

## Empowering the Workforce: Mediating Role of AI Acceptance in Transformational Leadership and Employee Outcomes

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### Abstract

The rapid integration of artificial intelligence (AI) into organizational processes has transformed contemporary workplaces, necessitating leadership approaches that facilitate employee acceptance of AI-driven systems. The purpose of this research is to examine the influence of transformational leadership on job satisfaction, employee engagement, and quality of work life through AI acceptance as a mediating variable. Further, this study evaluates the moderating role of training and development in the relationship between transformational leadership and AI acceptance. The population of the study consists of employees from the manufacturing and service sectors. Convenience sampling technique is used to draw a sample from the population. The sample size of the study is 511 employees. Results showed that transformational leadership positively influences AI acceptance. Results also revealed that AI acceptance positively influences job satisfaction, employee engagement, and quality of work life. It is further revealed that AI acceptance mediates the relationship between transformational leadership and job satisfaction, employee engagement, and quality of work life. At last, the results showed that training and development moderate the relationship between transformational leadership and AI acceptance. This means that training and development strengthen the relationship between transformational leadership and AI acceptance. Training and development help organizations to accept AI technology with transformational leadership. This research provides valuable guidance for organizational leaders, HR professionals, and policymakers in large-scale Pakistani enterprises across manufacturing, technology, and service sectors. By highlighting the role of transformational leadership in fostering AI acceptance, the study emphasizes the importance of leadership development programs designed to enhance employees' readiness for technological change.

**Keywords:** Transformational Leadership, AI Acceptance, Job Satisfaction, Employee Engagement, Training and Development, Quality of Work Life

## 1 Introduction

A group of technologies known as artificial intelligence (AI) allow robots to carry out tasks that normally need intelligence from humans (Arerkar, 2019; Tang et al., 2023). The science of artificial intelligence (AI) has developed since the late 1950s to provide a wide range of applications, from sophisticated deep learning structures to automated systems and robotics. According to Wang et al. (2025), the worldwide AI market is expected to increase at a compound annual rate of 37.3% between 2023 and 2030, showing its revolutionary effect throughout industries (Li et al., 2019). AI use in business functions increased from 55 to 78% in just a single year, according to a global survey (Alex et al., 2025). Scholars disagree on how AI will affect organizations, though. Some highlight how it could improve efficacy and efficiency (Pillai & Sivathanu, 2020; Tang et al., 2022).

The degree to which workers integrate AI technology into their regular jobs to carry out tasks intelligently is known as AI acceptance (Tang et al., 2022). Typical uses for ChatGPT include writing or debugging code, creating prose, translating texts, and composing emails. Finding the elements that drive AI acceptance has attracted scholarly and practical attention because technologies have social characteristics (Liu et al., 2024) and users are essential in utilizing their potential (Potinteu et al., 2023; Liu et al., 2024; Tang et al., 2023; Shaikh et al., 2023; Wang et al., 2025). Although earlier studies have concentrated on antecedents at the human level, such as personality, trust, and risk perceptions (Park & Woo, 2022; Potinteu et al., 2023), more general environmental characteristics, such as leadership, have not received enough attention. Leaders are important sources of societal influence.

Over the past few decades, corporations have quickly embraced technological advancements in the workplace, particularly artificial intelligence, which has drawn growing scholarly attention. Numerous studies have highlighted the difficulties in developing and implementing AI as well as the risks it poses to workers' well-being (Mahi & Ghomari, 2025). These workers may experience job insecurity and frustration as a result of AI's presence in their workplace (He et al., 2023) and because they anticipate that the use of AI at work will either result in the creation or enhancement of new jobs or the loss of numerous job possibilities (Khogali & Mekid, 2023). As a result, about two among every five employees (38%) expressed worries that AI would eventually replace or automate some or all of their job duties (Lerner, 2023). Despite the growing body of research on the antecedents of AI acceptance, limited attention has been paid to its consequences for employee-related outcomes, such as job satisfaction, employee engagement, and quality of work life, particularly in large manufacturing and service enterprises.

The existing body of literature has identified several concerns relating to AI in organizational context. Most of the prior researches focused on antecedents and drivers of AI adoption with technological, social, psychological, and organizational factors and gave less attention to mechanism driven by leadership at employee level (Dwivedi et al., 2023). Second, empirical evidence is scarce how transformational leadership affect the employees' AI acceptance in large scale manufacturing and services organizations

where implementation of AI is complex and adaptability of workforce is critical (Wang et al., 2025). Third, AI adoption is widely studied as outcome variable, but its consequences for employee related outcomes i.e., job satisfaction, employee engagement, and quality of work life are less studied (Schulz et al., 2025; Khan et al., 2024; Mahi & Ghomari, 2025; Nanjundeswaraswamy & Beloor, 2022; Salaheldin & Hussein, 2025). Fourth, during technological transformation, training and development is considered as critical organizational support driver and previous researches most recognized and studied it as direct predictor, overseeing its moderating impact in strengthening relationship between transformational leadership and AI acceptance (Rahman et al., 2022). Finally, in Pakistan, there is need of a study for context specific evidence as integration of AI in large scale manufacturing and service firms is increasing.

Through vision, inspiration, and intellectual stimulation, transformational leaders encourage their followers to put the organization's needs ahead of their own (Bass, 1999; Reza, 2019). Transformational leadership can be extremely important in encouraging the favorable adoption of AI in digital transformation. Employees are likely to take leaders' views as signs of organizational expectations because AI frequently demands extra effort to understand (Potinteu et al., 2023) and its utilization could extend beyond official function requirements. This study limits its reach to situations in which leaders have positive sentiments regarding the use of AI since transformational leadership is value-free and its impacts rely on the leader's strategic emphasis. Leaders are better positioned to increase staff understanding and involvement with these technologies if they have positive attitudes toward policy-aligned AI deployment (Shaikh et al., 2023). In particular, executives who have positive attitudes toward AI are better equipped to express a compelling vision, set an example of appropriate behavior, and offer encouraging feedback, all of which may increase employee engagement with AI. Additionally, since leadership is frequently viewed as the organization's representative, this kind of support could be interpreted as corporate backing, boosting staff members' confidence in utilizing new technology.

Additionally, researchers have started looking at how implementing AI may affect individual-level outcomes related to employee job satisfaction, or how satisfied workers are with their jobs and employers (Locke, 1976). On the one hand, studies show that adopting AI has good effects on employment. Because AI can automate repetitive and well-structured jobs (Berente et al., 2021; Raisch & Krakowski, 2021), it can free workers from repetitive chores, streamline processes, and allow them to concentrate more on high-value, complicated tasks (Makarius et al., 2020). Additionally, research shows that using AI in an augmenting form can promote creativity (Bouschery et al., 2023; Jia et al., 2024), which is probably linked to higher job satisfaction (Humphrey et al., 2007).

Employees' psychological and emotional commitment to their work is reflected in employee engagement, which is a key component of organizational performance (Rožman & Tominc, 2024). AI can increase employee engagement by automating tedious jobs and opening up more strategic positions, but how well it is incorporated into processes and viewed by staff members will determine how much of an impact it

has (Goswami et al., 2023). Examining the relationship between AI acceptance and employee engagement provides timely insights for policymakers and business leaders in Pakistan, where digital transformation is a national priority in Vision2030, a comprehensive national strategy with the goal of achieving sustainable development and improving the quality of life for all Pakistanis by the year 2030 (Oxford Business Group, 2022).

Because investments in human resources usually enable a high level of employee productivity and job satisfaction, quality of work-life (QWL) is now essential to business performance (Sabonete et al., 2021). According to Babamohamadi et al. (2023), QWL is the degree to which workers are satisfied with both personal and professional demands in their positions and workplace. However, workers' well-being is affected by AI (Iqbal, 2018). Therefore, it is essential to comprehend how AI affects workers' QWL. In summary, AI can improve workers' quality of life (QWL) and boost efficiency through automation and knowledge enhancement (Banaffa, 2023).

Furthermore, Social Exchange Theory (SET) provide theoretical base to understand employee responses to implementation of AI in organizational settings. SET theorizes that workplace relationships are based on reciprocal exchanges, whereby employees respond positively when they perceive support, fairness, and investment from their leaders or organization (Blau, 1964; Cropanzano & Mitchell, 2005). In this study, transformational leadership represents the key social exchange mechanism, offering individualized consideration, inspirational motivation, and intellectual stimulation, signaling care and support for employees. AI acceptance functions as mediator in this exchange, reflecting employees' psychological response to leadership support and organizational investment. Training and development further strengthen this exchange by enhancing employees' skills and perceived organizational commitment, fostering trust and reciprocity. In turn, AI acceptance positively influences job satisfaction, employee engagement, and quality of work life, demonstrating how reciprocal social exchanges between leaders and employees facilitate both technology acceptance and beneficial workplace outcomes.

## 2 Literature Review and Hypotheses Development

### 2.1 AI Acceptance

Due to integration of intelligence systems in work processes, research on AI acceptance has grown rapidly in organizational context. Different technology frameworks like Unified Theory of Acceptance and Use of Technology (UTAUT) and Technology Acceptance Model (TAM) have explained how different perceptions of employees affect the willingness to accept and adopt AI technology. As per Choi (2021), employees' motivation and ability significantly enhance employees' intent to accept AI tools in service sector. Trust and perceived usefulness are important drivers of employees' willingness to accept and use AI in organizations. Venkatesh and Davis (2000) argued that usefulness of technology and ease of use are key antecedents of acceptance related attitudes in technology context. Further researches evident that leadership support and practices play major role in adopting and implementing of AI in early stages when employees' adoption decisions are tentative (Makarius et al., 2020).

## 2.2 Transformational Leadership and AI Acceptance

One of the most prominent leadership philosophies in the management literature, transformational leadership places a strong emphasis on feelings, convictions, and values (Bass, 1999; Guerrero et al., 2017; Yukl, 2012). Employee attitudes and behaviors, such as job performance (Bakker et al., 2023), innovative behavior (Jun and Lee, 2023), change management (Bagga et al., 2023), digital transformation (Philip, 2021), well-being (Gaur, 2023), have been demonstrated to be positively impacted by transformational leadership. Despite this substantial research, nothing is known about how it influences employees' acceptance of AI. Organizations must adjust to previously unheard-of environmental changes in the quickly changing AI era in order to survive and continue growing (Mikalef et al., 2021). The widespread use of AI technologies creates both opportunities and demands for organizational change, necessitating the development of executives capable of successfully directing digital transformation initiatives (Philip, 2021). Because it entails expressing a compelling vision, identifying external needs, and developing adaptable organizational solutions, transformational leadership is a good fit in this situation (Ghamrawi, 2013; Mikalef et al., 2021; Bagga et al., 2023). Transformational leadership strengthens the organization's ability to incorporate emerging technologies into its core practices by increasing employee engagement and awareness with technology (Shaikh et al., 2023) and developing employees' capacity to adopt technological resources like authorized AI tools and resources (Bagga et al., 2023; Jun & Lee, 2023).

It is crucial to remember that AI in work settings functions as a cooperative "fellow" as well as a tool for completing duties (Tang et al., 2022; Wang et al., 2025). However, a user's reaction to the employment of AI in the workplace has some bearing on the reality of such jobs. Previous studies on the use of AI by employees have mostly concentrated on domain-specific settings including public service (Gesik & Leyer, 2022), healthcare (Mousavi et al., 2025), education (Abbas et al., 2024), and customer service (Xu et al., 2020). Individual-level factors, such as personality traits (Park & Woo, 2022) and opinions on AI (Potinteu et al., 2023; Mousavi et al., 2025), have been the subject of more recent research. However, situational factors—particularly leadership—remain understudied when it comes to influencing the use of AI. A compelling vision for AI is articulated by transformational leadership, which also models its use and offers encouraging feedback. Given that transformational leaders are typically adept at integrating new technology and sensitive to external dynamics, such supporting activities may inspire employees to use AI (Bagga et al., 2023; Jun & Lee, 2023). Additionally, AI can improve work performance by reducing routine task loads and increasing data processing efficiency (Tang et al., 2022). As a result, workers under transformational leadership might be more likely to incorporate AI into their regular tasks. Furthermore, transformational leadership's focus on self-development and adaptation (Shriberg & Shriberg, 2011) might further support the essential skill acquisition, hence encouraging active AI acceptance, given that effective AI usage involves substantial learning (Potinteu et al., 2023). Based on the aforementioned logic, we suggest that transformational leadership improves employees' acceptance of AI in

the workplace, especially when leaders have positive attitudes about policy-aligned AI deployment. The following is the hypothesis:

H1: Transformational leadership positively affect AI acceptance

### **2.3 AI Acceptance and Employees Outcomes**

#### **2.3.1 AI and Job Satisfaction**

One of the most researched ideas in studies on general job attitudes is job satisfaction and its antecedents (Judge et al., 2017). According to earlier research, satisfied employees tend to perform better, withdraw less, and enjoy happier and healthier lives (Miner, 2005). Previous studies have highlighted elements including organizational culture (Kirkman and Shapiro, 2001; Egan et al., 2004; Ng & Feldman, 2015) and job security (Cheng & Chan, 2008) as crucial antecedents to higher employee job satisfaction. Scholars have used a number of theories, including social exchange theory, to explain the mechanisms connecting such antecedents to job satisfaction.

Businesses can gain from automated structured and measurable tasks by implementing AI-related solutions (Berente et al., 2021; Raisch & Krakowski, 2021). Employees can now concentrate on more challenging activities because they are not required to complete related, frequently repetitive jobs (Daugherty & Wilson, 2018; Jia et al., 2024). According to research on job characteristics, exposing workers to activities demanding advanced problem-solving abilities might increase their motivation (Jia et al., 2024) and, consequently, their job happiness (Humphrey et al., 2007). By reducing the dependence of tasks with other employees (Jia et al., 2024) and improving the quality of results (Boussioux et al., 2024), augmenting difficult jobs by assigning portions to AI can further enhance employees' productivity. In particular, AI can prepare work that is sent to humans more consistently and reliably (Jia et al., 2024) and even provide more learning chances for staff members (Shao et al., 2024), which will increase productivity and work efficiency (Berente et al., 2021; Raisch & Krakowski, 2021). We anticipate that the adoption of AI will have a positive, linear enrichment effect. A growing number of individual jobs can be enhanced and eventually automated as AI adoption rises (Raisch & Krakowski, 2021; Schulz et al., 2025), resulting in ongoing work enrichment and ultimately higher job satisfaction for individuals. The following is the hypothesis:

H2: AI acceptance positively affect job satisfaction

#### **2.3.2 AI and Employee Engagement**

As per published research, AI technology can increase employee engagement through rewards, monitoring, and coaching. The degree of engagement in the modern workplace is generally high due to the growing involvement of individuals who are highly skilled at utilizing new technologies (Bag et al., 2021). According to Bolton et al. (2018), AI has the potential to help firms increase employee engagement and cooperation by utilizing AI solutions. AI-driven technologies are used in chatbots and virtual assistants, which have been shown to improve teamwork and communication and raise employee engagement levels (Chang et al., 2023). Employees' use of AI technology contributes to increased corporate transparency and identification, which improves employee engagement (Larsson & Heintz, 2020). AI technologies are particularly useful for influencing and predicting user behavior. While these technologies automate repetitive

processes, they are also intended to offer personalized feedback and development possibilities that increase employee engagement. According to Capatina et al. (2020), this in turn gives users a wide range of analytics skills, such as understanding, decision-making, or even the creation of insight that could engage an individual. Additionally, Bag et al. (2021) provided empirical evidence of the impact of AI tools on user engagement. By encouraging a sense of ongoing development and accomplishment, AI's capacity to evaluate worker performance and offer immediate feedback greatly raises employee engagement (Davenport & Kirby, 2016). As a result, offering AI services can increase staff engagement and their capacity to accurately, rapidly, thoroughly, and sympathetically answer to client requests (Khan et al., 2024). Consequently, we make the following hypothesis based on these arguments:

H3: AI acceptance positively affect employee engagement

### **2.3.3 AI and Quality of Work Life**

Health and safety conditions, facilities offered, working conditions, leave benefits, work-life balance, and healthy living arrangements are all factors that contribute to a quality of work life (QWL) (Islam and Siengthai, 2009). The most important aspects of QWL are work-related stress, occupational stress, working circumstances, and career and work satisfaction (Almarshad, 2015). The work-related elements linked to the employee's QWL are work design, work context, and work environment (Almalki et al. 2012). According to Srivastava et al. (2019), the key components of an employee's quality of life (QWL) are supervision, physical surroundings, compensation and benefits, development and growth, involvement, integration at work, and social relevance. The overall quality of work-life for employees in the apparel industry is influenced by QWL facilitators, which include pay and benefits, job satisfaction, participative management, dedication to the organization, growth and development, teamwork, attitude and perception, social integration, employee participation, welfare opportunities, safety and healthy environment, and rewards system (Yadav et al., 2019). Numerous studies have looked at how technology affects workers' life at work. According to the Kraut et al. (1989) study, technology has a significant and unavoidable effect on quality of work life (QWL). Technology's influence on the efficiency and quality of service agents' work-life was shown to be as strong as other key influences, highlighting its role in influencing employees' QWL. To make sure that technology integration in workplace improves rather than diminishes workers' well-being and job happiness, it should be carefully considered. Akyol and Güler (2014) discovered a favorable correlation between technology and work-life quality in another investigation. Additionally, depending on employees' capacity to embrace, adjust to, and integrate information technology into decision-making processes, how they think of information technology has a beneficial impact on the quality of working life. QWL, diversity and inclusion, and communication are examples of antecedents of employee engagement that AI may help with. By offering chances for personal development, growth, and security, work-life balance, fair compensation, secure working conditions, and the social relevance of work life, it can also improve the QWL. Increased productivity, improved employee wellbeing, and lower attrition rates are all benefits of employing AI in employee engagement. The usage of AI can have a big impact on how well

employees utilize and grow their human abilities. By employing AI to focus on employees' needs and requirements, companies can construct a more informed and customized employee engagement strategy that will help employees grow their abilities and improve job performance, which will increase job satisfaction and engagement (Ramachandran et al., 2021). AI integration in the workplace values people's individual talents while enabling them to use to improve their skills in new and relevant ways. By using AI to enhance human capabilities and not replacing them, organizations can build a workforce more capable of meeting the needs of contemporary society. Council (2018).

H4: AI acceptance positively affect quality of work life

### **3.3.4 AI Acceptance as Mediator**

Employees attitude towards technological transformation is positively influenced by transformational leadership by enhancing support, shared values, and motivation that in response boost the adoption of new technology like AI (Yumu, 2025). AI acceptance works as psychological mediator that assist to translate leadership effect into employee related outcomes. When employees accept and use AI in their work, they acknowledge efficiency in their work and improved job performance that contribute to high job satisfaction, enhanced employee engagement, and improved quality of work life (Alshammari & Al-Mamary, 2025; Khan et al., 2025; Wang et al., 2025). Therefore, AI acceptance mediate relationship among transformational leadership and employee related outcomes i.e., job satisfaction, employee engagement, and quality of work life by highlighting the significance of employee perception about tech driven work settings. Thus, we proposed following hypotheses

H5: AI acceptance mediate relationship transformational leadership and job satisfaction

H6: AI acceptance mediate relationship transformational leadership and employee engagement

H7: AI acceptance mediate relationship transformational leadership and quality of work life

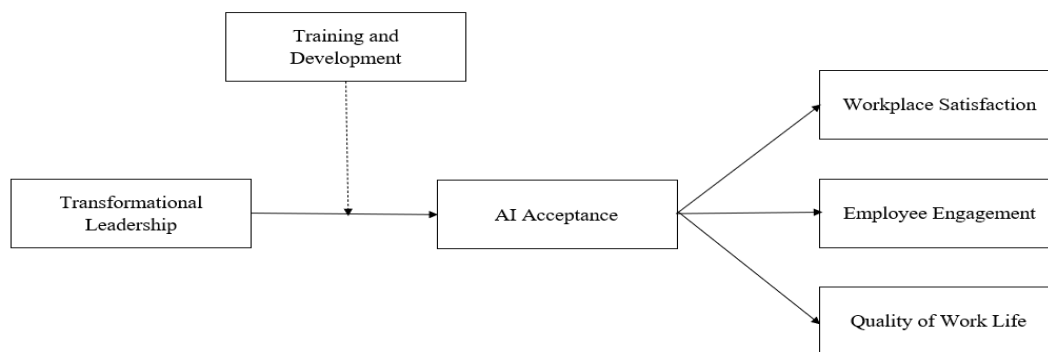
### **2.5 Training and Development as Moderator**

According to Wong (2005) and Gloet (2006), training is a continual development technique that enhances employees' knowledge and abilities necessary to complete an assignment and improve job performance. Training, according to Noe et al. (2008), is a deliberate endeavor to help organizational personnel acquire job-related competences that are essential for an individual's job performance. Conversely, development entails formal education, expanding work experience, personality, and skills that equip workers for future work performance (Noe et al., 2008). In the context of AI acceptance, training is crucial because employees learn the benefits of AI and how to share ideas and information through official training sessions or casual conversations between two or more people (Sposato, 2024).

Transformational leaders motivate, intellectually stimulate, and support employees, which fosters openness to innovation and technological change (Susilowati et al., 2025). However, without adequate training, employees may lack confidence or competence to adopt AI tools effectively. Training increases perceived ease of use and self-efficacy,

key predictors in technology acceptance models such as TAM and UTAUT, thereby strengthening the positive influence of transformational leadership on acceptance behaviors (Venkatesh et al., 2003). Empirical work on technology adoption highlights leadership as a critical driver of acceptance, but also notes that organizational enablers like skill development and learning initiatives enhance adoption outcomes (Patnaik & Bakkar, 2024). Recent research on AI-training acceptance further underscores that tailored, AI-focused training can shape attitudes toward acceptance when combined with supportive leadership (Alshammari & Al-Mamary, 2025). Consequently, training and development act as a moderator that amplifies transformational leadership’s effect on AI acceptance in complex enterprise contexts.

H8: Training and development moderate relationship between transformational leadership and AI acceptance



**Figure 1. Theoretical Framework**

### 3 Research Methodology

#### 3.1 Data Collection Procedure

For this quantitative research, a non-probability sampling technique i.e., convenience sampling is adopted to collect data (Attiq et al., 2023). This sampling technique helps to target the employees and is cost effective. The data was collected from various large manufacturing and service sector organizations’ employees about their satisfaction, engagement, and quality of work life. A link was generated to distribute the final questionnaire. In total, 511 forms were considered for data analysis.

#### 3.2 Demographic Profile

Males and females from a variety of age groups and educational levels made up the respondents who took part in the data gathering. Table 1 presents complete details:

**Table 1: Demographic Statistics**

Demographic Category	Percentage (Frequency)
Gender	Male 63.2 (323)
	Female 36.80 (188)
Age (In years)	21-30 years 19.76 (101)
	31-40 years 36.99 (189)

	41-50 years	24.65 (126)
	Above 50 years	18.60 (95)
	Matriculation	7.04 (36)
	Intermediate	18.00 (92)
Education	Bachelors	37.38 (191)
	Masters	25.44 (130)
	Above masters	12.14 (62)
	Less than 5 years	27.00 (138)
Experience	5- 10 years	30.72 (157)
	11-15 years	25.24 (129)
	Above 15 years	17.04 (87)

### 3.3 Measures

All measuring items were evaluated using a five-point Likert scale, with 1 = strongly disagree and 5 = strongly agree. The measuring items were adapted from earlier research. Transformational leadership is measured using scale of five items by Bass and Avolio (1994). Five items are borrowed from Venkatesh and Davis (2000) for evaluating AI acceptance. Five items from the work of Sahinidis and Bouris (2008) were used to gauge training and development. Five items have taken from Weiss et al. (1967) to quantify job satisfaction. Seventeen items have taken from Schaufeli et al. (2002) to quantify employee engagement. Finally, twelve items have taken from Huang et al. (2007) to measure the quality of work life.

### 3.4 Data Analysis Procedure

For the analysis, we used PLS-SEM. A statistical technique for modeling intricate interactions between latent and observable variables is partial least squares structural equation modeling (PLS-SEM) (Purwanto & Sudargini, 2021). It is prudent and sensible to use PLS-SEM in this situation. In context of employee job-related outcomes, this study looks at novel or comparatively understudied interactions. When the theoretical model is being developed or is being modified, PLS-SEM is the best option for exploratory research. Because of the model's multi-path complexity, the research's predictive focus, and the exploratory goal of comprehending the psychological factors influencing sustainable food consumption behavior, this study used PLS-SEM. Its modest sample size and adaptability to non-normative data further supported its use. Examining the outside model (measurement model) and assessing the inner model (structural model) are the two phases of PLS-SEM.

## 4 Results

### 4.1 Common Method Bias Test

Examining common method bias (CMB) is crucial in cross-sectional studies. According to the results of the Harman-Single Factor test, the maximum explained variance was 43.74%, which is below the 50% cutoff (Hair et al., 2017). These results showed that there isn't a serious problem with CMB.

**4.2 Measurement Model**

According to Cheah et al. (2018), reliability, convergent validity, and discriminant validity are the three important components of the measurement model assessment. Since scores are over 0.70, the Dijkstra Henseler (rho\_A), Cronbach's alpha ( $\alpha$ ), and composite reliability (CR) values are compatible (Hair et al., 2017). These findings show that every variable is consistently measured and has good dependability. Additionally, average variance extracted (AVE) values surpass the suggested threshold, i.e., > 0.50, which validates the convergent validity (Fornell & Larcker, 1981), and outer loading scores are above the suggested criterion, i.e., 0.60 (Hair et al., 2017). All constructs are connected and share a respectable amount of variation as per convergent validity values (see Table 2).

**Table 2: Reliability and Validity Analysis**

<b>Construct</b>	<b>Dimensions</b>	<b>Code</b>	<b>Loadings &gt; 0.60</b>	<b>Alpha &gt; 0.70</b>	<b>CR &gt; 0.70</b>	<b>AVE &gt; 0.50</b>			
Transformational Leadership Bass and Avolio (1994)		TL_1	0.773	0.877	0.911	0.671			
		TL_2	0.848						
		TL_3	0.845						
		TL_4	0.831						
		TL_5	0.796						
AI Acceptance Venkatesh and Davis (2000)		AI_1	0.797	0.852	0.894	0.628			
		AI_2	0.821						
		AI_3	0.794						
		AI_4	0.794						
		AI_5	0.755						
Training and Development Sahinidis and Bouris (2008)		TD_1	0.651	0.802	0.864	0.563			
		TD_2	0.822						
		TD_3	0.863						
		TD_4	0.754						
		TD_5	0.636						
Job Satisfaction Weiss et al. (1967)		WS_1	0.731	0.853	0.895	0.631			
		WS_2	0.819						
		WS_3	0.797						
		WS_4	0.833						
		WS_5	0.789						
Employee Engagement Schaufeli et al. Vigor (2002)				0.932	0.940	0.535			
		EE_V1	0.726				0.860	0.895	0.588
		EE_V2	0.784						
		EE_V3	0.820						
		EE_V4	0.735						
		EE_V5	0.758						
	EE_V6	0.755							
	Dedication	EE_D1	0.670	0.816	0.872	0.578			

	EE_D2	0.806			
	EE_D3	0.784			
	EE_D4	0.766			
	EE_D5	0.768			
Absorption	EE_A1	0.777	0.845	0.885	0.563
	EE_A2	0.747			
	EE_A3	0.751			
	EE_A4	0.798			
	EE_A5	0.711			
	EE_A6	0.715			
Quality of Work Life			0.931	0.941	0.569
Huang et al. (2007) Work Life Balance	QL_W1	0.849	0.826	0.896	0.742
	QL_W2	0.874			
	QL_W3	0.861			
Job Characteristics	QL_J1	0.833	0.768	0.866	0.683
	QL_J2	0.796			
	QL_J3	0.849			
Supervisory Behavior	QL_S1	0.841	0.773	0.869	0.688
	QL_S2	0.808			
	QL_S3	0.839			
Compensation and Benefits	QL_C1	0.848	0.804	0.884	0.718
	QL_C2	0.860			
	QL_C3	0.835			

Note: Alpha- Cronbach Alpha, CR- Composite Reliability, AVE- Average Variance Extracted

The study uses the heterotrait-monotrait (HTMT) ratio to evaluate discriminant validity. Remarkably, all of the studied variables (Table 3) maintain values below 0.85, indicating good discriminant validity (Kline, 2023).

**Table 3: HTMT Validity Analysis**

Variables	TL	AI	TD	JS	EE	QL
Transformational Leadership (TL)						
AI Acceptance (AI)	0.890					
Training and Development (TD)	0.665	0.704				
Job Satisfaction (JS)	0.792	0.830	0.733			
Employee Engagement (EE)	0.754	0.810	0.814	0.802		
Quality of Work Life (QL)	0.798	0.887	0.739	0.867	0.836	

### 4.3 Structural Model

After evaluating the measurement model to verify its validity and reliability, the structural model applies the five-step procedure. Variance inflation factor (VIF) evaluation is used to address the collinearity issue. The values of the VIF are still much

lower than 5, as Table 4 demonstrates (Hair et al., 2017). This finding leads us to the conclusion that the model does not have any multicollinearity problems.

We next use the bootstrapping approach with 5000 resamples to evaluate the hypothesis outcomes. Based on Table 4, we can see that transformational leadership (H1:  $\beta = 0.67$ ,  $p < 0.00$ ) positively affect AI acceptance; this indicates if leaders show strong transformational behavior in their organizations, in response workers are more willing to accept and adopt AI. AI acceptance (H2:  $\beta = 0.70$ ,  $p < 0.00$ ) positively affect job satisfaction; this conveys those workers who demonstrate high level of AI acceptance, they experience significant level of work satisfaction at their job place. AI acceptance (H3:  $\beta = 0.72$ ,  $p < 0.00$ ) positively affect employee engagement; this means those employees who accept AI tend to be more involved in their jobs. AI acceptance (H4:  $\beta = 0.79$ ,  $p < 0.00$ ) positively affect quality of work life; this reveal that employees those are open to AI tend to experience a greater quality in their work life (also see Figure 2). Table 4 shows that each predictor explained variance ( $R^2$ ) is 63%, 50%, 52%, and 62% in AI acceptance, job satisfaction, employee engagement, and quality of work life respectively.

**Table 4: Structural Model Evaluation**

Hyp.Path	Betat	p-value	R <sup>2</sup>	VIF <sup>2</sup>	Q <sup>2</sup>	
H1 Transformational Leadership → AI Acceptance	0.67	16.43	0.00	0.63	1.59	
H2 AI Acceptance → Job Satisfaction	0.70	25.82	0.00	0.50	1.00	
H3 AI Acceptance → Employee Engagement	0.72	27.09	0.00	0.52	1.00	
H4 AI Acceptance → Quality of Work Life	0.79	30.89	0.00	0.62	1.53	
Mediation Analysis			Betat	p-value	LCL (2.5%)	UCL (97.5%)
H5 Transformational Leadership → AI Acceptance → Job Satisfaction	0.47	13.63	0.00	0.39	0.53	
H6 Transformational Leadership → AI Acceptance → Employee Engagement	0.48	14.82	0.00	0.40	0.53	
H7 Transformational Leadership → AI Acceptance → Quality of Work Life	0.53	14.70	0.00	0.44	0.58	
Moderation Analysis			Betat	p-value	LCL (2.5%)	UCL (97.5%)
H8 Training and Development Transformational Leadership → AI Acceptance	0.06	2.32	0.01	0.02	0.15	

VIF- Variance Inflation Factor, LCL- Lower Confidence Limit, UCL- Upper Confidence Limit

The relative significance of each pathway was then determined by computing the effect size ( $f^2$ ) (Sullivan & Feinn, 2012). Three categories can be used to classify effect sizes: small (0.02), medium (0.15), and large (0.35). The effect size ( $f^2$ ) results are shown in Table 4. The predictive significance of the model is evaluated using a blindfolding

approach ( $Q^2$ ). According to Hair et al. (2017), the endogenous constructs have  $Q^2$  values that are higher than zero, ranging from 0.23 to 0.36. This suggests that the model has predictive power.

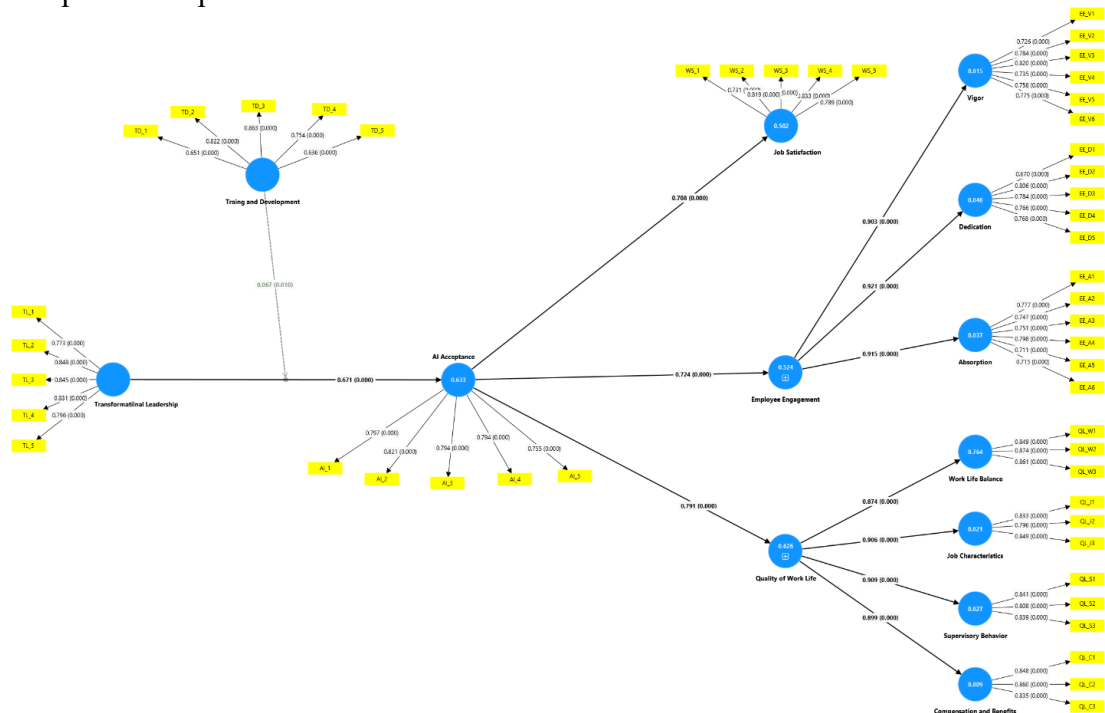


Figure 2: Structural Model

#### 4.4 Mediation Analysis

To study the indirect effect of AI acceptance, mediation analysis is performed (see Table 4). AI acceptance (H5:  $\beta = 0.47$ ,  $p < 0.00$ ; LCL= 0.39, UCL= 0.53) mediate the relationship between transformational leadership and job satisfaction; this denotes that transformational leadership increase the AI acceptance among employee that enhance the job satisfaction of workers. AI acceptance (H6:  $\beta = 0.48$ ,  $p < 0.00$ ; LCL= 0.40, UCL= 0.53) mediate the relationship between transformational leadership and employee engagement; this denotes that transformational leadership increase the AI acceptance among employee that enhance their engagement at work. AI acceptance (H7:  $\beta = 0.53$ ,  $p < 0.00$ ; LCL= 0.44, UCL= 0.58) mediate the relationship between transformational leadership and quality of work life; this denotes that transformational leadership increase the AI acceptance among employee that enhance the quality of work life of employees.

#### 4.5 Moderation Analysis

To examine the moderating indirect effect of training and development, moderation analysis is performed (see Table 4 and Figure 2). Training and development (H8:  $\beta = 0.06$ ,  $p < 0.01$ ; LCL= 0.02, UCL= 0.15) moderate the relationship between transformational leadership and AI acceptance; this result demonstrate that training and

development is strengthening the relationship between transformational leadership and AI acceptance among employees. Further, this denoted that if training and development is high in organizations, this will help transformational leaders in enhancing the acceptance of AI among employees.

## 5 Discussion

It was hypothesized that transformational leadership positively affects the AI acceptance. The results of hypothesis 1 showed that transformational leadership positively and significantly influence the acceptance of AI by employees in manufacturing and as well as in service sector in Pakistan. These findings are aligned with previous research that suggested, transformational leaders play significant role in development of employees' attitude towards technological innovations (Agarwal & Prasad, 1998; Dwivedi et al., 2021).

The finding of Hypothesis 2 reveals that AI acceptance positively and significantly influence the job satisfaction of employees in manufacturing and service sectors. These results suggest that when workers accept and comfortable with using artificial intelligence (AI) gears, they experience high job satisfaction. AI tools help to simplify routine assignments, improve accuracy, and lessen time pressure, permitting the workers to focus on their work more meaningfully (Tarafdar et al., 2023).

As per hypothesis 3, finding reveal that AI acceptance positively and significantly impact the work engagement. This means AI help to enhance employee work engagement. The way we work is constantly changing due to digitalization (Meyer et al. 2022; Parker and Grote 2022), and it is usually still technology-centered, meaning that technical advancements drive it rather than the demands of human workers.

The results of research further demonstrated that AI acceptance mediate the relationship between transformational leadership and job satisfaction, employee engagement, and quality of work life (H5, H6, and H7). It means that influence of transformational leadership assists in how workers sense and accept the AI that in response their job satisfaction, work engagement, and quality of work life. Transformational leaders are the persons that motive, help, and encourage their teammates and develop an environment where employees can work confidently and introduce new technologies like AI (Bass & Riggio, 2006). When leaders built their trust and value in their employees then employees become more comfortable and welcome the change in organization and accept AI as assisting tool not as fear for them (Dwivedi et al., 2021).

### 5.1 Implications

This work offers a number of theoretical insights. First, it provides a clear picture of AI's potential function in facilitating work engagement in organizational contexts. These results are consistent with SET's central tenet that productive interactions between workers and organizations benefit workers. According to the findings, AI applications in organizational settings have a beneficial impact on work engagement by facilitating efficient communication between organizational actors and delivering timely and correct information. This result is consistent with the SET ternate, which states that employee positive behaviors are reciprocated by organizational assets and backing (such as the integration of AI in the workplace). Thus, by empirically proving

that AI serves as a facilitator of mutually beneficial exchanges, our study expands and unifies the theoretical foundation of SET with contemporary technology.

### 5.2 Limitations and Future Recommendations

This study, while providing valuable insights into the influence of transformational leadership on AI acceptance and its subsequent impact on job satisfaction, employee engagement, and quality of work life, is not without limitations. First, the research employs a cross-sectional design, which restricts the ability to establish causal relationships among variables. Future studies could adopt a longitudinal or experimental approach to examine how these relationships evolve over time as AI technologies mature within organizations. Second, the study's focus on large enterprises in Pakistan's manufacturing, technology, and service sectors limits the generalizability of findings to small and medium-sized enterprises (SMEs) or organizations operating in other cultural and economic contexts. Researchers could extend this model to cross-country or multi-sectoral comparisons to validate its robustness. Third, data collected through self-reported questionnaires may be subject to common method bias or social desirability effects. Future research should consider multi-source data, such as supervisor evaluations or objective performance indicators, to enhance validity. Moreover, while training and development is examined as a moderator, other contextual factors such as organizational culture, technological readiness, or leadership support for innovation may also influence AI acceptance and its outcomes. Exploring these moderators could enrich theoretical understanding. Lastly, qualitative approaches, such as interviews or case studies, could uncover deeper insights into employee perceptions and behavioral responses toward AI implementation.

### 5.3 Conclusion

This study concludes that transformational leadership plays a pivotal role in shaping employees' acceptance of artificial intelligence (AI) and enhancing key workplace outcomes, including employee engagement, job satisfaction, and quality of work life. Leaders who inspire, intellectually stimulate, and support employees create a positive environment that fosters openness toward AI technologies. The findings further suggest that AI acceptance acts as a significant mediating mechanism through which transformational leadership influences employees' attitudes and experiences at work. Moreover, the moderating role of training and development strengthens the relationship between transformational leadership and AI acceptance, emphasizing that continuous learning initiatives and skill enhancement programs are essential for successful digital transformation. In the context of Pakistan's manufacturing, technology, and service sectors, these insights underscore the importance of leadership and workforce readiness in navigating AI-driven organizational change. Organizations that invest in leadership development and targeted employee training are better positioned to realize the potential benefits of AI adoption. Overall, the study contributes to leadership and technology management literature by integrating human-centric and technological perspectives, offering both theoretical enrichment and practical guidance for building a more adaptive and engaged workforce in the era of digital transformation.

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