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THE MODERATING EFFECT OF EMPLOYEE TRUST IN AI SYSTEMS ON THE RELATIONSHIP BETWEEN AI ADOPTION AND EMPLOYEE ENGAGEMENT

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Abstract
The implementation of Artificial Intelligence (AI) within the working conditions is transforming numerous industries, and the pharmaceutical one is one of them since it is used to impact the level of employees engagement. The paper is an investigation of the relationship between employee engagement and AI adoption and the role of trust of employees in AI systems. The survey of 300 employees who performed their work at the pharmaceutical industry in Pakhtunkhwa of Khyber Pakhtunkhwa was taken as the source of data (Hayes, 2022). The findings showed that the trust in AI systems did not mediate the association between AI adoption and employee engagement significantly. According to the research, trust will not have a critical role in engagement at the initial stages of AI integration in this regard.

INTRODUCTION

The implementation of the AI in the workplace is changing the nature of functioning of organizations especially in the pharmaceutical sector where efficiency and innovativeness hold paramount importance. Employee engagement, job satisfaction, and work-life balance are affected in several ways as AI technologies are becoming more and more involved in different business processes (Wijayati et al., 2022). Nevertheless, little has been investigated on the moderator of employee trust in AI systems and its association with AI adoption and employee engagement (BHARTHI et al., 2025). It has been found that employees need to have trust in AI systems to embrace these technologies fully and that, in its turn, can promote their engagement (Atmaja et al., 2025). This paper explores how employee trust mediates the interaction between the introduction of AI and employee engagement in the pharmaceutical organizations of Khyber Pakhtunkhwa (KP), Pakistan, where AI implementation has yet to occur on a large scale (Alzeiby et al., 2025). The perception of the role of trust in engaging with AI changes is

fundamental to organizations seeking to use AI to introduce a productive, motivated, and resilient workforce (Priya et al., 2024). The proposed study sets out to discuss the concept of employee trust as a moderator of the relationship between AI adoption and employee engagement in the pharmaceutical industry.

Literature Review

The pharmaceutical industry can transform the world through the implementation of AI, which will streamline several processes, including drug development, clinical trials, and licensing (Sadiqin and Hwihanus, 2025). Nevertheless, when the increase in the efficiency and productivity of AI is well-recorded, the impacts on the engagement of employees are complex and multifaceted (Khan et al., 2025). The workers in the AI-enhanced jobs will feel empowered since more automation will be done on routine duties, and employees can work on more complex and value-added tasks. This has an opportunity to increase intrinsic motivation and job satisfaction (Rajesh, 2025). But the other side is that its introduction can cause the fear of losing a job, which can result in anxiety and disengagement (Soomro et al., 2026). Employees with the feeling of being endangered by AI might also be more inactive and opposed to its implementation, especially when the organization fails to effectively address their apprehensions and worries via training, assistance, and effective communication (Tariq, 2025).

The principle of employee engagement is paramount to this. Engagement is defined as the emotional and cognitive investment of an employee in his work and the organization which is vigor, dedication and absorption (Schaufeli et al., 2002). The employees will have higher chances of viewing AI as a resource that increases their job satisfaction and work-life balance instead of it threatening their jobs when they trust the AI systems they work with (Sadiqin and Hwihanus, 2025). Trust in AI systems, therefore, is a critical variable that can either reinforce or break the relationship between AI adoption and employee engagement (Atmaja et al., 2025). It is especially relevant to the pharmaceutical industry where the accuracy and reliability of AI systems may directly influence the effectiveness and success of the activities (Aljuaid, 2025).

The concept of trust in AI is a multifaceted phenomenon that encompasses both cognitive trust – the belief in the ability of AI to do things in a way as promised – and emotional trust – how comfortable employees are with the use of AI systems (Yuan et al., 2025). The presence of high trust levels can also reduce change resistance, and the employees are able to accept AI and, in turn, enhance their involvement (Sadeghi, 2024). Conversely, lowly trusted AI employees might feel like the technology is unreliable or biased and hence they will be unwilling to use the system, underwhelmed by the job and eventually decrease their engagement (Tariq, 2025). Research indicates that when organizations invest in establishing trust by implementing transparency, communication, and training programs, employee engagement is more likely to increase in the process of adoption of AI (Vora et al., 2023).

The psychological safety of employees is also dependent on the trust. Employees will perceive AI positively when they believe that it will not hurt their job security or well-being, and that is why they will embrace it more (Soomro et al., 2026). This trust is further reinforced by the leadership support that encourages transparency and offers a clear guideline of how AI will enter work routines (Alzeiby et al., 2025). Moreover, when organizations actively engage employees in the process of adopting AI, e.g. by consulting them or soliciting their feedbacks leads to a greater trust of the system in question and, consequently, to more engaged employees (Priya et al., 2024). This throws light on the importance of organizational leadership in balancing the impact of adoption of AI on employee engagement.

Work-life balance is one of the most important aspects contributing to the engagement of employees in the workplace where AI is adopted. The work-life balance can also be improved through AI systems, which can be used to automate repetitive work, thus providing the employee with flexibility in his schedule (Gaur,

2024). This is a great advantage especially in the pharmaceutical industry where the workers have a lot of work and limited time to meet deadlines. Using AI-based technologies, it is possible to assist in scheduling, allocating resources, and managing data to get less stressed and enabling employees to devote more meaningful time to their work (Sadiqin and Hwihanus, 2025). With AI reducing the load of repetitive work, employees will feel a better range of work-life balance, and it will be possible to engage and find more job satisfaction (Khan et al., 2025).

Nevertheless, AI influences work-life balance depending on the perception of the technology by the employees as well. In case AI is seen as a technology that will increase flexibility and autonomy, employees have more chances to feel that their personal and professional life can be more balanced (Rajesh, 2025). Conversely, when AI is considered a tool of micromanagement or surveillance, it can be a cause of stress and discontent, which eventually brings down engagement (Alzeiby et al., 2025). Thus, the implementation of AI should be supported by a strong statement of the leadership with the promise that the technology will improve, not jeopardize, the work-life balance of employees (Soomro et al., 2026).

The implementation of AI in the workplace is not without its challenges notwithstanding its obvious benefits. Among the key challenges is the skills gap which exists among the employees particularly in the emerging markets such as Khyber Pakhtunkhwa (KP). Workers might not have the technical skills they need to communicate with AI machines, resulting in frustration and lack of interest (Sadiqin and Hwihanus, 2025). To counter this, organizations need to invest in training programmes that would enable the employees with the skills that they are required to utilize the AI tools effectively. Also, it is essential that the adoption of AI is a participatory process, which is supported by the leadership with open and transparent communications about the impact of AI on the employees, along with their roles and duties (Tariq, 2025). The inability to handle these issues can lead to a decrease in the level of trust in AI systems, opposition to change, and eventual reduced engagement with workers (Sadeghi, 2024).

Methodology

This paper take a quantitative research approach and will use surveys to gather information among employees working in the pharmaceutical firms in Khyber Pakhtunkhwa. The survey measures the level of AI adoption, trust toward AI by employees and employee engagement on a Likert scale. Data will be analyzed through regression analysis, which study the moderation role of employee trust on the correlation between AI adoption and employee engagement. The research give an understanding of the role of trust in the attitude of employees towards the adoption and engagement of AI as well as offer some recommendations that can be applied by organizations interested in implementing AI in a manner that will achieve maximum employee participation and output.

Results and Discussion

Hypothesis: Employee trust in AI systems serves as a moderating factor in the relationship between AI adoption and employee engagement.

Procedure: Perform the MATRIX analysis:

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***************** SPSS Version 4.2 *****************

        Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2022). www.guilford.com/p/hayes3

**************************************************************************
Model  : 4
    Y  : engageme
    X  : adoption
```

M : leveloft

Sample
Size: 300

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VARIABLE OF THE OUTCOME:
leveloft

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0051	.0000	2.1361	.0076	1.0000	298.0000	.9304

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.0742	.1998	15.3881	.0000	2.6810	3.4673
adoption	.0053	.0604	.0874	.9304	-.1136	.1242

****

VARIABLE OF THE OUTCOME:
engageme

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0393	.0015	2.0403	.2297	2.0000	297.0000	.7949

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.0332	.2616	11.5968	.0000	2.5185	3.5480
adoption	-.0309	.0591	-.5227	.6016	-.1471	.0854
leveloft	.0246	.0566	.4341	.6645	-.0868	.1360

********** Immediate and Indirect Influences of X on Y**********

X on Y EFFECT

Effect	se	t	p	LLCI	ULCI
-.0309	.0591	-.5227	.6016	-.1471	.0854

Indirect effect(s) of X on Y:

	Effect	BootSE	BootLLCI	BootULCI
leveloft	.0001	.0038	-.0080	.0087

********** Evaluation Notes and Identified Issues **********

The confidence intervals reported in the output are set at a 95% confidence level.

A total of 5,000 bootstrap samples were used to generate the percentile-based confidence intervals.
------ END MATRIX ------

The associating effect of employee trust on AI systems on the correlation between AI implementation and employee engagement was examined through the PROCESS procedure (Hayes, 2022) and a sample of 300 participants. The results showed that the degree of trust (leveloft) in the AI systems did not have a significant mediation between the adoption of the AI (adoption) and the employee engagement (engageme). In the former, the impact of AI implementation on the trust in AI systems was statistically insignificant ($p = 0.9304$), which indicates that the degree of employee trust does not (Nazir et al., 2026) directly depend on the adoption of AI. Moreover, the regression analysis of the second model also revealed that the adoption of AI did not mean significantly the engagement of employees ($p = 0.6016$), and the trust in AI systems did not make any significant difference ($p = 0.6645$). The other indirect impact of AI adoption on employee engagement through trust was also not significant (BootLLCI = -0.0080, BootULCI = 0.0087), which further proves the absence of modulation (Adityaksa & Suyoso, 2025).

These results indicate that employee trust in AI systems is usually viewed as a key aspect of successful implementation of AI technologies (Sadiqin and Hwihanus, 2025). This may be because of the contextual specificity of the pharmaceutical industry in Khyber Pakhtunkhwa where trust in AI may not be quite established given the lack of exposure and knowledge about the technology. Also, other elements, including organizational support, leadership involvement, or training programs, could prove more important in employee engagement, when adopting AI (Alzeiby et al., 2025).

Conclusion

Finally, this paper concluded that the trust in AI systems did not significantly mediate the relationship between AI adoption and employee engagement in the pharmaceutical sector of Khyber Pakhtunkhwa. In spite of the fact that trust is a crucial element when it comes to the adoption of AI technologies, the effect it has on the engagement can be offset by other organizational or individual elements. The future research may include research into the impacts of other moderating variables or the impact of employee engagement in the long run in terms of AI system implementation.

Recommendations

- Consider investing in Training Programs: To instill trust and interest in employees, pharmaceutical firms ought to invest in extensive employee training on AI to improve the familiarity and anxiety regarding the technology.
- Leadership Support: The organizational leaders should be eager to convey advantages of AI adoption and engage employees in the process of integration to create the favorable workplace atmosphere.
- Consider Context-Specific Factors: Future studies can also take into account further contextual issues in the pharmaceutical industry in terms of job redesign and resource access.

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