



Research article

Influence of transformational leadership on innovative work behavior and task performance of individuals: The mediating role of knowledge sharing

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ABSTRACT

This research tries to investigate the dynamic link between higher education institution (HEIs) transformational leaders (TFL) and follower's outcome innovative work behavior (IWB) and Task Performance) through Knowledge sharing (KNS) in Pakistan. Using quantitative design an adopted construct was used to obtain response from HEIs leaders and employees behavior. The obtained information was analyzed through structural equation modeling (SEM) technique via Smart PLS. Results depict that direct link between University Transformational leadership and employees Innovative work behavior as well as Task Performance. The results further postulate that KNS mediate the relationship between Transformational leadership and employees TSP in the context of HEIs. Surprisingly, KNS could not evident to become a mediating variable to strengthen the relationship between transformational Leadership and employees IWB in the HEIs sector of Pakistan. In addition to enhancing the theoretical comprehension of higher education leadership, the outcomes of this article provide that promoting knowledge sharing culture is valuable asset for both existing and future HEIs leaders in order to promote the culture of innovation and creativity. Although recent studies investigate the role of KNS as a mediator, however the current study use KNS as contemporaneous intervening variable for IWB and Task Performance for the first time. The study also confirms theoretical underpinning of social exchange mechanism in strengthening the relationship between leader member's continuum.

1. Introduction

In the contemporary landscape, democratic leadership has gained prominence as a compelling substitute for the conventional authoritarian method, acknowledging the central importance of employees as key assets within organizations [1]. In contemporary leadership paradigms, there is a deliberate effort to devolve roles, authority, and responsibilities to team members, with a commitment to involving employees in decision-making activities [2]. The novelty and innovative spirit demonstrated by workers have become

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integral aspects in defining an organization's competitive edge [3].

Employee involvement in organizational culture is a catalyst for creativity and eventually increases an organization's effectiveness, as highlighted by numerous studies such as [4,5], and [6]. Transformative leadership, or TFL, has drawn a lot of attention lately [7] and is acknowledged as a major force behind innovation, particularly in the field of education [8,9]. Empirical evidence consistently demonstrates a causal relationship between TFL and innovative work behavior (IWB) [10,11]. TFL inspires people to go above the call of duty and use creative approaches to solve challenging problems.

TFL practitioners encourage trust and drive beyond job duties, pushing staff members to reach higher goals [12]. As [13] demonstrates, this leadership style fosters a sense of respect and belonging among staff members.

The ability of an organization's personnel to demonstrate IWB is a crucial component in determining its competitive edge, as highlighted by Refs. [14,15]. IWB, according to Ref. [16], is the process by which workers at all organizational levels develop, market, and put into practice worthwhile innovations. It is essential for dealing with developing issues brought on by global competition, increasing customer demands, and altering market dynamics [10].

One of the best ways to promote innovation is to make use of workers' creative abilities to guarantee long-term success [9]. In order to improve work processes, goods, and services and support organizational performance, innovative work behavior (IWB) are developed, shared, and put into practice [17]. Consequently, it is critical for employers to recognize and support elements that improve IWB across their workforce. In light of the intricate nature of contemporary difficulties, it is imperative for workers to engage in collaborative efforts and leverage their collective experience to uncover novel solutions [18].

Despite this expectation, the connection between TFL and followers' IWB has yielded conflicting findings in previous research [19, 20], with meta-analytic results indicating a wide range of associations. Researchers like [21,22], have considered different mediators and moderators that focus on the notion that transformational leaders could encourage IWB to design the atmosphere of work culture that also promotes Knowledge Sharing (KNS). According to Ref. [23] KNS can be expressed by way of "the provision of task-related information and knowledge to benefit others" and is validated as a mediating mechanism in order to align leaders-members relationship. In accord with the study of [24], KNS acts as a mediator between TFL, employees' stress, and IWB among higher education sector. Many other researchers [11,25–29] try to align the relationship between TFL and KNS as well as TFL and Task Performance (TSP) and IWB individually in different work sectors. Similarly, the mediational role of KNS was investigate in different work contexts. For instance the study of [30] depicts that KNS mediate the relationship between transformational leadership and innovation among manufacturing sector. Similar result are validated by the findings of [31] that support the notion of mediational importance of knowledge sharing among supply chain firms. Recent research work of [32] also support the notion that KNS attributes mediates the relationship between transformational leadership and frugal functionality. One of the most influential recent study [33] indicate the importance of mediational role of KNS to connect the relationship between Transformational leadership and product as well process innovation through organization support.

However, there is a gap in the existing research literature that addresses the validation of the mediation mechanism of KNS in connecting the relationships between TFL and employee IWB, as well as TFL and TSP, especially within the context of higher education institutions, all within a single research model. Most of the previous studies although validate the mediational role of KNS with transformational leadership and various outcomes i.e. innovation, frugal functionality, and IWB [11,25–30,33], however there is no evidence that connect the dynamic link between transformational leadership and employees IWB and TSP through KNS as a mediational tool. Most importantly transformational leadership foster the culture of higher task performance through individual stimulation and provide opportunities to the follower to me with innovative work process. At the same time, the knowledge sharing process between leader and follower also promote the culture of win-win situation from both ends. Therefore, this study aims to offer a comprehensive understanding of the intricate connection between leadership and employee behavioral patterns within the framework of KNS in higher education institutions. The insights gained will contribute significantly to our pursuit of fostering a healthier educational environment. As currently global trends indicate that HEIs focusing on knowledge sharing attributes enhance employees as well as student's creativity, as a result the new vistas of opportunity with developed countries through joint research group enhance the capabilities of developing countries HEI segment.

2. Literature review

2.1. Social Exchange Theory

Social Exchange Theory (SET), a sociological framework, seeks to illuminate human behavior in the context of interpersonal interactions, focusing on the benefits and drawbacks inherent in these relationships [34]. At its core, SET suggests that rational decision-making hinges on an individual's assessment of the advantages and disadvantages associated with engaging in these interactions [35]. People are more inclined to sustain relationships when they believe that the benefits outweigh the costs [36].

One of the foundational works in the realm of SET is George Homans' article, "Social Behavior as Exchange," published in the American Journal of Sociology in 1958 [37]. In this groundbreaking study, Homans put out the theory that social conduct may be viewed as an exchange in which people interact in a give-and-take fashion, giving and getting rewards. In addition, he presented the idea of "outcome," which denotes the whole effect of a transaction that ultimately decides whether it is beneficial or detrimental for a person to continue a specific connection.

Peter Blau, whose 1964 book "Exchange and Power in Social Life" was released, made another essential contribution to SET. Blau added to Homans' groundwork by introducing the idea of "social power," which broadened the theory. He made the case that people with more social influence are better able to manage the resources in their connections. Blau's thesis states that people with more social

power can gain more from their connections, which strengthens their overall authority and influence [38].

A useful framework for comprehending the dynamics of interpersonal connections and decision-making processes is provided by the Social Exchange Theory [39]. It establishes the groundwork for investigating the ways in which human conduct inside organizations—especially those of higher education institutions—is influenced by the concepts of costs, rewards, and social power. This study intends to contribute to a deeper understanding of how TFL and KNS combine to produce a healthy atmosphere within such institutions by exploring the implications of SET in this particular scenario.

2.2. Transformational leadership and innovative work behavior

The complex relationship between TFL and IWB has been the subject of recent investigations, which have shown the moderating and mediating mechanisms at work. For example [40], looked at psychological capital's impact as a moderating variable and discovered that higher psychological capital levels among employees were associated with a bigger TFL impact on IWB. This shows that psychological capital enhances the beneficial effects of TFL on IWB by acting as a useful resource in social exchanges with employers. The mediating function of intrinsic motivation in the TFL-IWB link was examined in another study [41]. The study's findings demonstrated the significant moderating influence that intrinsic motivation had, suggesting that TFLs encourage employees to participate in IWB by meeting their basic needs. These results are consistent with the tenets of Social Exchange Theory (SET), which holds that people connect with others when they believe the advantages exceed the disadvantages [42]. According to SET, employees are more likely to show IWB and react favorably to TFL in the workplace when they feel their employer recognizes and appreciates their efforts.

Numerous studies have examined the complex relationships among TFL, IWB, and SET [15,24,28], and [43]. Furthermore [44], investigated how perceived organizational support (POS) mediated the relationship between IWB and TFL. While many aspects of the inventiveness of the employees were determined to be unimportant, POS stood out as a crucial component. These results imply that transformational leaders can support IWB by fostering a cooperative work environment that values and honors contribution from staff members.

Notably [45], investigated the mediating roles of perceived support for innovation and innovation readiness in the relationship between TFL and IWB. They found that creativity and self-efficacy served as significant mediators, with a stronger association observed among employees engaged in more social interactions.

In summary, these studies collectively point to the interrelated nature of TFL, IWB, and SET. Transformational leaders who create a supportive work environment, value employee contributions, and reward innovation are more likely to inspire and encourage employees to engage in IWB. Moreover, the mediating role of KNS in the relationship between TFL and IWB has been highlighted in the higher education sector (Rafique et al., 2022b). Employees tend to participate more actively in IWB when they perceive that their contributions are acknowledged and valued, thus reinforcing the positive impact of TFL.

Based on this literature, we propose the following hypothesis:

H1. Transformational Leadership is positively related to IWB.

2.3. Transformational leadership and task performance

Empirical evidence from studies [46,47] consistently demonstrates that TFL is positively associated with various outcomes, including enhanced employee task completion, increased organizational engagement, and higher levels of employee job satisfaction. These findings align with the core principles of Social Exchange Theory (SET), which posits that individuals enter into relationships with the expectation of receiving reciprocal rewards.

Within the context of leadership, SET principles suggest that leaders who exhibit transformative behaviors, such as giving individualized attention and stimulating cognitive abilities, are likely to establish high-quality social exchanges with their teams [48]. These positive social interactions can lead to improved TSP among subordinates [49]. Research has consistently supported the notion that TFL positively influences TSP, with SET principles serving as a mediating factor in this relationship [50].

Moreover [51], provided evidence that TFL has a positive impact on organizational commitment and employee job satisfaction. Similarly [52], demonstrated that TFL is associated with increased levels of Leader-Member Exchange (LMX), which, in turn, positively affects both TSP and job satisfaction.

Furthermore [5], found that transformative leadership plays a central role in enhancing emotional organizational engagement and task completion among employees through the intermediary of employee engagement. In another study by Ref. [53], TFL was positively linked to job satisfaction and showed a favorable correlation with TSP.

According to the existing literature, SET principles serve as a foundational framework connecting TFL and TSP. Leaders who understand and apply these principles can create a productive workplace characterized by high-quality relationships, heightened employee enthusiasm, and improved productivity.

Based on this literature, we propose the following hypothesis:

H2. Transformational Leadership is positively related to TSP.

2.4. Mediating role of knowledge sharing between transformational leadership and innovative work behavior

Several research studies have consistently supported the mediating role of KNS in the relationship between TFL and IWB. For

instance Ref. [9], conducted research in the context of Iraqi public universities and discovered a significant link between TFL and KNS, with KNS acting as a partial mediator in the connection between TFL and IWB. They also found that the effectiveness of Leader-Member Exchange (LMX) mediated the association between TFL and KNS.

Similarly [18], discovered that KNS partially moderated the association between Organizational Justice (OJ) and IWB in a study involving 345 workers in a Chinese telecom business. Their research showed a stronger relationship between OJ and KNS when workers showed higher degrees of affective commitment.

Result from the study of indicate that KNS mediate the relationship between TFL and IWB among Indonesian workforce. Similar results were validated by the study of while depicting the relationship between TFL and IWB through 3 different mediational variables [54].

KNS was found to perform an intervening role in the relationship between TFL and innovation capability, specifically influencing both product and process innovation, in another study by Ref. [33] that included 394 participants from 88 Chinese businesses.

These results support the SET tenets and imply that KNS mediates the relationship between TFL and IWB. By encouraging improved social interactions and KNS among employees, TFL can help workers with their IWB at work.

Drawing from this body of literature, we propose the following hypothesis:

H3. Knowledge Sharing mediates the relationship between TFL and IWB.

2.5. Mediating role of knowledge sharing between transformational leadership and task performance

Numerous studies have explored the relationship between TFL, KNS, and TSP, consistently suggesting that KNS plays a mediating role in this dynamic. For example [55], found that KNS partially influenced the interaction between TFL and TSP, with higher job satisfaction associated with a stronger connection between TFL and KNS. Similarly, a study [24], done at Higher Education institutions in Pakistan unveiled a significant correlation between TFL and KNS and IWB. Moreover, the study found that KNS had a moderating role in the association between Pandemic Job Stress (PJS) and IWB, as well as partially mediated the link between TL and IWB.

Furthermore [9], demonstrated that KNS served as a strong mediator between TFL and innovation in the context of higher education institutions in Iraq. In another study conducted in an Indonesian work context [56], proactive KNS was found to mediate the relationship between TFL and TSP. Collectively, these findings suggest that TFL can enhance TSP within organizations by fostering robust social interactions and promoting KNS among subordinates. By applying the principles of SET and cultivating a positive work environment, leaders can further enhance employee KNS, ultimately leading to improved TSP.

Based on this body of literature, we propose the following hypothesis:

H4. Knowledge Sharing mediates the relationship between TFL and TSP.

3. Theoretical framework

As references [38,57], and [58] demonstrate, the present study emphasizes the importance of the SET (Social Exchange Theory) method in explaining the dynamic interaction between leaders and employees in organizational situations. SET is a theoretical framework that clarifies how people participate in reciprocal and mutually beneficial social interactions. Fundamentally, SET asserts that workers view advantages based on the inputs they provide while performing their jobs.

The SET approach’s focus on the reciprocal nature of social exchanges in the workplace makes a natural connection between it and the dynamic interaction between leaders and employees. Leaders are essential in starting and maintaining these conversations because they give their staff members tools, encouragement, and development opportunities.

Moreover, the SET approach underscores the importance of trust, fairness, and mutual respect in shaping the quality of social exchanges between leaders and employees. Leaders who cultivate positive interpersonal relationships through knowledge sharing and demonstrate genuine concern for their employees’ well-being are more likely to elicit favorable responses and outcomes from their workforce IWB and affective TSP (see Fig. 1).

The present study provides vital insights into how leaders may effectively manage and utilize the dynamics of social exchange to improve employee task performance and IWB by embracing the fundamental principles of SET. It emphasizes how interactions

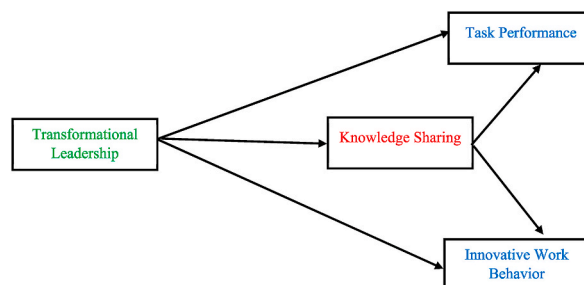


Fig. 1. Theoretical framework.

between managers and employees are mutually beneficial and how important it is to foster a supportive environment at work that is characterized by justice, trust, and reciprocity. All things considered, the SET approach provides a solid framework for understanding and optimizing interactions between supervisors and employees in work settings.

4. Method

Following the principles of pragmatism and drawing on previous studies with similar topics, this research utilized a straightforward convenience sampling approach, which is a non-probability sampling technique that selects samples from readily available study groups. Specifically, questionnaires served as the instrument for data collection in this study, distributed to Higher Education Institutions (HEIs) in KP. MBA students, who was enrolled in master's program at the university where one of the authors worked, facilitated the distribution process. A cover letter accompanied the questionnaires to inform respondents that the study had received management approval, and strict confidentiality was guaranteed. It was also explained that results were going to be limited to academic study to enhance comprehension of leadership dynamics in the workplace. Participants in the study were not compensated in any way, and the questionnaires were given out while they were at work.

The study employed an item-to-response theory, where each item in the questionnaire had a criterion of ten responses (21×10), resulting in a sample size of 210 participants [59]. The participants were approached through referral basis. Employee data was collected to mitigate the Common Method Bias (CMB) problem, their immediate managers in two successive assessments [60]. During the initial wave, 210 employees were contacted to gather information about their top management transformational leadership, and KNS. Out of the contacted employees, 190 responded, yielding 90.47 % response rate. During the follow up wave, the immediate boss of the same 190 employees were contacted to provide feedback on employees' TSP and IWB. Among the top management contacted, resulting in a response rate of 88.13 %. However, only 185 responses were considered for the final analysis. To ensure confidentiality, each response in the first wave was assigned a unique three-digit code, which were corresponded with the responses gathered from their respective managers [61]. The study found that 91 % of the respondents were male, reflecting the male-dominated workforce in Khyber Pakhtunkhwa. The current study obtained information through an adopted construct; hence, approval from the Ethical Committee (for ULM research) of DBM ULM was obtained via Reference No. (DBM-ULM-1014, 2021). Additionally, appropriate consent was obtained before receiving responses from the target sample.

5. Measures

5.1. Transformational leadership (TFL)

The Multi-Factor Leadership Questionnaire (MLQ), originally created by Ref. [62], was employed in this study in a modified form., which included 8 items adapted from Ref. [24]. Additionally, for more comprehensive information, 2 extra items were incorporated from previous research [63]. On a Likert scale with a maximum score of 5, respondents were requested to rate their responses from 1 (not at all) to 5 (frequently). Internal consistency of the scale was determined to be (0.79). An illustrative item from the questionnaire is "My Leader expresses confidence that goals will be achieved."

5.2. Task performance (TSP)

The research utilized a seven-item questionnaire originally developed by Ref. [64] to assess workers' TSP. Participants' responses were gathered using a five-point Likert scale, ranging from 1 (not at all) to 5 (frequently). The scale's internal consistency was determined to be (0.78). An illustrative item from the questionnaire is, "The employee fulfills the responsibilities outlined in their job description."

5.3. Innovative work behavior (IWB)

Using a set of 6 items modified from the construct devised by Ref. [65] the study assessed employees' IWB. By Ref. [24], this questionnaire has recently been validated in the Chinese workplace. The response options for the items remained aligned on a five-point Likert scale, covering the range starting "never" (1) to "always" (5). Scale exhibited calculated internal reliability of 0.79, and after pilot testing, only four items were retained. An illustrative item from the questionnaire was "Overall, I consider myself a creative member of my team in this department."

5.4. Knowledge sharing (KNS)

Adapting eight items modified from the construct created by Ref. [66] employees' KSR attribute is measured. This construct was recently validated in the Higher Education Institution (HEI) sector by Ref. [24]. Participants' responses were gathered using a five-point Likert scale, with the options ranging from 1 (not at all) to 5 (frequently). Internal reliability of the scale was calculated to be (0.75), and following pilot testing, six items were retained to obtain responses from the target audience. An example item from the questionnaire was, "When I have learned something new, I tell my colleagues about it."

5.5. Data analysis procedure

Before moving to evaluate structural path relationship, construct mean and standard Deviation is calculated through SPSS (see Table 1). To evaluate research hypotheses, using Smart PLS (4.0), we used the partial least squares approach to structural equation modeling [67]. You can approach structural equation modeling in one of two ways: covariance-based SEM, which requires normally distributed data, the variance-based SEM does not required such requirements [68]. We followed two-step approach. Initially, validated our model based on measurement approach proceeding to test our hypothesized model through structural analysis [69]. For both tasks of measure validation and testing the hypothesized model, we employed the Smart PLS 4.0 software.

6. Results

6.1. Measurement model assessment

The measuring model was constructed of five crucial latent constructs, namely TRF leadership, KNS, TSP, and IWB. The evaluation of the reflective measurement model involved assessing its reliability and validity issues [69]concerning the latent constructs [70]. This entails examining the connection between the latent constructs and their observed indicators. To evaluate our model’s internal consistency reliability and convergent validity, we employed composite reliability (CR) and average variance extracted (AVE).

Table 1
Mean and Standard Deviation for all items.

Item	Statement/Construct	Mean	SD	
Transformational Leadership				
1	My leader communicates a clear and positive vision of the future	3.02	2.67	Rafique et al., 2022; Amankwaa, Gyensare, & Susomrith, 2019; Khaola, & Musiiwa, 2021
2	My leader treats staff as individuals, support and encourages their development	3.11	2.55	
3	My leader gives encouragement and recognition to staff.	3.24	2.77	
4	My leader fosters trust, involvement, and cooperation among team members.	3.43	3.01	
5	My leader encourages thinking about problems in new ways and questions assumptions	3.02	2.67	
6	My leader is clear about his/her values and practices what he/she preaches.	3.11	2.55	
7	My leader instills pride and respect in others and inspires me by being highly competent	3.24	2.77	
8	My Leader articulates a compelling vision for the future	1.22	0.78	
9	My Leader expresses confidence that goals will be achieved	3.33	2.99	
Innovative Work Behavior				
1	While working in this institution, I have come up with innovative and creative notions	1.22	1.01	(Hochwarter et al., 2008) (Rafique et al., 2022)
2	While working in this institution, I try to propose my creative ideas and convince others	1.777	1.13	
3	While working in this institution, I seek new service techniques, methods, or techniques	3.02	2.67	
4	While working in this institution, I provide a suitable plan for developing new ideas	3.11	2.55	
5	While working in this institution, I try to secure the funding and resources needed to implement innovations	3.24	2.77	
6	Overall, I consider myself a creative member of my team in this department	3.43	3.01	
Knowledge Sharing				
1	When I have learned something new, I tell my colleagues about it.	3.02	2.67	Van den Hooff & de Ridder, 2004; Rafique et al., 2022
2	I share the information I have with my colleagues.	3.11	2.55	
3	I think it is important that my colleagues know what I am doing.	3.24	2.77	
4	I regularly tell my colleagues what I am doing	3.43	3.01	
5	When I need certain knowledge, I ask my colleagues about it.	3.02	2.67	
6	I like to be informed of what my colleagues know	1.33	0.67	
7	I ask my colleagues about their abilities when I need to learn something.	3.21	2.89	
8	When a colleague is good at something, I ask them to teach me how to do it.	1.44	1.08	
Task Performance				
1	This subordinate adequately complete assigned duties	3.27	2.33	Williams, L.J., & Anderson S.E., (1991)
2	This subordinate Fulfills responsibilities specified in job description	3.44	3.02	
3	This subordinate Takes time to listen coworkers’ problems and worries	3.03	2.57	
4	This subordinate Assists supervisor with his/her work (when not asked)	3.11	2.55	
5	This subordinate Gives advance notice when unable to come to work.	3.27	2.66	
6	This subordinate Passes along information to coworkers.	3.43	3.01	
7	This subordinate Goes out of the way to help new employees.	1.34	0.67	
8	This subordinate Meets formal performance requirement of job	1.55	1.11	

The table displays the measuring model’s results for various constructs, including (IWB), (KNS), (TFL), and Task Performance (TSP). Each construct is assessed based on its items loading, Cronbach’s Alpha, CR, and AVE. For (IWB), four items were used (IWB3, IWB4, IWB5, and IWB6), with their respective loadings ranging from (0.707–0.833). The α for IWB is (0.795), CR is (0.867), and the AVE is (0.621). KNS is measured using five items (KNS1, KNS2, KNS3, KNS4, and KNS5), with their loadings ranging from 0.626 to 0.981. The α for KNS is (0.958), with CR (0.958), and AVE (0.843). Eight items (TFL1 through TFL9) were used to measure transformational leadership (TFL), and their loadings ranged from 0.711 to 0.989. TFL’s α is (0.974), CR is (0.978), and AVE is (0.851). The six items (TSP1 through TSP6) used to measure Task Performance (TSP) have loadings ranging from 0.680 to 0.866. TSP’s α is (0.875), whereas CR is (0.905) and AVE is (0.615). In general, the table provides useful details about the validity and reliability of the measurement model for every construct, assisting in the evaluation of the precision and caliber of the data derived from the items pertaining to the latent variables (see Table 2).

In order to verify that each dimension in a model for measurement is unique and different than the remaining characteristics in the model, discriminant validity is an essential component of validation. The table’s Heterotrait-Monotrait (HTMT) values show how different pairings of certain constructs interact with one another. More discriminant validity, or that each of the concepts are significantly separate, is indicated by a lower HTMT score. Table (2) analysis reveals that there are differences in the HTMT values between the construct pairs. As an example, the HTMT score of 0.521 indicates a moderate discriminant validity between the two notions of knowledge sharing and IWB. Similarly, the HTMT value between IWB and TFL is 0.524, also suggesting moderate discriminant validity. However, the HTMT value between IWB and Task Performance is 0.804, indicating a higher level of discriminant validity between these two constructs. Furthermore, the HTMT, KNS and TFL as well as KNS and TSP are 0.443 and 0.486, respectively, both indicating moderate discriminant validity between these pairs. Lastly, the HTMT value between TFL and TSP is 0.418, again suggesting moderate discriminant validity (see table –3). In conclusion, The HTMT values provide useful information about the distinctness of the latent constructs in the study. These values help researchers assess the validity of their measurement model and ensure that each construct is adequately differentiated from the others, strengthening the overall credibility of the research findings.

To evaluate the path coefficient between variables, beta values are presented in table (4) and represented via (Fig. 2).

The beta value of (0.316) indicates a positive relationship for (KNS - > IWB). This suggests that as KNS increases, it also leads to increase in IWB. The T statistics value of 2.444 is associated with a ($p = 0.015; <0.05$). Thus, this relationship is considered statistically significant and is “Accepted,” indicating that there is evidence to support the notion of positive association between KNS and IWB (see Fig. 2). The beta value of 0.353 indicates a positive relationship between (KNS - > TSP). This means that as KNS increases, it also enhances TSP. The T statistics value of 3.291 is associated with a ($P = 0.001, <0.05$). As a result, this relationship is considered statistically significant and is “Accepted,” providing evidence to support the existence of a positive association between (KNS - > TSP). The beta value of 0.325 indicates a positive relationship between (TFL - > IWB). This suggests that as the level of TRF increases, it also enhances innovative work behavior. The T statistics value of 3.271 is associated with a very low P value of 0.001, indicating that the relationship is statistically significant. Thus, the hypothesis is “Accepted,” providing evidence to support the existence of a positive association between (TFL - > IWB).

Table 2
Measurement model results.

Construct	Items Loading				Cronbach’s Alpha	Composite Reliability	Average Variance Extracted
	IWB	KNS	TFL	TSP	A	CR	AVE
IWB3	0.786				0.795	0.867	0.621
IWB4	0.833						
IWB5	0.821						
IWB6	0.707						
KNS1		0.971			0.958	0.969	0.843
KNS2		0.981					
KNS3		0.626					
KNS4		0.963					
KNS5		0.952					
KNS7		0.962					
TFL1			0.966		0.974	0.978	0.851
TFL2			0.947				
TFL3			0.941				
TFL4			0.949				
TFL5			0.989				
TFL6			0.930				
TFL7			0.921				
TFL9			0.711				
TSP1				0.680	0.875	0.905	0.615
TSP2				0.772			
TSP3				0.801			
TSP4				0.776			
TSP5				0.866			
TSP6				0.798			

IWB= Innovative Work Behavior, TFL = Transformational Leadership, TSP= Task Performance, KNS= Knowledge Sharing.

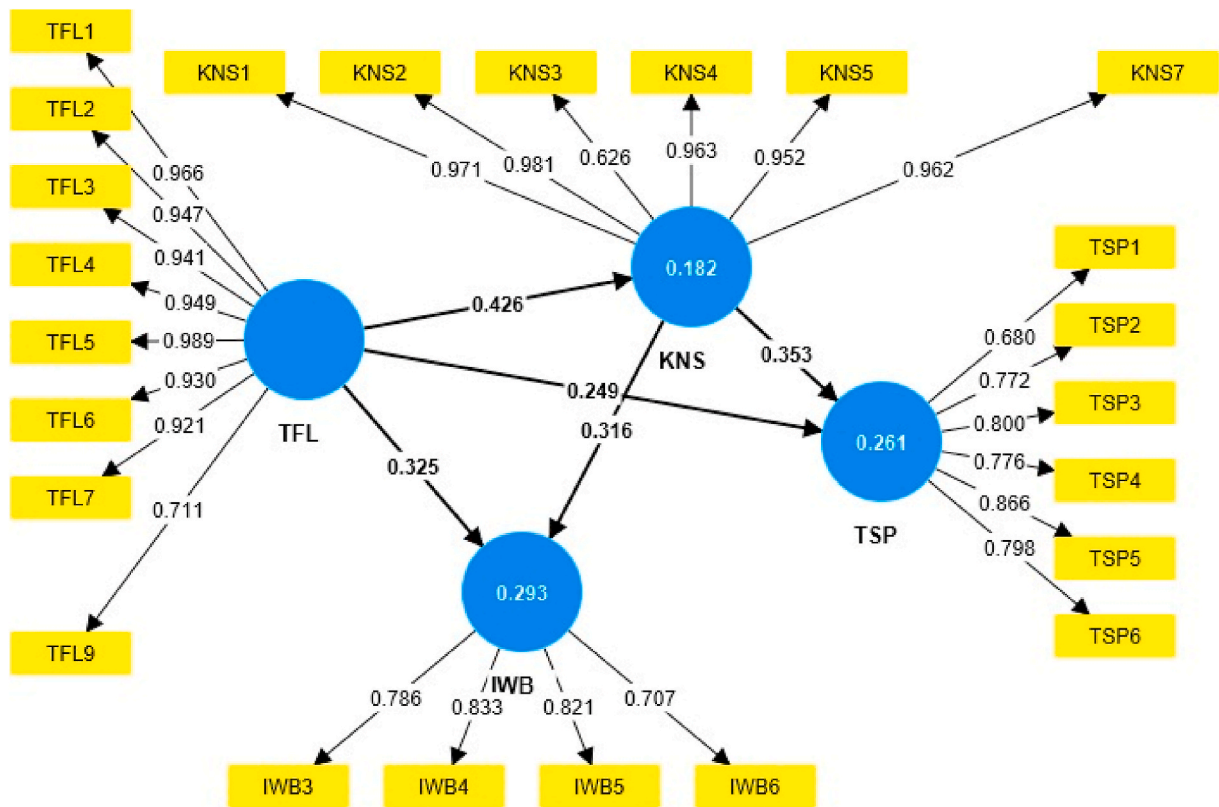


Fig. 2. Measurement model through SEM

The beta value of 0.426 indicates a positive relationship between (TFL -> KNS). This means that as the level of TRF increases, it also enhances KNS. The T statistics value of 2.714 is associated with a P value of 0.007, which is below then (0.05). As a result, this relationship is considered statistically significant and is "Accepted," providing evidence to support the existence of a positive association between (TFL -> KNS). The beta value of 0.249 indicates a positive relationship between (TFL -> TSP). This means that as the level of TRF increases, it also enhances TSP. The T statistics value of 2.432 is associated with a P value of 0.015, which is lower than (0.05). As a result, this relationship is considered statistically significant and is "Accepted," providing evidence to support the existence of a positive association between (TFL -> TSP).

The beta value of 0.151 indicates a positive relationship (TFL -> KNS -> TSP). However, it's important to note that this relationship is weaker compared to the direct relationships. The T statistics value of 2.074 is associated with a P value of 0.038, which is less than the significance level of 0.05. Therefore, this relationship is considered statistically significant and is "Accepted," providing evidence to support the existence of a positive association (TFL -> KNS -> TSP). The beta value of 0.135 indicates a positive relationship between (TFL -> KNS -> IWB). However, this relationship is relatively weak compared to the direct relationships. The T statistics value of 1.827 is associated with a p value of 0.068, which is marginally above the significance level of 0.05. Therefore, this relationship is considered statistically non-significant, and the hypothesis is "Rejected," indicating that there is not enough evidence to support the existence of a significant association between (TFL -> KNS -> IWB).

In the context of SEM, the Stoner-Geisser Q2 is an index used to evaluate the fit of a model when dealing with repeated measures or longitudinal data. It assesses the sphericity assumption, which is an assumption related to the covariance matrix of the repeated measures data. Violation of sphericity can lead to biased estimates in repeated measures analyses. The value of Stoner-Geisser Q2 ranges from 0 to 1, where a value closer to 1 indicates better sphericity (i.e., the assumption is more likely to hold), and a value closer to 0 suggests possible violation of the sphericity assumption. The value of 0.032 for the variable "Knowledge Sharing" and similar values

Table 3
Discriminant validity HTMT values.

	IWB	KNS	TFL	TSP
Innovative Work Behavior				
Knowledge Sharing	0.521			
Transformational Leadership	0.524	0.443		
Task Performance	0.804	0.486	0.418	

for other variables (0.201 for IWB and 0.108 for TSP) suggest that the model may have a reasonably good fit, indicating that the sphericity assumption is reasonably met (see Table 4). The SRMR (Standardized Root Mean Square Residual) is a fit index used in Structural Equation Modeling (SEM) to assess the goodness of fit of a model. It provides a measure of how well the proposed model reproduces the observed covariance matrix of the data. The SRMR evaluates the discrepancy between the observed covariance matrix and the model-implied covariance matrix, after adjusting for the number of estimated parameters in the model. The SRMR value lies between (0–1), where 0 suggests that the model fits the data well, indicating a good fit, while a value closer to 1 indicates poor fit. In the given context, the SRMR value of 0.042 is provided for the structural model being evaluated (see Table 3). Since the value is relatively close to 0, it suggests that the proposed model fits the observed data reasonably well. This means that the relationships among the observed and latent variables in the model are consistent with the actual relationships present in the data.

7. Discussion and implications

Based on the results the current study establishes the directional link (direct Vs Indirect) TFL and employees work outcomes (IWB and TSP), while sharing knowledge and learning experiences with peers during their working hours in Higher education setup of Pakistan. The outcomes pertaining to the mediational role of knowledge sharing, results of SEM depict that transformational attribute of Higher Educational Institute in Pakistan also shape employee’s behavior to promote the culture of innovation for performing the assigned task. First of all, the direct impact of top crest transformational behavior indicates direct relation and how it relates to employee’s innovative work behavior. The [24] study’s results demonstrated that there is significant association among TFL and IWB. Similar results were quoted by the findings of [15] by interlinking the relationship through buffering role of Locus of control among Malaysian family firms. Conversely, the findings from the study by Ref. [71] in the work sector of Ghana’s banking depict that TFL is positively correlated to employees IWB. The findings of [72] also portray the same story while examining dynamic influence of transformational leadership on fostering a culture of innovation among teachers in Dutch schools’ setups. In contrast the result of [73] indicate no relationship between schools leaders TFL behavior and workers IWB in the work context of Indonesian schools. Similar results were evident by Ref. [74] among the leaders workers relationship of (USA & Holland).

In addition, the results also demonstrate the significant path relationship between knowledge sharing attribute among higher education workers and their IWB in universities of selected sample in Pakistan. Similar results were evident by the study of [24] in HEIs sector of Pakistan while managing faculty stress during their work performance. Similar results were quoted by Ref. [26] among the Romanian workers. Similar results are evident by the findings of [59] while understanding the dynamic link between ICT workers IWB and KNS through self-efficacy. These results are based on the arguments that sharing knowledge offer novel opportunities to worker in order to solve organizational complex issues. Likewise [15], recognized KNS as the primary factor nurturing employees’ IWB. Alternatively, the findings from Ref. [57] indicate insignificant relationship between these attributes among Kazakhstan. One of the major reason behind the positive relation of KNS and IWB in HEIs sector of Pakistan is based upon advancing one’s knowledge and capabilities through sharing updates research, curriculum advancement and adaptation of ICT for R&D purpose.

Task performance is the ability of individual to achieve organizational and individual objective with in stipulated time frame. Findings from previous studies indicate that TRF promote employees task performance abilities through encouragement, motivation, inspiration and articulating vision. Results of [58] indicate that TRF promote nurses Task performance ability while performing their job at health care institutions. Similar results are recorded by Ref. [11] while investigating the behavioral aspect of academic workers. The findings of [75]also depict the same picture while analyzing the behavioral pattern of employees among hospitality work sector. Similar results are quoted by Ref. [76] among Chinese worker by confirming the importance of social capital theory among insurance sector employees.

Earlier studies depict the Significant evidence in connecting the path between TRF and employees KNS during [24]leader member exchange process. Once the employees perceive that top management share information, knowledge and facts with them, which induce the felling of respect, and inspiration of top management, that ultimately enhance worker performance capabilities [11,58,75] and promote Innovative work behavior [71,72].

Table 4
Results of the hypothesis testing.

Relationship	Beta	T statistics	P values	Remarks
KNS - > IWB	0.316	2.444	0.015	Accepted
KNS - > TSP	0.353	3.291	0.001	Accepted
TFL - > IWB	0.325	3.271	0.001	Accepted
TFL - > KNS	0.426	2.714	0.007	Accepted
TFL - > TSP	0.249	2.432	0.015	Accepted
TFL - > KNS - > TSP	0.151	2.074	0.038	Accepted
TFL - > KNS - > IWB	0.135	1.827	0.068	Rejected
Stoner-Geisser Q²				
Knowledge Sharing	0.032			
Innovative Work Behavior	0.201			
Task Performance	0.108			
SRMR	0.042			

IWB= Innovative Work Behavior, TFL = Transformational Leadership, TSP= Task Performance, KNS= Knowledge Sharing, SRMR = Standardized Root Mean Square Residual.

The contemporary research confirms the mediational role of KNS between universities top management TFL behavior and employees task Performance by enhancing (Faculty members) capabilities to achieve organization vision as well as personal goal of promotion and career growth. The investigation by Ref. [24] validates KNS's mediating function in the relationship between TRF and IWB among high education employees. While the result of [76] confirm indirect relationship between TRF and IWB through social media as a mediator. Similarly, the result of (Lan & Chen, 2020) indicate that career adaptability is the major attribute to strengthen the relation between TRF and TSP. The findings of [11] depict that Bass leadership styles did not evident direct relation with employee's task performance among academic staff of Malaysian universities, however results confirm the mediating role of PSW to strengthen the impact of TRF toward employees TSP. In this regard, the current study pioneers the introduction of novel mechanism by connecting HEIs top management TRF behavior in order to investigate employees IWB and TSP through mediating mechanism of Knowledge sharing. Interestingly, the intervening role of KNS is not supported amid TFL and IWB among followers of KP selected universities. One of the major reason behind the insignificant role of (TFL - > KNS - > IWB) is based on the logic that response is obtained from respondents of mixed public and private sector universities. It is generally perceived that in government sector universities among developing countries promotion, and career growth depends upon faculty member's relations with top management as well as one's organizational politics abilities and active role in faculty association. In such an environment innovation became night mare and everyone focuses on performing their assigned task. In contrast Private sector universities develop the culture of joint venture that support innovative ideas, promote faculty on the basis of research productivity and such kind of environment is further booster through continues support from top management in the form of transformational leadership behavior.

8. Conclusion

The current study delves into the dynamic interaction between TRF and employee behavior in the form of IWB and TSP among higher education faculty members in Pakistan, using KNS as a mediator. Results confirm that TRF act as direct and significant attribute to shape employees IWB and Task performance as well as enhance individuals KNS behavior. However, during mediational analysis it was concluded that although KNS mediate the relation between TRF and TSP, but could not evident for supporting mediational role of KNS for linking the association between TRF and IWB among higher education sector employees of Pakistan. The current study pioneering research that introduces dynamic association between selected variable in HEIs sector of developing country prospective.

8.1. Theoretical implication

The current investigation establishes the value of [38,77,78] SET approach in connecting the dynamic interaction between leaders and employees. The foundation of Social Exchange Theory (SET) founded on the premise that employees perceive benefits in response to their input in exchange process while performing their job. Hence if employees perceive that top management is loyal in sharing knowledge, information's and facts, as a response workers respond through achievement of organizational objectives through performing their assigned task appropriately. On the other side, once employees get confidence through articulating vision and inspirational approach of guidance through their leaders also infuse the feelings of IWB in order to solve the work/organizational related problems.

8.2. Managerial implications

Many significant management implications result from the favorable mediating function of information sharing between transformational leadership and creative work behavior and task performance among Pakistani higher education personnel.

First, it emphasizes how important it is to support transformational leadership cultures in higher education. Leaders who encourage and inspire their staff to embrace innovation and share information facilitate higher task performance. As a result, HEC and administrators ought to fund leadership development initiatives that highlight transformative traits like charisma, vision, and thoughtfulness for each individual.

Second, promoting knowledge-sharing initiatives becomes crucial for enhancing the performance of creative tasks and professional conduct. The Higher Education Commission can facilitate the creation of online discussion boards, training sessions, seminars, and other cooperative learning environments where staff members can exchange knowledge, best practices, and lessons learned. This expands the amount of collective knowledge while also improving the creativity and problem-solving abilities of staff members.

Rewarding and praising employees who take initiative to share knowledge and behave creatively can also help to promote desirable outcomes. Systems for evaluating employee performance must be designed to recognize and reward actions that support the organization's objectives of promoting creativity and attaining high job performance.

Finally, through regular feedback channels and performance indicators, HEC should actively monitor and evaluate the efficacy of leadership approaches, knowledge sharing efforts, and innovation processes. This guarantees sustainable growth and competitiveness within Pakistan's higher education system by enabling constant improvement and adaptation to shifting conditions. In higher education institutions, utilizing the mediational role of knowledge sharing within the framework of transformational leadership can greatly augment organizational efficacy and accomplish strategic goals.

8.3. Limitation of the work and direction for future researchers

Likewise, other studies, the current research work also comprises of several limitations that affects it generalizability to other work

context. Participants' responses were gathered from selected three private sector universities, while 8 government sector universities. That may arouse the question of response validity from both sector due to cultural and administrative variation. Hence future researchers may have obtained response from similar number of response as well as similar number of HEIs from both sector. That will enrich our information's in gaining a comprehensive understanding of KNS's mediating role. Similarly, data was cross-sectional in nature as response was get at once, that also question its validity, hence future researchers may get the data from selected HEI's with specific time interval and then the findings may be compared to get the accurate picture of underlying phenomena. In the current study, only KNS is use as a potential mediator to align leader's member relationship, however future researcher may use HEI culture, o justice perception, psychological attributes and LMX as a potential mediator. Similarly, employee's behavioral outcome can be understanding through adding employee's commitment, OCB and satisfaction as well as work engagement among teaching faculty members of schools, colleges and universities.

8.4. Practical implications of the study

The results of the study highlight how important transformational leadership is in helping staff members in Pakistani higher education to develop a culture of creativity and task performance. Academic leaders can encourage staff members to share information and take on creative work practices by modeling visionary traits and offering tailored support. This emphasizes how crucial it is to fund leadership development initiatives, in order to foster an atmosphere that encourages creativity and group learning.

The study also highlights the necessity of organizational activities that encourage staff members to share their knowledge. Formal methods that promote the sharing of ideas and best practices, like seminars and online forums, are established with the ultimate goal of improving task performance. Employee contributions to innovation and information sharing are acknowledged and rewarded, which strengthens the collaborative culture and creates a positive work atmosphere where staff members feel appreciated and empowered to perform well in their positions. All things considered, these practical implications provide managers and administrators with doable tactics to improve organizational effectiveness and foster innovation in Pakistani higher education institutions.

Data availability statement

Data will be available on request.

CRediT authorship contribution statement

Naveed Saif: Software, Formal analysis, Data curation. **Amelia:** Writing – review & editing, Writing – original draft. **Gerald Goh Guan Gan:** Supervision, Conceptualization. **Abner Rubin:** Visualization, Investigation. **Imrab Shaheen:** Formal analysis. **Muhammad Murtaza:** Software, Conceptualization.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) did not used any AI tools. All the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Gerald reports article publishing charges was provided by Multimedia University. Gerald reports a relationship with Multimedia University that includes: employment. Gerald has patent pending to Nil. NIL If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e32280>.

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