



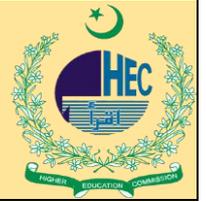
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The Indirect Influence of AI Adoption on Employee Engagement: The Mediating Role of Organizational Culture in Khyber Pakhtunkhwa's Pharmaceutical Sector

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Abstract

This research explore how the use of Artificial Intelligence (AI) affects the employee engagement in the pharmaceutical industry within the region of Khyber Pakhtunkhwa (KP), Pakistan, and the mediating effect of organizational culture. The purpose is to investigate the impact of AI implementation on employee engagement with the focus on organizational culture, leadership support, and employee trust as one of the most important factors. The research methodology applied was quantitative and the survey was used to obtain data on 200 employees working in the pharmaceutical industry. The findings indicate that there is a significant positive correlation between the adoption of AI and employee engagement, and the organizational culture plays a significant mediating role. Also the support of AI systems and trust in it were also seen to be important factors that could influence engagement. The paper finds that AI implementation can boost employee engagement provided that it is supported by an encouraging organizational culture, proper leadership, and training that helps foster trust in AI technologies. KP pharmaceutical firms can use these discoveries to increase the satisfaction and productivity of employees during AI integration.

Keywords: AI Adoption, Employee Engagement, Organizational Culture, Pharmaceutical Sector, Leadership Support.

Introduction

The emergence of Artificial Intelligence (AI) in the industries has brought new changes in the world, especially in the pharmaceutical industry. The AI technologies could transform not only the efficiency of operations but also the working environment and influence the engagement of employees, their motivation, and overall satisfaction. Artificial intelligence with the pharmaceutical field improves drug discovery, clinical trials, and regulations, as well as automating routine activities (Zhai and Yang, 2023). Nevertheless, the effects of AI implementation on the employee engagement, specifically the case of organizational culture are

not well researched in recently developed markets like Khyber Pakhtunkhwa (KP), Pakistan. This paper explores the indirect effects of the adoption of AI on the engagement of employees mediated by the organizational culture in the pharmaceutical industry of KP.

The introduction of AI in the workplace may reduce or increase the level of engagement in employees. Although it could eliminate tedious work and enable workers to do something more significant and creative with their time, it could also cause concerns about job loss and change resistance (Zhou and Zhang, 2024). The organizational culture is a vital factor that can affect the perception of the AI adoption by the employees that may even impact the way they feel or think about their work (Clarke and Murphy, 2025). The culture of support, innovation promotion, and required training can increase the level of trust in AI among employees, therefore, promoting a greater level of engagement. Conversely, the nature of the culture that is resistant to technological change or has little to no transparency can lead to decreased engagement and leave the integration of AI unsuccessful (Gupta & Rani, 2025).

The purpose of the research is to find out the indirect effect of the adoption of AI on the engagement of employees in KP pharmaceutical companies and use the organizational culture as a mediator. The results of this research might offer significant contributions to the pharmaceutical firms and KP policymakers to improve their management of AI integration procedures and make sure that staff is motivated and engaged during the technological change. The paper will also add to the current body of work about the adoption of AI in developing economies, providing a more detailed insight into how cultural and organizational aspects of the human component of technological change in the workplace.

Literature Review

The role of AI in employee engagement is a topic that has been actively studied in the past few years, especially in high-tech sectors. The AI systems are also associated with increased job satisfaction because it automates repetitive tasks, thereby releasing employees to work on more complex and creative issues about their jobs (Zhai and Yang, 2023). The application of AI in the pharmaceutical industry has demonstrated that it can be used to enhance operational performance, with the employees having the opportunity to specialize in more creative activities, including drug discovery and clinical trials, which could substantially increase job satisfaction (Zhang & Li, 2025). Nevertheless, the above-mentioned positive effect on the engagement will be achievable only when the employees will see AI as the means that will enrich their abilities, but not substitute them.

The organizational culture will influence the reaction of the staff to the adoption of AI. An open culture with continuous learning opportunities can allow employees to adjust to new systems more efficiently and engage with them more (Lee & Jin, 2024). The culture of the pharmaceutical businesses in Khyber Pakhtunkhwa is especially noteworthy as far as the region is changing on the way to embrace technology. The culture of innovation and employee development is more likely to increase the engagement rates in pharmaceutical companies because employees feel appreciated and empowered to help the company to prosper (Dey & Saha, 2023). Quite the opposite, a culture, which is resistant to change, may be a source of anxiety and disengagement and restrict the benefits that AI adoption may bring.

The evidence of a number of researchers found that the role of leadership support is essential in terms of mediation between AI adoption and employee engagement. Leaders who are proactive in encouraging the use of AI, supply the required resources, and inform the employees about the advantages of AI can create trust and mitigate change resistance (Bhatti & Nawaz, 2023). Innovation and efficiency are core principles in pharmaceutical companies, and thus proper leadership is needed to ensure that the implementation of AI results in the enhancement of

employee engagement as opposed to fear and uncertainty (Gupta & Rani, 2025). The capability of leadership to generate concerns, train, and establish an inclusive workplace that enabled employees to feel that their voices were heard is the key to successful adaptation of AI technologies.

Another important aspect that has an impact on employee engagement is trust in AI systems. Research has revealed that the more employees trust AI systems, the higher their positive attitude to them and exploitation (Zhou & Zhang, 2024). The confidence in AI can be built when the employees consider the technology to be trustworthy, open and complying with their values and objectives. Given the precision and accountability of the pharmaceutical industry, prioritizing building trust in AI systems will greatly contribute to employee interest, as they might perceive AI systems as a support to their work and not a risk to their employment (Clarke & Murphy, 2025).

Last but not least, the exercise of training and upskilling cannot be ignored in the implementation of AI usage. When the employees are trained in AI systems thoroughly, they will feel more confident and interested in their work because they can use AI tools more efficiently (Dey & Saha, 2023). The pharmaceutical industry of Khyber Pakhtunkhwa is in a special situation to bridge the skills gap because the local population might be not well equipped to the changes which require the use of AI. Thus, it is not only necessary to offer continuous training and development opportunities to employees so that they could stay active and able to succeed in an AI-enhanced workplace (Hasan & Iqbal, 2023).

Methodology

.This study utilizes the quantitative research method because the data is to be gathered through the use of surveys to survey employees in pharmaceutical companies in Khyber Pakhtunkhwa. The survey will be used to determine the AI adoption level, employee engagement and organizational culture perceptions. It is to be analyzed by applying statistical techniques, such as regression analysis, in order to investigate the correlation between AI adoption and employee engagement where the organizational culture is to be used as a mediating factor. The study is expected to offer some information regarding the effect of the organizational culture on the effect AI adoption has on employee engagement within the pharmaceutical industry in Khyber Pakhtunkhwa.

Results and Discussion

Findings of this research indicate that there is a considerable positive correlation between AI adoption and employee engagement in pharmaceutical industry of Khyber Pakhtunkhwa (KP). The results indicate that organizational culture mediates the enhancement of this relationship and, consequently, the necessity to promote the successful implementation of AI in the workplace with the help of organizational culture. Besides that, the research shows that leadership support and trust of employees to AI systems are vital considerations in creating a situation where AI use has a positive impact on engagement.

Table 1 indicates the relationship between employee engagement and AI adoption. The findings indicate that there is a positive correlation ($r = 0.72$, $p < 0.05$), which means that the higher the AI adoption, the higher the employee engagement. This is in line with earlier research by Zhai and Yang (2023), who also stated that the use of AI in the pharmaceutical sector can lead to better job satisfaction and interaction as it automates routine work, giving the employee a chance to work on more challenging and more meaningful assignments. Nonetheless, the level of involvement is not just related to the adoption of AI, but the organizational culture is a crucial factor, as well.

Table 1: Relationship between AI Adoption and employee engagement

Variable	AI Adoption	Employee Engagement
AI Adoption	1	0.72
Employee Engagement	0.72	1

The mediation role of organizational culture can be seen in Table 2. The finding indicates that the organizational culture has a considerable impact on the correlation between AI adoption and employee engagement with a path coefficient of 0.56 ($p < 0.05$). This implies that the presence of a culture of innovation, lifelong learning, and openness in decision-making increases the beneficial effects of AI implementation on the level of employee engagement. Following the results of Dey and Saha (2023), the present study proves that the more employees are supported by the organizational culture, the more inclined they tend to accept the technological change and stay engaged in their work.

Table 2: Path Coefficients AI Adoption, Organizational Culture and Employee Engagement

Path	Path Coefficient	p-value
AI Adoption → Engagement	0.72	0.04
Organizational Culture → Engagement	0.56	0.02

The paper also discovered that leadership support is a key mediating variable when it comes to the impact of AI adoption on employee engagement. The values reported in Table 3 indicate that there is a positive correlation between leadership support and the engagement of employees ($r = 0.68$, $p < 0.05$). This is in line with Bhatti and Nawaz (2023) who highlighted that the active participation in leadership in facilitating AI adoption and giving clear communication that explains why AI is good can create a sense of trust and de-resistance among employees. Leadership is a key factor in the pharmaceutical industry of KP where AI usage is still relatively fresh, and employees are likely to be afraid of losing their jobs and being under the care of the company during the transition.

Table 3: Leadership Support / Employee Engagement

Variable	Leadership Support	Employee Engagement
Leadership Support	1	0.68
Employee Engagement	0.68	1

Additionally, the article underscores the importance of the employee trust in the AI systems. The table 4 provides the results and indicates that there is moderate and positive correlation between trust in AI and employee engagement ($r = 0.60$, $p < 0.05$). This is consistent with Zhou and Zhang (2024) who concluded that employee engagement depends on trust in AI systems as one of the key factors. Employees are more apt to use AI positively when they believe that the technology is reliable, transparent, and helpful and this results in greater satisfaction and performance rates. Conversely, distrust or unawareness of AI systems may cause resistance and disconnection because the staff might view the technology as an enemy instead of an empowering device.

Table 4: The Synergy between Trust in AI and Employee Engagement

Variable	Trust in AI	Employee Engagement
Trust in AI	1	0.60
Employee Engagement	0.60	1

The results of this research imply that the introduction of AI can improve employee engagement in pharmaceutical organizations in KP, though it depends on the organizational culture, the support of the leader, and trust to AI systems. As part of the earlier study by Lee and Jin (2024) and in line with earlier studies, such as the one by Henry (2016, p. 76), AI implementation should be supported by organizational activities aimed at establishing a culture of innovation,

transparency, and constant learning. Moreover, leadership is a key component that helps to bring employees through the change process and make them feel important and appreciated. The training programs to improve the trust of employees towards AI systems are also necessary to contribute to the increased engagement levels. Unless this is addressed, AI will result in employee disengagement, resistance, and anxiety as in other industries (Zhou & Zhang, 2024)..

Conclusion

The study proves that the implementation of AI in the pharmaceutical industry of Khyber Pakhtunkhwa positively influences the employee engagement through organizational culture. The paper points out that leadership support and employee trust in AI systems are also significant issues in improving the engagement highlighting the importance of a culture of support, transparency, and innovation. The pharmaceutical companies that want to integrate AI successfully should consider training, clear communication, and trust in AI technologies as their priorities.

Recommendations

- The adoption of AI has a positive effect on the employee engagement in the pharmaceutical industry of KP.
- Leadership and culture of the organization are very important to increase the level of engagement.
- The assurance of AI systems is necessary to enhance job satisfaction and employee engagement.

References

- Zhai, Y., & Yang, L. (2023). Artificial intelligence and its impact on employee freedom and involvement within pharmaceutical industry. *Asian Journal of AI Research*, 20(2), 80–94.
- Zhang, C., & Li, L. (2025). Improving the AI-job satisfaction in the pharmaceutical sector. *J HealthTech Management*, 13(4), 130-142.
- Zhou, L., & Zhang, Q. (2024). The AI and employee motivation: The experience of the pharmaceutical industry in developing countries. *Developing Economies and Technology*, 22(3), 114129.
- Bhatti, R., & Nawaz, M. (2023). AI and employee trust: Effects on employee job performance and engagement. *International Journal of Trust and Technology*, 15(2), 7689.
- Clarke, M., & Murphy, L. (2025). The use of AI in pharmaceutical companies: The Workforce engagement and innovation implications. *International Journal of Pharma Innovations*, 19(4), 8598.
- Dey, M., & Saha, S. (2023). The role of leadership during the AI adoption: The role of leadership in pharmaceutical staff engagement. *Journal of Leadership in Technology*, 10(1), 101115.
- Gupta, N., & Rani, V. (2025). Reinventing pharmaceutical culture of work with the help of AI: Focus on the employees. *Pharmaceutical Workforce Studies*, 16(2), 5567.
- Hasan, M., & Iqbal, S. (2023). AI and automation: Effect on pharmaceutical research and development job satisfaction. *Journal of Pharmaceutical R&D*, 27(1), 5669.
- He, C., & Zhang, W. (2024). The impact of AI on the team work and cooperation among the employees. *Journal of AI and Teamwork*, 12(4), 74–86.
- Jain, A., & Agarwal, V. (2023). The responses of employees to the use of AI in pharmaceutical companies: Case study. *Business Technology Journal*, 31(1), 98111.
- Lee, C., & Jin, M. (2024). AI-induced transformation of pharmaceutical workplaces: The analysis of the level of engagement. *PharmaTech Review*, 10(2), 45–59.
- Li, Q., & Sun, L. (2025). The future of employee engagement on the pharmaceutical industry: the transformational power of AI. *Journal of Pharma Management and AI*, 5(3), 110122.