

Linkage between Artificial Intelligence and Innovative Work Behavior: Mediation of Knowledge Sharing and Moderating Role of Digital Leadership

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Abstract

Objective of the current study is to investigate the mediating role of knowledge sharing and moderating role of digital leadership in relationship between artificial intelligence and innovative work behavior. Data was collected through convenient random sampling technique from 508 participants from banking sector of Pakistan. The findings of the study endorse that knowledge sharing mediate the relationship of artificial intelligence and innovative behavior. Moreover, the findings of the study also confirm the moderated mediation effect of digital leadership between the relationship of artificial intelligence and innovative behavior in presence of knowledge sharing. Additionally, moderated mediation results confirm that digital leadership, at higher level increases the innovative behavior of the employees through the indirect effect of artificial intelligence in presence of knowledge sharing. The findings of the current study are useful for management to amplify the innovative work behavior of the employees through artificial intelligence especially in the banking sector. Further, knowledge sharing is helpful for the innovative work behavior. Moreover, digital leadership is an effective and beneficial tool for employees to achieve organizational objectives.

Keywords: Digital leadership; Knowledge Sharing; Artificial Intelligence; Innovative Work Behavior.

Introduction

Innovative work behavior (IWB) has been acknowledged as individual innovation of the employee at the work place (Li, Cheng, & Xu, 2022; Odugbesan, Aghazadeh, Qaralleh, & Sogeke, 2023; Verma & Singh, 2022). The concept of innovative work behavior involves, creating and introducing novel ideas at the workplace. IWB helps to find new means and resources for the application, implementation and acceptance of these ideas. In organizations employees may engage themselves in any stage of the innovative behavior at any time as there is no sequence. Innovative work behavior consists of creative behavior of employees that are useful for organizations (Odugbesan et al., 2023; Tussyadiah & Miller, 2019). For organization's sustainable performance innovation is an essential trait, hence, employees with innovative work behavior in the organization are source of competitive edge (Akmal & Mehmood, 2020; Tussyadiah & Miller, 2019). Apart from idea generation, IWB involves in all the essential social and political activities which are crucial to generate innovative ideas (Chen, Sharma, Edinger, Shapiro, & Farh, 2011; Yuan & Woodman, 2010). Innovative work behavior is enhanced when new technologies are incorporated in the organizations. s

Artificial intelligence (AI) is rapidly replacing human intelligence for improving jobs and creating efficiency and playing a crucial role in economic growth. Besides this extraordinary involvement of digital technologies in organizational processes, intrinsic human skills are also essential for efficient application of digital tools like AI (Cimini, Boffelli, Lagorio, Kalchschmidt, & Pinto, 2020; Galati & Bigliardi, 2019; Pontes et al., 2021; Romero & Ventura, 2020). Advancement of technology emphasis the needs to adapt the related changes and enable the workforce to effectively use the latest technologies, as dealing with the more advanced digital technologies require more innovative employees to handle more complex data. Modern technologies such as AI has transformed the various aspects of traditional Human Resource Management (Gooderham, Mayrhofer, & Brewster, 2019; Hecklau, Galeitzke, Flachs, & Kohl, 2016; Liboni, Cezarino, Jabbour, Oliveira, & Stefanelli, 2019).

Given that, an organization needs a strong and influential leadership with digital mind-set to shift the organization into a digital firm (Khaw, Teoh, Khalid, & Letchmunan, 2022; Sow & Aborbie, 2018). To transform a firm into a digital firm the leadership behavior should necessarily be associated with digital economy (Allio, 2015). Vision of digital leaders with digital leadership aptitude can master strategic planning and influence the latest technological development. Moreover, a leader with digital mindset can define a more appropriate, valid and meaningful goal for digitalization to implement policies (Larjovuori, Bordi, Mäkinieniemi, & Heikkila-Tammi, 2016). Absence of a digital leadership could hinder the implementation of digital strategies (Levin & Mamlok, 2021). Previous studies emphasized that organizational process should contain digital leadership.

Organizational innovation cannot be considered without knowledge sharing, as the knowledge sharing is important for business firms to bring innovation in business process (Azeem, Ahmed, Haider, & Sajjad, 2021). Hislop, Bosua, and Helms (2018) defined knowledge sharing as the collaboration between implicit and explicit knowledge relevant to the task. According to Lin (2007) knowledge sharing in the organization occurs when knowledge is requested. Whereas, Ardichvili, Page, and Wentling (2003) suggested that knowledge sharing involves when supply and demand for new knowledge is required. Undeniably, knowledge sharing is a source of more valuable information and it provides a solid base for thorough innovation in organizations (Zhou & Li, 2012).

Objectives of the study are:

1. To investigate the relationship of artificial intelligence and innovative behavior.
2. To examine the relationship of artificial intelligence and knowledge sharing.
3. To analyze the relationship of knowledge sharing and innovative behavior.
4. To determine the role of knowledge sharing in relationship of artificial intelligence and Innovative behavior.
5. To analyze the moderated mediation of digital leadership in relationship of artificial intelligence and innovative behavior via knowledge sharing.

Given that, purpose of the present study is to establish and examine the complicated connection of AI and innovative behavior. The study is further enriched by examining role of knowledge sharing and digital leadership in the relationship of AI and innovative behavior in the banking sector of Pakistan.

The present study will address numerous gaps. Although, the previous studies have explored the relationship of Artificial intelligence and innovative behavior (Li et al., 2022; Olan et al., 2022; Verma & Singh, 2022). The study will also explore that how contextual factors such as knowledge sharing intervene between the relationship of AI and innovative behavior and how the digital leadership interact this relationship (Oztirak, 2023; Shaikh, Afshan, Anwar, Abbas, & Chana, 2023). Therefore, a holistic dynamic of the relationship will be examined in Pakistani organizational settings.

Previous studies are conducted in health sector and manufacturing industry, however there is a need to incorporate such research in service organizations like banks, especially Pakistani banking organizations (Rong, Mendez, Assi, Zhao, & Sawan, 2020; Shaikh et al., 2023a). While existing literature acknowledges the influence of artificial intelligence (AI) on innovation, a notable gap persists in understanding the mediating and moderating factors that shape this relationship within organizational contexts. Limited research has been observed to explore the unique interaction between AI adoption, knowledge sharing, digital leadership, and their collective influence on innovative behavior.

The organizations in developed countries and the under developed countries likewise such as Pakistan are increasingly adopting AI technologies to increase productivity, operational efficiency, and competitive advantage (Badghish & Soomro, 2024; Neumann, Guirguis, & Steiner, 2024). For strategic decision making, organizations in Pakistani environment are grappling to incorporate AI into traditional structures. The present study pursues to address these research gaps by unfolding the intricate association between AI, innovative behavior, knowledge sharing, and digital leadership in Pakistani organizational settings. Given that the research will give an understanding to organizational leaders, policy makers, HR executives and practitioners to face the challenges and grab the opportunities using AI technologies. The study will contribute to the current digital era by enhancing the organizational theories and practices.

The study is based on the existing theoretical framework that is technology organization environment framework (TOE) given by Tornatzky, Fleischer, and Chakrabarti (1990). The framework has three dimensions; technology, organization, and environment perspective of business, which determine the success, factors of adopting the various technological innovations in organizations (Abed, 2020; Neumann et al., 2024). The technology aspect of the framework implies the internal and external technology infrastructure available for the organization. The organizational facet of the TOE framework indicates the management support and existing relationships and mechanism that are related to the technology adoption in the organizations (Al-Khatib, 2023). Based on TOE the study aims to provide empirical evidence of relationship of AI, knowledge sharing, digital leadership, and innovation. By examining the interaction of these constructs, this research will enrich theoretical understanding of how organizations move with the growing technological landscape (Stjepic et al., 2021).

Practically, the study will guide organizational leaders and decision makers. The study will provide a vision to work more innovatively, by fostering knowledge sharing culture and enhancing digital leadership capabilities which will eventually increase the benefits of AI for persistent innovation. Hence, the research will provide a compact model that will contribute to both theoretically and practically to the developing landscape of AI usage in organizations.

Literature Review and Hypothesis

AI and Innovation

AI has the capability to bring transformation in the organizational settings as the technology acts as a catalyst for innovation in the organization. Transformation, induced by AI is very significant for the organizational development in this rapidly changing technological landscape. The study elaborates the understanding of the process that brings innovation with AI usage (Haefner, Wincent, Parida, & Gassmann,

2021; Tang & Zainal, 2024). Bessen (2018) and other researchers Haefner et al. (2021) mentioned that AI technologies can promote innovative behavior significantly within various organizational settings. Based on the literature the current study suggests the hypothesis as follows.

H1: Artificial intelligence is positively related to innovative behavior.

Artificial Intelligence, Innovative Work Behavior and Knowledge Sharing

Association between technologies and knowledge sharing has remained the focus of various researches (Dong & Yang, 2015; Olan et al., 2022). Previous study found that, to reach innovative solutions, organizations depend on the collaboration of technologies and knowledge sharing (Dong & Yang, 2015). TOE framework suggests that AI technology when interacts with knowledge sharing it influences the innovative behavior of the employees and engage them to find innovative problem solving and decision making (Russell & Norvig, 2016; Turner & Kuczynski, 2019).

According to Spender (1996) knowledge is very crucial for the innovation process and for employees to exhibit innovative behavior. Given that, employees must acquire, interact and spread knowledge for innovative behavior (Thornhill, 2006). However, literature also suggests that knowledge sharing is considered an essential tool for promoting innovative behavior in employees, it facilitates innovative activities and stimulate critical thinking, that results in increasing capabilities to generate innovative ideas (Deng, Duan, & Wibowo, 2023; Sitlington, 2012). Hence, with knowledge sharing employees feel involvement in innovative work behavior that seeks new opportunity for change and its application at the work place. Built on the above arguments, the present study posits that knowledge sharing has a quantifiable impact on innovative work behavior, as formulated in the hypothesis:

H2: There is a positive relationship between artificial intelligence and knowledge sharing.

H3: There is a significant positive relationship between knowledge sharing and innovative behavior.

H4: Knowledge sharing mediates the relationship of artificial intelligence and innovative behavior.

Digital Leadership as a Moderator

Digital leadership is defined and examined by (Avolio & Kahai, 2003) and mentioned that how it effects subordinates and influence teams and organizations. However, another study mentioned a different view that for success digital leaders need to learn new skills and abilities (Dasgupta, 2011; Deng et al., 2023). As the number of research articles is increasing, researchers keep on highlighting the digital leadership. However, the literature on this construct is diffused and a consolidated review on digital

leadership is currently missing. There is a scarce literature and a review of digital leadership on sustainable performance also lacks (Hadi, Setiawati, Kirana, Lada, & Rahmawati, 2024; Senadjki, Au Yong, Ganapathy, & Ogbeibu, 2024).

When a leader has digital attitude, they emphasize on their most valuable asset i.e., their employees' digital behaviors. Leaders who have the ability adopt the digitalization are considered to be more concern about innovative work behavior (Erhan, Uzunbacak, & Aydin, 2022). In view of the above literature, authors of the proposed study posit that digital leadership can strengthen relationship between artificial intelligence and innovative work behavior among employees.

H5: Digital leadership moderates the strength of mediated relationship between artificial intelligence and innovative behavior via knowledge sharing among employees.

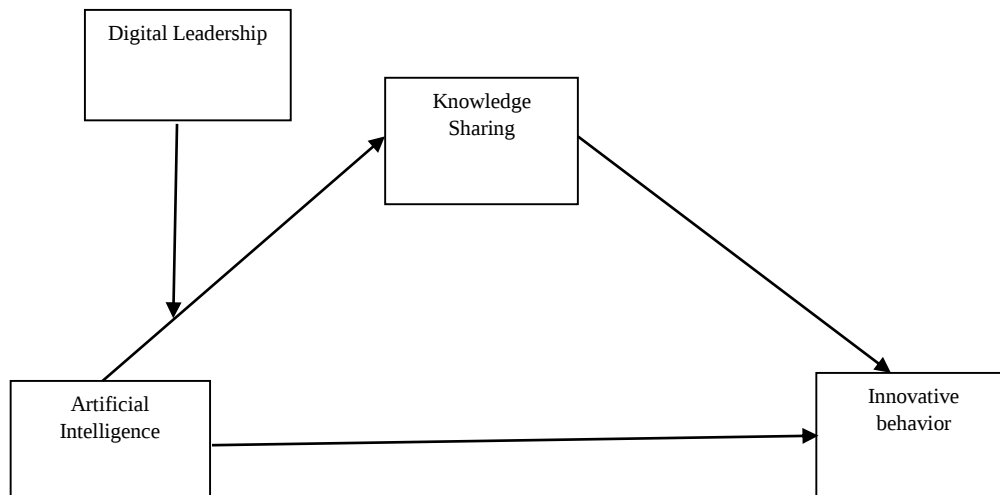


Figure 1. *Conceptual Framework*

Methodology

Research Design

To build up the theoretical model the current study followed a deductive approach. Quantitative data are collected to explain the relationship between the variables. The researcher concluded with the help of statistical analysis whether to accept or reject the hypotheses.

Sample

Target organizations represent the banking sector of Pakistan. Convenient random sampling technique was employed for data collection to ensure representative

sample. In the current study the data were collected through self-administered forms from various public and private sector banks located in twin cities of Pakistan including different cadres i.e., senior vice president, vice presidents, IT managers, and assistant vice presidents so that the data is representative and has enhanced generalizability to the banking sector. Informed consent of the participants was obtained and ensured anonymity and confidentiality of the data and the participants were given the right to withdraw. 600 questionnaires were distributed among bank sector employees and 508 questionnaires were used for main study analysis after data cleansing and omitting missing forms. The response rate was 84.65. G*Power software was used to determine the sufficiency of the sample size of 508. With a medium effect size (Cohen's $f^2 = 0.15$, $p = 0.05$) and statistical power = 0.99, 350-400 responses were required. Hence, the current study's responses exceed the minimum threshold for sample size, and hence it depicts sufficient power to conduct data analyses for hypotheses testing. Table 1 shows the participants' demographic profiles.

Measures

Artificial Intelligence

In this study an 8-item scale Artificial Intelligence Scale measured the artificial intelligence (Karaca, Caliskan, & Demir, 2021). Items are rated on five-point Likert scale (1=strongly disagree to 5= strongly agree). The reliability for this scale was 0.77. The current study reported composite reliability of Artificial Intelligence Scale reliability at 0.83.

Innovative Work Behavior

To measure innovative work behavior the scale is used, developed by De Jong and Den Hartog (2010). The scale consists of four dimensions, a. idea generation (IG), b. idea exploration (IE), c. idea championing (IC) and d. idea implementation (II). The 10 items scale was rated on 5-point Likert scale (1= never, 5= always). There are no reverse coded items. Cronbach's alpha coefficient has been calculated as 0.90, 0.88, 0.95, 0.82, respectively in the validation study. In the current study the composite reliability is 0.85

Digital Leadership

Digital leadership is was measured through "Digital Leadership Scale" developed by (Cavus, Aghamiri, & Sancar, 2025). The scale has six items rated through 7- Points Likert scale (1=strongly disagree to 7= strongly agree). Cronbach's alpha has been calculated as 0.92 in the validation study whereas in the current study the composite reliability is 0.89.

Knowledge Sharing

Knowledge sharing was measured with the help of seven items, taken from the scale proposed by Kianto, Vanhala, and Heilmann (2016), the items are measures through 5-Points Likert scale. There is no reverse coding in the scale.

Table 1
Demographics (N=508)

Demographic Variables		Frequency	Percentage
Gender	Female	183	36
	Male	325	64
	Total	508	100.0
Age	25–30 years	86	16.9
	31–35 years	122	24.0
	36–40 years	114	22.4
	41–50 years	99	19.5
	Over 50 years	87	17.1
	Total	508	100.0
Experience in Current Organization	2–5 years	82	16.1
	6–10 years	146	28.7
	11–15 years	175	34.4
	More than 15 years	105	20.7
	Total	508	100.0
Position in the Organizations	Senior Vice President	78	15.4
	Vice President	144	28.3
	IT Managers	118	23.2
	Assistant Vice Presidents	168	33.1
	Total	508	100.0

Measurement Model

In this study, the measurement model is evaluated through the construct validity and reliability. Convergent validity and discriminant validity are used to measure construct validity. Whereas Cronbach's alpha, composite reliability and factor loadings were used to evaluate reliability of the measurement model. The composite reliability for all items was above 0.7. Convergent validity is established, because

average variance extracted (AVE) was above the threshold value of 0.5 (Fornell & Larcker, 1981). Validity tests confirmed that all the values are within the acceptable range (Hair, Sarstedt, Ringle, & Mena, 2012). The measurement model has high psychometric properties of the variables that suggested the construct in the study are divergent, Table 2.

Table 2
Reliability Indices of the Study Measures (N=508)

Construct	Cronbach's alpha	rho_a	CR	AVE
Artificial Intelligence	0.75	0.76	0.83	0.50
Digital Leadership	0.85	0.86	0.89	0.62
Innovative Behavior	0.78	0.85	0.85	0.59
Knowledge Sharing	0.77	0.78	0.84	0.52

Table 3 suggests that, VIFs that is variance inflation factor values were within the limit, below 3.0, threshold level (Kock, 2015). The VIFs values depicts that there is no collinearity issue. Table 3 also shows the factor loadings of the indicators which is above 0.5, items of the constructs having values below 0.5 are deleted such as AI2, AI6, AI7, DL6, KS6, KS7, In.B1, In.B2, In.B3, In.B4, In.B7, In.B8 (Fornell & Larcker, 1981; Hair et al., 2012).

Table 3
Factor loading and Collinearity of the Study Measures (N=508)

Construct	Indicators	Factor Loadings	VIF
Artificial Intelligence	AI1	0.69	1.42
	AI3	0.75	1.45
	AI4	0.78	1.52
	AI5	0.66	1.37
	AI8	0.65	1.25
Digital Leadership	DL1	0.77	1.90
	DL2	0.83	2.16
	DL3	0.83	2.01
	DL4	0.77	1.83
	DL5	0.75	1.76
Innovative Behavior	In.B10	0.88	2.23
	In.B5	0.64	1.57
	In.B6	0.66	1.53
	In.B9	0.87	2.14
Knowledge Sharing	KS1	0.75	1.47
	KS2	0.75	1.61
	KS3	0.75	1.60
	KS4	0.71	1.74
	KS5	0.64	1.61

Discriminant validity is established through the square root of AVE and correlation coefficients for the construct as the square root of AVE is greater than the correlation coefficient of each construct. Discriminant validated is also established through HTMT, where all values are less than 0.9 (Fornell & Larcker, 1981) as shown in Table 4. These values were generated through Smart PLS 4.0, and the Figure 2 is the software output of Smart PLS 4.0, depicting the measurement model. The above measures signify that model can be hypothesized.

Table 4
Discriminant Validity (N=508)

Fornell and Larcker Criterion					HTMT		
Construct	AI	DL	Inn.B	KS	AI	Inn.B	KS
AI	0.71						
DL	0.33	0.79			0.39		
Inn.B	0.30	0.54	0.77		0.36	0.59	
KS	0.35	0.28	0.26	0.72	0.45	0.32	0.10

Note: AI= artificial intelligence; DL= digital leadership; Inn B= innovative work behaviors; KS= knowledge sharing.

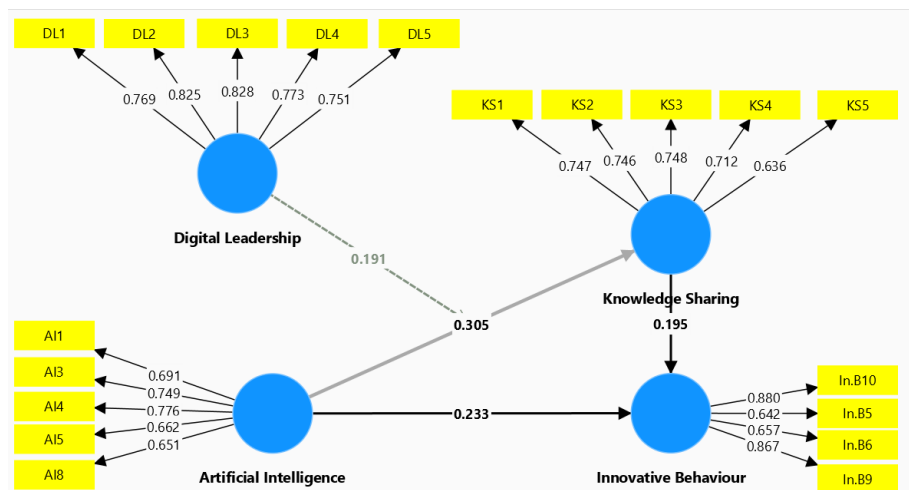


Figure 2. Path Analysis

Structural Model

To test objective no. 5 moderated-mediation is conducted in Smart PLS 4.1 by using the PROCESS option. For the first objective of study path analysis is run to establish the relationship of artificial intelligence and innovative behavior. Table 5 suggests that the (H:1 $\beta=0.215$, $t=4.147$ and $p=0.000$) this shows that independent variable artificial intelligence has a significant impact on dependent variable innovative behavior hence hypothesis one is accepted. The second objective of the study was to examine the relationship of artificial intelligence and knowledge sharing, the mediator, the results suggest a statistical significant effect of artificial intelligence on knowledge sharing (H:2 $\beta=0.309$, $t=6.266$ and $p=0.000$), hence the hypothesis 2 is also proved. Third objective of the study was to examine the relationship of knowledge sharing and innovative behavior it is evident from the results that knowledge sharing has a

significant impact on innovative behavior H:3 $\beta=0.165$, $t=3.352$ and $p=0.001$) Table 5.

Table 5
Direct Relationships between Study Variables (N=508)

	β	Mean	SD	t-stat	p values
Artificial Intelligence -> Innovative Behavior	0.22	0.22	0.05	4.17	0.00
Artificial Intelligence -> Knowledge Sharing	0.31	0.31	0.05	6.23	0.00
Digital Leadership -> Knowledge Sharing	0.21	0.21	0.05	4.28	0.00
Knowledge Sharing -> Innovative Behavior	0.166	0.16	0.05	3.35	0.00

Mediation Analysis

The fourth objective of the study was to examine the mediating role of knowledge sharing in relationship between artificial intelligence and innovative behavior. The result shows the specific indirect effect of artificial intelligence on innovative behavior through knowledge sharing is significant (H4: $\beta=0.051$, $t=3.162$ and $p=0.002$) is significant. Total effect of artificial intelligence on innovative behavior is also significant ($\beta=0.266$, $t=5.654$ and $p=0.000$). With the inclusion of mediator, knowledge sharing the effect of artificial intelligence on innovative behavior is also significant ($\beta=0.215$, $t=4.174$ and $p=0.000$). Knowledge sharing partially mediates relationship between artificial intelligence and innovative behavior as the total effect, direct effect and specific indirect effect all are statistically significant as shown by results in table 6. Hence hypothesis 4 is accepted.

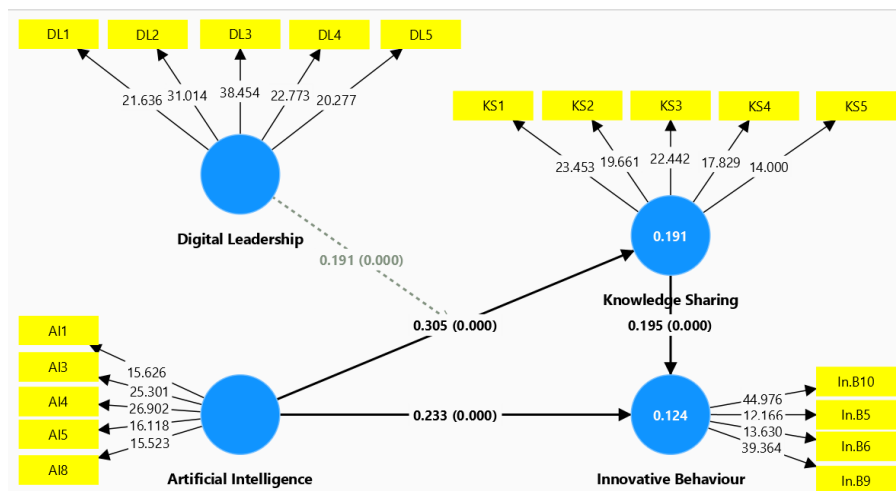


Figure 3. Path Analysis showing Mediation Analysis

Table 6
Mediation Analysis

	Total effect		Direct Effect			Indirect Effect			Bootstrap result for indirect effect	
	β	t-value	B	t-value	Hypothesis H4: AI>KS>Inn.B	β	t-value	p-value	LLCI	ULCI
AI -> Inn.B	0.22	4.17	0.27	5.65		0.05	3.16	0.00	0.02	0.08

Note: AI= artificial intelligence; Inn B= innovative work behaviors; KS= knowledge sharing.

Moderated Mediation

The fifth objective of the study was to examine the role of digital leadership. The results highlight that there is a moderation exists when digital leadership is introduced in the model. It determines the level to which the mediation of knowledge sharing between artificial intelligence and innovative behavior depends on the moderating role of digital leadership.

In the hypothetical model of this study to establish the moderating effect the index of moderation is significant it means that there exists moderated mediation in the model and digital leadership moderates the relationship of artificial intelligence and innovative behavior in presence of knowledge sharing as the mediator (H5: $\beta=0.030$, $t=2.511$ and $p=0.012$). Whereas there is no zero between the lower-level confidence interval and upper level confidence interval (LLCI= 0.011, ULCI=0.58) table 7. However, in order to achieve the conditional mediation or moderated mediation conditional indirect effect of artificial intelligence on innovative behavior through knowledge sharing should be different at different levels of digital leadership. Hernandez, Guarana, and Halgin (2016) recommended three conditions to establish moderated mediation. First condition states that indirect effect between predictor and outcome variable should be significant in presence of mediator. Secondly, a statistically significant relationship should exist between mediator and moderator to predict the criterion variable that have been established see table 5. Lastly, conditional indirect effect of independent variable on the criterion variable should have different at moderator's different levels that is high and low. The findings show that the indirect impact of artificial intelligence on creative behavior through knowledge sharing is greater at higher levels of digital leadership (path=0.081, $t=3.191$, $p=0.001$) than it is at lower levels (path=0.031, $t=2.06$, $p=0.002$). This indicates that as digital leadership increases, artificial intelligence's indirect influence on creative behavior through information sharing increases as well; for this reason, the moderated mediation model is endorsed. The concept is further supported by slope analysis, as seen in figure 4. When a continuous moderator is employed in the model, Johnson-Neyman's plot is utilized to identify moderation at various moderator levels (Preacher, Rucker, & Hayes, 2007). Figure 4 is supporting hypothesis 5 showing exacerbating effect of digital leadership and knowledge sharing. At +1 SD i.e., high level of digital leadership the

slope is steepest showing that as there is increase in digital leadership the effect of artificial intelligence on knowledge sharing is increased the most.

Table 7
Moderated Mediation (N=508)

	β	T statistics	P values	LLCI	ULCI
Digital Leadership x Artificial Intelligence -> Knowledge Sharing -> Innovative Behavior	0.03	2.51	0.01	0.01	0.06
Digital Leadership at Low level of -1 SD	0.03	2.06	0.00	0.02	0.06
Digital Leadership at Mean	0.05	3.16	0.00	0.02	0.09
Digital Leadership at Higher level of +1 SD	0.08	3.19	0.00	0.04	0.14

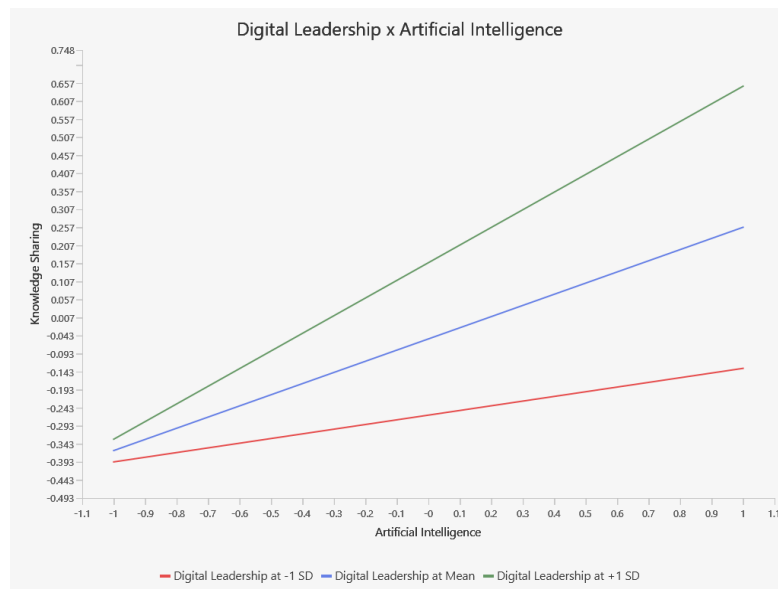


Figure 4. *Mod Graph showing the exacerbating effect of Digital Leadership in relationship between Artificial Intelligence and Knowledge Sharing*

Discussion

Based on theoretical foundations of TOE theory, Tornatzky et al. (1990) the purpose of the current study was to investigate how artificial intelligence affects innovative work behaviors. Additionally, the study examined the knowledge-sharing mediating mechanism between artificial intelligence and innovative work behavior and moderation of digital leadership in relationship between artificial intelligence and knowledge sharing. The current study was based on TOE, which posits that when a new technology is adopted, it is influenced by different factors, such as technology itself, organizational context in which the technology is used and external environment where the organization operates (Tornatzky et al., 1990).

The outcomes of the research revealed that there is a statistically significant impact of use of artificial intelligence (AI) on employee innovative work behavior (hypothesis: 1) it means that more an organization embraces in AI related activities the more innovative work behavior, its employees will exhibit (Tang & Zainal, 2024). These findings are in line with the previous studies (Shaikh, Afshan, Anwar, Abbas, & Chana, 2023; Stjepic et al., 2021; Tang & Zainal, 2024). Many scholars suggested to investigate the direct relationship of AI and Innovative work behavior (Jain et al., 2021; Nazareno & Schiff, 2021; Vahdat, 2022). Further, according to TOE framework suggests that , use of internal and external technology infra-structure can directly enhance organizational competitiveness and employee innovativeness at work place (Stjepic et al., 2021). It means that when technology, like AI is used in organizations it directly improves the innovative work behavior of the employees. This highlights the importance of AI technology in human resource management (Sithambaram & Tajudeen, 2023).

The results also validated the hypothesis 2 that artificial intelligence is significantly related to knowledge sharing. This indicates that AI is important to share knowledge at the workplace. The results further reveal that, AI helps to share new knowledge, skills and abilities which in turn leads employee to demonstrate innovative work behavior especially in the banking sector. The results further highlight the significant and direct impact of knowledge sharing on innovative behavior and knowledge sharing is proved as a significant mediator in relationship between artificial intelligence and innovative behavior (hypothesis 3 and 4). It means that, in organizations especially in the banking sector knowledge sharing plays a vital role in this age of algorithm and is significant to transform the behavior of the employees at the workplace, especially in terms of innovative work behavior. The results are in line with the findings of previous studies (Olan et al., 2022; Olan, Suklan, Arakpogun, & Robson, 2021; Robbins, 2020). These studies suggest that AI work environment helps employees sharing their knowledge and improve innovative work behavior. It has already been established in previous research that knowledge is a strong predictor of innovative behavior (Chughtai & Khan, 2024; Islam, Zahra, Rehman, & Jamil, 2024; Olan et al., 2022; Robbins, 2020).

One of the objectives of the study was to analyze the moderated effect of digital leadership. Findings of this study highlighted that digital leadership has a robust conditional direct effect on the relationship of artificial intelligence and innovative behavior in presence of knowledge sharing as the mediator (Hypothesis 5). Pakistani organizations, especially banking organizations have well-developed infrastructure and use modern technology to run daily operations. The results suggest that higher level of digital leadership in collaboration with artificial intelligence enhances the knowledge sharing in the employees. Findings of the holistic model of moderated mediation indicated that digital leadership moderates the indirect effect of artificial intelligence on innovative work behavior through knowledge sharing. The results are in line with

the previous research (Avolio, Bass, & Jung, 1999; Sagbas & Erdogan, 2022; Salam, 2023; Tigre, Curado, & Henriques, 2023).

Practical Implications

The research suggests implications for practitioners and organizational leaders in the banking industry. HR management should consider different dimensions of employee innovative behavior like AI implementation knowledge sharing and digital leadership practices. Knowledge sharing environment in the organization can help employees of the organization to create more knowledge and enhance skills, abilities and innovative skills. Moreover, this process may be accelerated when digital leadership acts as a catalyst for improving innovative work behavior through artificial intelligence and knowledge sharing. This increased innovative behavior is a source of competitive edge for the organization which can enhance organizational productivity. Pakistan is a developing country and striving for development in various fields. This model can be introduced in the organizations for long term benefits, individual employee's innovative work behavior and organizational development. Organizational leaders can emphasize the need for strategic investments in fostering knowledge-sharing cultures and developing digital leadership competencies to maximize the benefits of AI.

Theoretical Contributions

The present study gives important theoretical insight for understanding the robust relationship of artificial intelligence and innovative work behavior in the banking sector. The study added a valuable literature to the existing body of knowledge. The results of the study indicate that use of technology (AI) enables the employees for knowledge sharing and enhances the innovative behavior. The findings also found Digital leadership as potential moderator, that means when digital leadership behavior is at higher level employees more confidently use AI, they independently share knowledge and are more innovative at the workplace. Based on TOE framework, the study model reveals that how technology effects the organizational aspects through the environment (internal or external). The study provides the empirical evidence of interplay play between Technology (AI), organizational aspects (Innovative work behavior) and environment (Knowledge sharing and digital leadership) and thus validates the theory.

Limitation and Directions

Despite the significant theoretical and practical contributions, the study has some limitations. First the data is collected from the major banks of Pakistan, which meets the objective of the study but generalizability remains limited in single source data. Future researchers should collect the data from other organization such as telecom industry, education industry to generalize the results. Secondly, the current study conducted the analysis as a holistic approach rather than comparing the results of public

and private sector. Future researchers may collect data from public and private organizations and compare the results for thorough understanding of the model. Thirdly, Future researchers may test the relationship with different moderators and mediators. The current study focuses the positive aspects of AI, future research may also be conducted to explore the negative aspects of use of AI in the organization.

Conclusions

The study demonstrates the moderated mediation model. The study attempts to establish the influence of artificial intelligence on employee innovative work behavior in the banking sector. Further, the study validates the mediation of knowledge sharing and moderating role of digital leadership on the relationship of artificial intelligence and innovative work behavior. The findings underscore the significance of integrating the technology-organization-environment framework in the development and implementation of AI at the workplace. Overall, this study is a valuable addition in the existing literature on the benefits and challenges of use of AI in the banking industry. Further, the study sheds light on the prospective for persistent research and application of Technology-Organization-Environment theory.

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