been developed.

Technology Factors

Relative Advantage: The likelihood of a technology, being adopted in an organization, is higher if there is a perception that, in comparison to the organization's current technology, it provides a relative advantage over previous technologies (Lee et al., 2004). The relative advantage of the adoption of technology, as compared to other alternatives, is a key aspect that contributes to the adoption of that technology related to organizations. It has been acknowledged,

Relative advantage is a precursor to any technology adoption.

Fig. 1 Conceptual Framework for AI Adoption in HR



Source: Own research

that relative advantage is a precursor to any technology adoption (Wamba et al., 2017). The following hypotheses are proposed:

H1a: Factor of Relative advantage has positive impact in relation to Perceived Usefulness

H1b: Factor of Relative advantage has positive impact in relation to Perceived Ease of Use

Compatibility: Compatibility is the perceived impression that a technology transformation is influenced by the potential adopter's preceding experiences, the value system, and requirements (Rogers, 2003). As shared by Calisir et al. (2009), studies in technology adoption indicate that the compatibility factor plays a key role in technology adoption, and additionally in the "perceived usefulness" aspect too. The notion deemed is that the more the artificial intelligence technologies are aligned to the technology platforms being used, the more the organization will be able to leverage the new technology, and lesser will there be the uncertainty in the organization and the Human Resources function, related to the new technology adoption. So, the following hypotheses are recommended.

H2a. Factor of Compatibility has positive impact in relation to Perceived Usefulness

H2b. Factor of Compatibility has positive impact in relation to Perceived Ease of Use

Complexity: Complexity is denoted as the perception, related to the extent of difficulty in comprehending and in using a certain innovation (Sonnenwald et

al., 2001). Regarding technology adoption, complexity can be deduced by the time required to conduct tasks, incorporation of new processes into existing ones, the efficacy of data handling, strengthening of the functionality of systems, and design interface. Thus, as per Chau & Hu (2001), the deduction can be made that the complexity factor has an inverse relation proportional to perceived usefulness, the perception regarding user's comfort to use and intent to adopt the technology. Adoption of technologies related to Artificial Intelligence HR is related to how the existing HR applications/ systems will be integrated with Artificial Intelligence applications deployed. It could vary depending on several factors, including the current automation or application of technology in HRM function. Thus, the following hypotheses are put forth:

H3a. Factor of Complexity has negative impact in relation to Perceived Usefulness

H3b. Factor of Complexity has negative impact in relation to Perceived Ease of Use

*Security & Privacy: S*ecurity/privacy is a key factor in technology adoption. Security and privacy reflect the extent to which technology is deemed to be not safe for conducting work and exchange of data (Zhu et al., 2006). Existing research indicates there is apprehension, related to security, in technology adoption. Yabanci (2019) focuses on the security and privacy aspect, specifically about the threat posed either on confidentiality, integrity, and accessibility front, in human-computer interaction. Thus, security is a concern for AIT, especially the concern that needs to be addressed, which is related to, if AIT can safeguard, the employee data and preserve the privacy of the employees. This concern's impact is to be tested, by the following hypotheses.

H4a. Factor of Security/privacy has negative impact in relation to Perceived Usefulness

H4b. Factor of Security privacy has negative impact in relation to Perceived Ease of Use

Organization Factors

HR Readiness: HR readiness can be referred to the HR professional's impression on how ready they think the organization is, related to the extent of knowledge, commitment, required resources allocation, and execution concerning adopting a technology (Tan et al., 2007). For AIT in HRM, to be effectively deployed in organizations, effective infra-

Security and privacy reflect the extent to which technology is deemed to be not safe for conducting work and exchange of data.

For AIT in HRM, to be effectively deployed in organizations, effective infrastructure, requisite HR expertise, and financial allocation of resources are required.

structure, requisite HR expertise, and financial allocation of resources are required. Organizational technology preparedness is indicated to impact technology adoption. Matsa & Gullamjji (2019) highlight the need for organizations, to train and re-transform their workforce to be able to deploy AIT to improve its HRM process. The following hypothesis is to be tested:

H5. Factor of HR readiness has positive impact in relation to Perceived Usefulness

Support of Top Management: In any key transformation in an organization, the role of top management support is pivotal. Literature related to IT adoption has emphasized on senior management backing, as key in the adoption of any relevant technology. Top management support is reflected in how they perceive and position the importance of technological innovation in creating value for organizations (Salwani et al., 2009). This support ensures the commitment of resources and encourages a positive climate to manage barriers to change and any resistance to technology adoption. The support of top management is critical in AIT adoption in HRM. The hypothes is that need to be tested are:

H6a. Factor of Support of Top management has positive impact in relation to Perceived Usefulness

H6b.Factor of Support of Top management has positive impact in relation to PEOU (Perceived Ease of Use).

Environment Factors

Support of Technology Vendors: As AIT is a recent innovation, a key factor influencing its adoption is the positive role of AIT vendors during all stages of implementation (Ghobakhloo et al., 2011). For seamless adoption, it is expected of the vendor to provide all support at each stage, including training and post-implementation support. HR professionals require requisite vendor support, for deployment. As per the specific needs of the organization, in the HRM function, there might be a need to customize the AI applications, which the vendor will need to build and deploy. Thus, vendor support is presumed to be critical for the adoption of AI for HRM. This assumption needs to be tested.

H8: Factor of Support of Technology vendors has positive impact in relation to adoption of AIT in HRM

Competitive Pressure: The existing studies indicate that pressure from competitors in the market results in having organizations being pushed for the adoption of technology related to HR (Alam et al., 2016). When multiple applications of AI technology, are implemented in the HRM functions by many organizations, this provides a strategic advantage to them as competition. This creates pressure and results in a compulsion for the organization to implement this technology change. This assumption needs to be tested.

H9: Factor of Competitive pressure in market has positive impact in relation to adoption of AIT in HRM

Perceived Usefulness

Perceived usefulness (PU) is defined for the user who will potentially operate the technology. It refers to the intuitive possibility, related to the adoption of a specific application system, that would have a positive impact and enhance the concerned user's performance on the job, in relation to and in the context of an organization. The following hypothesis is put forward:

H10. Perceived Usefulness has positive impact in relation to adoption of AIT in HRM.

Perceived Ease of Use

Perceived ease of use (PEOU) is expounded as the degree of expectation, that a potential user has that the concerned innovation being adopted, will be comfortable and devoid of extra effort to apply (Davis,1989). Schillewaert et al., (2005), in their research put forth that the TAM advocates that PEOU influences PU (Perceived usefulness), as in relation to technologies that are comfortable from a user's perspective, will be more beneficial. So, the following hypotheses are to be validated:

H11a. Perceived Ease of Use has positive impact in relation to on adoption of AIT in HRM.

H11b. Perceived Ease of Use has positive impact in relation to PU.

Discussion

The proposed AIT Adoption in HR integrated model is built with constructs and elements that complement each other, wherein each construct/element influences with diverse weightage, at one or the other decision period. This study provides insights in to the relationship that relative advantage provided, compatibility, readiness of HR team, support provided by top management, indirect pressure from the competition, and AI vendors support, have on the AI technology adoption for the HR function. Elements of complexity and security/ privacy issues impacts are also factored to determine their impact on AI technology adoption. The proposed framework identifies the influence of "Perceived ease of use" on "Perceived usefulness", as major contributors that determine the intent to adopt AI in Human Resources.

This study distinctively subscribes to the present models of the theory, by adding depth to the research related to AI technology adoption. The contribution of the proposed framework is to provide further insights to enhance understanding and support scholars, academicians, practitioners, and technology vendors to be able to better imbibe and enhance the research on the mechanism that HR professionals portray them in the organizational context, in relation to the adoption of AIT in HRM. It brings forth insights on AIT adoption by existing organizations, HR teams and HR professionals who are not aware or have not applied AIT in HRM. This study benefits AI technology developers and vendors who will get insights on how to

support organizations and HR professionals. The study can help marketers build their marketing strategy by analyzing the factors of adoption. AI designers will greatly benefit from this study, and it will support them in the formulation of algorithms and applications, related to AI technology, for Human Resources functions. The proposed model once empirically validated, could provide further key insights to the major stakeholders.

Conclusion

Human Resource Management is going through a transformational phase, resultant of the integration of Artificial Intelligence into HR processes. The adoption of AIT in HRM enables organizations to hire and retain key talent. This study recommends a framework for the adoption of Artificial Intelligence in the Human Resources function. It dispenses crucial inputs, to gauge factors that impact adoption of AI technology in the Human Resources function. There does not exist adequate research on the adoption of AI in HR and this was identified as a research gap. The objective of this research is to bridge this gap. This research recommends the model to investigate the incorporation of the technology related to AI in HRM. The study's contributions will strengthen, the theoretical foundation in this area, as it highlights the variables that influence the adoption of Artificial Intelligence in Human Resources function. This research has clearly exhibited that the TOE framework combined with the TAM can be fully leveraged to enhance, the evaluative power for technology adoption. The research puts forth a set of variables to be referenced to decipher aspects related to the study of future adoptions of innovations related to technology. The research is of relevance to multiple stakeholders. Future empirical studies, based on the proposed model, could provide insights to top management, leaders, managers, HR teams, and HR professionals, who will benefit from the adoption of Artificial Intelligence in HR. The research adds value to the AI technology developers and vendors. Further, since the proposed model focuses on the adoption of AIT for HRM, from the perspective of HR professionals, future research could be designed to extend the scope of research to the top management, managers, AI developers, and HR application vendors, to bring forth their inputs. This study is a precursor to the research that could be pursued to explore the impact of AIT adoption related to organizational performance, managerial effectiveness, and employee experience.

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