

The Impact of AI on Organizational Employees: A Literature Review

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Abstract. The quick advancement of artificial intelligence technologies represents a backdrop that cannot be disregarded in contemporary organizational management practice and research. Based on the field of human resource management, the study reviews and summarizes the impact of AI on the subject of human resource decision-making—employees—from the viewpoint of organizational management. This study takes two important research directions of AI and organizational management research at the individual level, and summarizes the research on employees' adoption of AI technology and the impact of AI on them individually in organizations. The adoption of AI technology by employees is influenced by technological, organizational and personal factors. AI technology shows the advantage of augmentation effect on employees on the one hand, and the phenomenon of automation, i.e. substitution effect on the other. Organizations should place a high value on the new changes that AI has made to the workplaces, attach importance to employees' attitudes, psychological and behavioral responses to new intelligent technologies. Utilize AI technologies to support decisions and promote the development of the new model of "AI+HRM".

Keywords: Artificial Intelligence; human resource management; organizational employees; individual adoption; individual impact.

1. Introduction

A new generation of technology, including big data, cloud computing, and artificial intelligence, is currently flourishing and bringing new opportunities for all kinds of organizations [1]. For HRM researchers, the impact of AI includes at least two major aspects as follows: on the one hand, the impact of AI technology on HRM activities (AI on HRM), such as how the advent of AI technology has reshaped organizations' recruitment activities and efficiency, whether and how the implementation of AI has altered the equilibrium of talent supply and demand in the labor market, and so on; On the other hand, it shows the impact on HRM activities itself and its management objects (people, employees, interpersonal relationships, human-machine collaboration, etc.) after the combination of AI technology and HRM activities (AI+HRM) [2].

Yet, the direct target of HR decisions is employees, and the question of how employees feel and perceive AI and what impact it will have on them at the individual level is very important. While AI can empower organizational management and employee work, improve management efficiency and service quality, it can also have a negative impact. Issues such as algorithmic discrimination, technology ethics, autonomy threat and technological upgrades brought about by AI may lead to individual employees' resistance to AI technology and induce negative organizational outcomes. This has raised awareness of the possibility that, while AI is increasing productivity at work, it may simultaneously be lowering employee engagement and weakening the relational aspects of psychological contracts [3]. Knowing what influences employees' behaviors in accepting AI and what inspires them to genuinely adopt and utilize AI technologies to their full potential is indeed of tremendous theoretical and practical value [1]. At the same time, for scholars in the domain of organizational behavior research, the direct research topic brought by the entry of AI into the organizational management sphere is the psychological and behavioral responses of individuals. At present, the research on AI and organizational management at the individual level presents the following two important research directions: first, the individual's adoption of AI technology. Second, the impact of AI applications on individuals' attitudes, emotions, behaviors, etc. [2].

As a consequence, this study presents a literature review on how AI affects employees on an individual level within organizations. The primary contributions of this study are: from the theoretical aspect, this study summarizes the factors influencing individual acceptance of AI technology and sorts out the theoretical basis for individual AI technology adoption, which helps researchers review the research progress and consolidate the theoretical foundations for future researches; from the practical aspect, this study summarizes the direction of the researches on the impact of AI on individual employees in organizations in recent years, as well as the application and impact of AI technology on different aspects of employees in HRM, which help practitioners to deepen their understanding of "AI+HRM" and provides reference for future HRM practices in enterprises.

2. Theoretical Foundations and Influence Factors

2.1. Theoretical Foundations for the Individual Adoption of AI Technologies

Individual technology adoption has been the mainstream research direction in the domain of technology adoption, and the theoretical basis of the study is relatively rich. Currently, scholars mainly use TPB [4], TAM [5] and UTAUA[6] to study individual AI technology adoption intentions and behaviors, among which TAM has been applied most often. Existing theoretical studies on the continuous adoption of AI technologies by individuals are relatively few, and the main applied theories are expectancy confirmation theory (ECT) [7], information system continuous use model (ISCM) [8], and information system success model (ISSM) [9]. Currently, the contextual factors influencing the continuous adoption of individual AI technologies are under-researched, and scholars have only explored the moderating role of the need to interact with humans between perceived enjoyment, perceived ease of use, perceived usefulness, as well as individual contentment with using AI technology [10]. Table 1 summarizes the theoretical foundations of individual technology adoption researches.

Table 1. Theoretical foundations of individual technologies adoption researches

Theory model	Stages	Main contents	Theoretical characteristics	Representative investigators
Theory of Planned Behavior (TPB) (Ajzen, 1991)	Individual initial adoption	People's behavior intention(BI) is influenced by personal attitude(A), subjective norm(SN), perceived behavioral control (PBC), and determines the actual behavior.	Can be used to understand people's acceptance and use of many different technologies	(Sohn & Kwon, 2020)
Technology Acceptance Model (TAM) (Davis, 1986)	Individual initial adoption	Perceived usefulness(PU) and Perceived ease of use(PEA) influence A toward technology use, which in turn influence BI and use behaviors, and PEA can also influences BI and behaviors through PU.	Designed specifically to explain computer usage behavior, it can thereafter be used in other techniques.	(Huang, Song, & Li, 2020); (Wang & Jing, 2020); (Pan, 2019); (Sohn & Kwon, 2020); (Belanche, Casalo, Flavián, 2019)

Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003)	Individual initial adoption	Performance expectancy(PE), effort expectancy(EE), social influence(SI), and Facilitating conditions (FC) influence behavior through BI, and FC can directly influence behavior, considering the moderating effects of gender, age, experience, and voluntariness of use. Customers' contentment with past usage, which is determined by the confirmation of expectations between pre-use expectations and perceived performance, determines their propensity to repurchase products in large part.	Eight models of technology acceptance were integrated, built based on the context in which organizations implement new technologies, and the influencing factors have a clear utilitarian character.	(Chen et al., 2020); (Sohn & Kwon2020); (Chatterjee &Bhattacharjee, 2020)
Expectation-confirmation Theory(ECT) (Oliver, 1980)	Individual continuous adoption	PU and expectation confirmation affect continuous usage behavior through user satisfaction, expectation confirmation affects PU, and PU can directly affect users' continuous usage behavior.	The basic theory of studying consumer satisfaction, it's widely used to assess consumer satisfaction and post-purchase behavior.	(Ashfaq et al., 2020)
Information Systems Continuance Usage Model (ISCM) (Bhattacharjee, 2001)	Individual continuous adoption	Information about the system, system and service quality, intention to use, use and user satisfaction, results of using the system - net benefits affect user satisfaction and continued use of the system.	The combination of ECT and TAM, which focuses on the psychology of employees after using the system and ignores the characteristics of the technology itself, has been most used in the study of continuous use.	(Li et al., 2021)
Information System Success Model (ISSM) (DeLone & McLean, 2003)	Individual continuous adoption		The model is widely validated and compensates for the shortcomings of the ISCM.	(Ashfaq et al., 2020)

2.2. Factors Influencing the Individual Adoption of AI Technologies

The individual-based standpoint indicates that people's cognitive characteristics influence how they perceive a technology and, consequently, whether or not they will embrace it [11]. According to some academics, the adoption of AI involves trade-offs, which is based on two distinct technological paradigm visions: automation and augmentation [12]. The apprehension of being supplanted by humanoids is conjured up by the first concept, whilst a mutually beneficial league between humans and humanoids is envisioned by the second. Yet, since automation and augmentation actually take place concurrently in reality, the distinction is mainly theoretical. Various factors such as the ability of AI to upgrade individual capabilities, the ability to expand more individual possibilities and increase the level of self-control, and the normative pressures of the group and society all influence individual AI adoption [11]. Existing researches mainly focused on three aspects of technology, organization, and individuals to explore the factors that influence individual adoption of AI technologies [1]. The studies on the factors impacting individual adoption of AI technology in recent years are summarized in Table 2. The factors driving individual AI adoption in the context of specific industry have only been the subject of a small number of researches. Due to the different characteristics of the industries, the factors also differ to some extent. However, the factors influencing the individual adoption of AI technologies are still highly consistent across industries.

Table 2. The influencing factors of individual adoption of AI technologies in different industries

Application industries	Specific applications	Stages	Respondents	Factors affecting the adoption	Representative investigators
Tourism, accommodation, and catering industries	No specific technology and scenarios are specified	Individual initial adoption	Employees of tourism enterprises Hotel managers, and consumers	AI anxiety, PU, PEA, SN PU, PEA, Perceived trust (PTR), Perceived intelligence (PNT), Anthropomorphism (ANM), Technology anxiety (TXN) A, Experience of Using, SN, Perceived Risk (PR)	(Huang, Song, & Li, 2020) (Pillai & Sivathanu, 2020)
Medicine, health, and social work	Intelligent medical services	Individual initial adoption	Doctors	Perceived Risk (PR)	(Pan, 2019)
Education	AI applied in education	Individual initial adoption	Teachers, administrators, and students Topic analysis based on Twitter data,	PR, EE, FC, A	(Chatterjee & Bhattacharjee, 2020)
No specific industry	Robots in the workplace	Individual initial adoption	employees of information-technology companies	Anthropomorphism (ANT), Technophobia (TCH)	(Sinha et al., 2020)

2.2.1 Technical factors

In terms of technical factors, the risks and benefits of using AI technologies are key factors that influence employees' adoption of AI technologies. When AI technology has security and privacy issues, it can significantly reduce employees' willingness to use AI technology. Meanwhile, the extent to which employees believe that using AI technologies will contribute to their job performance (performance expectations, perceived usefulness, and efficiency expectations) positively affects employees' willingness and behavior to adopt AI technologies in the workplace [13]. Security and privacy concerns are fundamental prerequisites for employee adoption of AI technologies [14]. Performance expectancy represents employees' expectation that long-term use of AI technologies will be beneficial to future performance [8], and these influences do not change depending on the stages of AI technology adoption.

2.2.2 Organizational factors

In terms of organizational factors, numerous scholars have demonstrated that the extent to which others believe individuals should use AI technologies (social influence, subjective norms) positively affects individuals' willingness to adopt [15-17], and employees' willingness and behavior to adopt emerging technologies like AI is influenced by multifaceted influences, colleagues, leaders, and the organizational environment. Also, Facilitating conditions (FC) positively influences employees' willingness to adopt AI technologies [18]. Employees are likely to experiment with new technologies only when the necessary infrastructure and resources are available in the organization. Management support and facilitating conditions provide emotional and instrumental support for employees' adoption of AI technologies [14]. Unlike the initial adoption of AI technologies, subjective norm was not included as an influential factor in employees' continuous adoption of AI technologies. After the initial adoption of AI technology, employees already had certain cognition of the used technology, and colleagues' perception was no longer a key factor influencing employees' continuous adoption.

2.2.3 Personal factors

In terms of personal factors, employees' individual AI technology adoption behavior is mainly positively influenced by their intention to adopt [16,18]. The adoption of new technologies is related to their intrinsic characteristics, and individual characteristics, emotions and attitudes influence their willingness to adopt technology. Personal innovativeness, which represents individual characteristics [13], attitudes toward AI technologies [18], and experience with related technologies [15] positively influence individual AI technology adoption intentions; meanwhile, when employees perceive that technologies threaten their own existential significance, they will show anxiety or fear of technology emotionally, and the intention to adopt new technology will be reduced [19]. Employee satisfaction after using technology is considered to be the strongest predictor of individuals' continued adoption of new technology [20]. According to ISCM [8], the higher the satisfaction of employees after the initial adoption of AI technology, the stronger their willingness to continue adoption.

3. Researches on the Impact of AI on Individual Employees

What will be the psychological and behavioral responses of individuals when the management system of an organization adopts artificial intelligence or achieves some degree of human-computer collaboration? Will the phenomena, concepts, relationships, and laws that have been widely studied in traditional organizational behavior research change in the emerging AI context? In this process, the implement of AI will lead to practical work-level implications for employees, such as the exploration of human-machine collaboration issues and the impacts on job performance. At the same time, it will also have an influence on the psychological and emotional mechanisms inherent in employees. This section will review the four domains that have received more attention according to existing research from these two perspectives.

3.1. AI with Human-machine Collaboration and Job Performance

In AI technology application scenarios, employees and intelligent machines collaborate with each other to complete tasks through interaction [21]. Humans conduct creative, social, and interpersonal duties, while computers are more frequently used for routine jobs like repetitive, compliance, as well as system processing. A symbiotic human-machine interaction has developed between employees and intelligent machines as a result of their ongoing friction. As shown in the evidence of an empirical research using Difference-In-Difference (DID) technique, the increased demands on workers' ability to operate machinery and equipment and exercise creativity are the key outcomes of the alterations in job skill needs brought on by AI technology [22]. An empirical study based on self-determination theory showed that AI-induced job skill requirements can enhance employees' sense of exuberance and motivation by improving their sense of competence, which highlights the enhancement effect of AI introduction [23]. Employees need, however, to advance to a higher intelligence level for AI-HI (Human Intelligence) collaboration in a dynamic situation where work assignments at lower intelligence levels can all be completed by AI [24].

Based on complementarity and role theory, some scholars considered whether the introduction of AI and employee conscientiousness could positively affect job performance in a complementary manner, and found that pairing AI with less responsible employees would improve their job performance by enhancing complementarity [25]. As a rational individuals, when employees believe that AI technology is more convenient and easier to use, and thus gain more convenience and advantages at work, their acceptance of AI technology and readiness to change is further increased as the perceived ease of use and usefulness improves; Active acceptance and willingness to adjust will allow them to continue receiving assistance and support from technology, improve the match between the individual, technology, as well as work, and improve job performance, which is a mutually reinforcing process [26].

3.2. AI with Employees' Psychological and Emotions

Studies have shown that AI adoption causes a sense of alienation among workers, the positive impact of employees' psychological contracts on work engagement decreases significantly. Accurately, AI adoption reduces employees' psychological contracts, engagement, and trust considerably [3]. At the same time, the potential replacement risk triggered by AI has been found to moderate the relationship between employee insecurity and professional ability development [27]. However, some scholars' studies have also shown that in AI scenarios, a new type of human-like nexus is developed between intelligent machinery and humans, and this Human-machine symbiotic relationship serves to reinforce the connection between job skill requirements and thriving at work [23].

The human-machine symbiotic relationship changes employees' knowledge resources, affective resources and relation resources, triggering psychological and emotional changes in employees. The dramatic increase in the risk of unemployment leads employees to a lack of security [28]. Employees' awareness of AI applications can significantly influence their quitting intentions, and employees with the higher perception of AI may have a higher negative impact on quitting intentions [29]. In organizational HR decision-making contexts, employees perceive less information transparency and consequently lower perceptions of procedural fairness in AI algorithmic decision-making compared to supervisory decision-making, which will have a significant impact on their subsequent work attitudes and behaviors, and having an inclusive organizational climate is a boundary condition to mitigate the adverse impact of AI algorithmic decision making [30].

4. Summary

This study places an emphasis on how AI affects specific employees, and reviews past researches on AI adoption as well as its effects on individuals from these two major research areas. In the section on individual adoption of AI technology, this paper summarizes the theoretical basis of individual AI

technology adoption, which is divided into two stages: initial individual adoption and continuous individual adoption. Secondly, this paper discusses the factors affecting the initial and continuous adoption of AI technology from three aspects: technology, organization and individual, and summarizes the factors influencing the acceptance of AI technology by individuals in different industries; in the section of the impact of AI on individuals, this paper reviews the impact of AI on four major segments: human-computer collaboration, work performance, employees' psychology and emotions. Based on the findings of scholars, we can see inconsistencies in the conclusions in the limited current research findings. Some studies highlight the enhancement effects of AI on employees, while others place more emphasis on the replacement and threat effects of AI on employees.

This review article provides some reference for scholars to place more emphasis on the impact of AI applications on employees, who are the main subjects of organizational management. Yet, little study attention is still being paid to this topic, and numerous research questions merit exploring. A lack of more theoretically oriented concepts and research questions that can deeply reflect the characteristics of the AI management context itself is another issue with the present study results which base primarily on quantitative exploration. In future research, theoretical and practical researchers should not only focus on the new changes brought by AI to the work environment of employees, but also carefully explore employees' willingness to adopt, attitudes, psychological and behavioral responses and coping strategies to the new intelligent technologies at different stages. Future applied researches should not only improve AI technology achievements, but also focus on application consequences, build a new ethical paradigm to achieve a harmonious coexistence between humans and AI, and further explore the differentiated impact of different natures and types of AI technologies in different cultural backgrounds, industries, and service characteristics of organizations. Organizations should also use AI technology as a tool for decision support and promote the development of the new model of "AI+HRM".

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