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Enhancing Employee Engagement Through Ai Adoption: The Role Of Improved Work-Life Balance

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	Abstract
<p>Sudhair Abbas Bangash Faculty of management sciences, Department of Business Administration, Sarhad University of Science and Information Technology Peshawar, Pakistan sudhair.fls@suit.edu.pk</p> <p>Prof.Dr. Syed Gohar Abbas Faculty of management sciences, Department of Business Administration, Sarhad University of Science and Information Technology Peshawar, Pakistan abbas.ba@suit.edu.pk</p> <p>Syed Adeel Hassan Department of Management Sciences Riphah International University, Islamabad, Pakistan. adeel.hassan72@gmail.com</p> <p>Muhammad Islam PhD Scholar, Faculty of management sciences, Department of Business Administration, Sarhad University of Science and Information Technology Peshawar, Pakistan islam.ba@suit.edu.pk</p> <p>Izhar Ullah Faculty of management sciences, Department of Business Administration, Sarhad University of Science and Information Technology Peshawar, Pakistan Email: Izharullah342@gmail.com</p> <p>Tayyaba Gul Faculty of management sciences, Department of Business Administration, Sarhad University of Science and Information Technology Peshawar, Pakistan taiba.ms.suit@gmail.com</p> <p>Dr Waseem Abbas Bangash MBBS, Guilin Medical University 桂林医科大学, Affiliated Hospital of Guilin Medical University 桂林医科大学医学院 waseemab110@zohomail.com</p>	<p>Introduction of Artificial Intelligence (AI) in workplaces has transformed the way the employees engage by bringing work-life balance. Automation of routine work, better workflow management and more adaptability in work schedules provided by AI have been demonstrated to have a positive influence on job satisfaction and business loyalty. This paper discusses the benefits of the adoption of AI as a means of improving work-life balance and, consequently, employee engagement in the pharmaceutical sector. The data collection methodology involved a quantitative survey and questionnaire data with the employees, especially in the pharmaceutical industry. The statistical analysis was used to test the hypothesis of the relationship between AI adoption, work-life balance, and employee engagement. The obtained results showed that there exist no statistically significant direct or indirect impacts of AI on work-life balance and employee engagement, which can be explained by the fact that organizational culture and leadership support could have a greater influence. The adoption of AI does not necessarily positively affect employee engagement by helping to improve the work-life balance, which is why such factors as organizational culture, the support of the leadership, and trust in technology play a part in the process.</p>
<p>Keywords:</p>	<p>Artificial Intelligence, Employee Engagement, Work-Life Balance, Pharmaceutical Industry, Organizational Culture</p>



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Introduction

Implementation of Artificial Intelligence (AI) in workplaces has transformed different organizational activities, in particular, in improving employees engagement. It has a broad range of advantages, and AI has been shown to enhance work-life balance through the automation of routine tasks, improved workflow management, and increased work schedules flexibility. This, in its turn, impacts positively on worker satisfaction, efficiency and business loyalty to the enterprise (Atmaja et al., 2025). Job satisfaction and reduced stress have always been linked with work-life balance, but the modern working demands keep testing this balance. Delving into these issues, AI can help to develop a more engaged and happier workforce, especially in the fields where the work-life integration is becoming more significant (Upadhyay and Sharma, 2024). The paper discusses how the use of AI can help improve work-life balance and, finally, improve the level of employee engagement in the various sectors, pharmaceutical industry being the case.

Literature Review

AI has gradually changed the dynamics of workplaces particularly when it comes to employee engagement. Among the most notable effects of AI, there is the possibility to mechanize the routine and repetitive work, which will greatly decrease the cognitive load on the workers (Sadiqin and Hwihanus, 2025). The change enables the employees to concentrate on more advanced, inventive and value-added work, which are directly associated with improved involvement. Use of AI applications, including automation in data entry, scheduling and decision making, has enabled the employees to be more effective in management of their work, which ultimately facilitates the existence of better work-life balance (Tariq, 2025). Consequently, the workforce feels less pressured in time and have more opportunities to manage their time better, which is crucial in ensuring the sustenance of both professional and personal health (Gaur, 2024).

Nevertheless, there are also difficulties with AI-based solutions to work-life balance. The fear of job displacement and other forms of resistance to change is the most frequent obstacle to the adoption of AI (Priya et al., 2024). In the case of stress and disengagement of the employees, who feel threatened by AI due to the risk it poses to their job, the benefits of AI may be wasted. This resistance is usually supported by the insufficient trustworthiness to AI systems, particularly in those sectors where the employees have not been sufficiently trained to use these tools (Akca, 2025). Research has shown that the perceived risk of automation has a negative impact on the emotional attachment that employees develop on their work, which decreases the level of engagement (Ohri and Dutta, 2025). With these fears as organizations embrace AI, it is important to curb those fears by ensuring that employees comprehend the purpose of the technology as an addition to their jobs and not eliminating jobs as that would foster a feeling of safety and trust. Additionally, the effects of AI application on work-life balance and employee involvement may be conditioned by organizational culture and leadership. The more leaders promote AI adoption and explain the advantages in an adequate way, the higher the chances that they can create positive attitudes among employees and thereby increase engagement (Atmaja et al., 2025). Conversely, absence of leadership support may cause confusion and mistrust which in turn may cause the employees to resist. Other sectors, in which jobs are deeply specialized, e.g. pharmaceuticals, employees must feel that AI implementation does not interfere with their goals at work and it expands their career growth opportunities (Upadhyay and Sharma, 2024). Organizational culture is also a key factor in defining the adoption of AI by the employees. The culture encouraging lifetime learning, flexibility, and creativity will probably result in a beneficial atmosphere in which the implementation of AI provides improved work-life balance and the increased interest of employees (Sadiqin and Hwihanus, 2025).

The incorporation of AI in workplaces is also associated with enormous consequences regarding employee job satisfaction and performance. The more employees can be intrinsically motivated, which is a major motivator behind employee engagement, the more they are likely to be motivated as AI systems can help employees focus on more creative and meaningful tasks (Rajesh, 2025). That the routine activities are automated eliminates mental fatigue and stress, which enables the employees to have a less stressful and more balanced lifestyle and have a higher level of accomplishment (Tariq, 2025). Nevertheless, one should remember that the benefits of AI are not always achieved automatically without the implementation. The necessary training and support should be offered to the employees so that they could use the AI tools effectively. Additionally, AI systems must be designed in a manner that is friendly and makes work easier instead of more difficult as it forces employees to do only some simple tasks (Gaur, 2024).

Methodology

The given paper is based on the quantitative research method, as the survey and questionnaires are employed to evaluate the effect of AI implementation on the work-life balance and engagement of employees. The survey will involve employees working in different industries, but it will prefer employees working in pharmaceutical industries to determine their perception of the role of AI on their work-life integration and job satisfaction. The statistical tools will be used to analyze the data and establish the relationship among AI adoption, work-life balance, and employee engagement. The emphasis on empirical data will help the proposed study to bring information on the extent to which AI can be efficient to improve work-life balance and create a more engaged workforce.

Results and Discussion

Hypothesis: It is true that AI adoption enhances the engagement among employees due to improved work-life balance.

Run MATRIX procedure:

***** PROCESS Procedure for 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 : improved

Sample



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Size: 300

OUTCOME VARIABLE:

improved

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0926	.0086	1.9427	2.5782	1.0000	298.0000	.1094

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.1473	.1905	16.5196	.0000	2.7724	3.5222
adoption	-.0925	.0576	-1.6057	.1094	-.2059	.0209

OUTCOME VARIABLE:

engageme

Model Summary

R	R-sq	MSE	F	df1	df2	p
.0560	.0031	2.0371	.4678	2.0000	297.0000	.6269

Model

	coeff	se	t	p	LLCI	ULCI
constant	2.9566	.2700	10.9494	.0000	2.4252	3.4881
adoption	-.0263	.0593	-.4432	.6579	-.1429	.0904
improved	.0483	.0593	.8149	.4158	-.0684	.1651

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI
-.0263	.0593	-.4432	.6579	-.1429	.0904

Indirect effect(s) of X on Y:

Effect	BootSE	BootLLCI	BootULCI	
improved	-.0045	.0073	-.0212	.0082

***** ANALYSIS NOTES AND ERRORS *****

All confidence intervals reported in the results were calculated using a 95% confidence level.

The number of bootstrap resamples used to construct the percentile bootstrap confidence intervals was set to 5,000.

----- END MATRIX -----

The outcomes of the PROCESS process show that the use of AI does not contribute to employee engagement due to the use of better work-life balance in the current research. In particular, there is no statistically significant direct impact of the AI implementation on the work-life balance ($p = 0.1094$) or there is no statistically significant improvement in the work-life balance affecting the employee engagement ($p = 0.4158$). These results indicate that, although it is usually believed that AI can enhance the work-life balance by eliminating repetitive jobs and improving flexibility (Sadiqin and Hwihanus, 2025), the influence of AI implementation on these factors is not as direct or uniform as it once was thought to be. Past research in other settings has shown that AI has the potential to decrease work stress and bring about greater autonomy, which results in an improved work-life balance (Atmaja et al., 2025). In this particular example, the impacts were not very significant, which may be explained by the lack of training sessions, a lack of trust to AI or immature organizational culture in the pharmaceutical industry of Khyber Pakhtunkhwa (Upadhyay and Sharma, 2024).

In addition, the indirect influence of the adoption of AI on employee engagement via work-life balance is negative and insignificant (BootLLCI = -0.0212, BootULCI = 0.0082), which complicates the relationship between the constructs even further. The discovery undermines the hypothesis that the success rate of AI adoption will culminate in an improved engagement due to better personal well-being. The organizational culture, support of leadership, and the degree to which the employees believe that AI is complementary to their work can be a more dominant force of engagement than the presence of AI (Tariq, 2025). Also, it may be possible that the insignificance of findings is explained by the small sample size or the fact that AI adoption in the pharmaceutical industry of Khyber Pakhtunkhwa is still in its infancy and the employees in the sector may



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be in their first steps of implementing AI tools in their work processes (Gaur, 2024). Therefore, in order to determine the overall effects of AI on work-life balance and employee involvement in this industry, more longitudinal studies are required.

Conclusion

The findings of this paper suggest that AI implementation does not have a significant effect on increasing staff engagement based on the improvement of the work-life balance within the pharmaceutical sector of Khyber Pakhtunkhwa. Although AI has the potential of enhancing the work-life balance through automation of duties and providing better flexibility, direct and indirect effects on employee engagement were found to be insignificant. This is to imply that the influence that AI has on engagement is probably mediated by the other variables, including organizational culture, leadership support, and trust in technology.

Recommendations

- **Increase Training and Support:** To make AI more effective in work-life balance and engagement, organizations must invest into elaborate AI training practices, in which employees must be trained and provided with skills to use AI tools successfully, and feel comfortable with the technology.
- **Cultivate Culture and Leadership:** Organizations need to focus on the support of leadership and the open dialogue regarding the usage of AI, with the focus being on the ability of AI to support the work of the employees and help them to have a better work-life balance.
- **Longitudinal Studies:** Even more studies should be conducted to evaluate the impacts of AI on the work-life balance and employee engagement in the long-term since, according to the present research, the impact of AI implementation might not be direct and evident in the initial phases of the process.

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