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Investigating the impact of pandemic job stress and transformational leadership on innovative work behavior: The mediating and moderating role of knowledge sharing



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ABSTRACT

Only a few studies have been conducted on job stress and transformational leadership (TL), particularly in the environment of the COVID-19 pandemic. This study aims to overcome this gap and attempts to explore the impact of pandemic job stress (PJS) and TL on employees' innovative work behavior (IWB) through knowledge sharing (KNS), while focusing on the importance of innovations for organizational survival and growth. The data were collected from 357 faculty members of higher education institutions in Pakistan and analyzed using the partial least squares estimation, a structural equation modeling (PLS-SEM) technique. The results demonstrate that PJS positively impacts employees' IWB, negating the negative relationship between job stress and IWB found in previous studies. Moreover, this study found a positive impact of TL and KNS on IWB. KNS also moderates the relationship between PJS and IWB while partially mediating the relationship between TL and IWB. Lastly, the theoretical and practical implications are discussed.

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Introduction

A severe pandemic has prevailed worldwide since December 2019 due to COVID-19 (a contagious disease precipitated by "Severe Acute Respiratory Syndrome Coronavirus 2"). This disease was first diagnosed in Wuhan, China (Mo et al., 2020), and subsequently, many countries have been affected by this pandemic. Since October 18, 2021, about 240 million COVID-19 cases have been reported, and 4.8 million deaths have been declared across 200 countries (BBC, 2021), including 28,359 deaths in Pakistan (NCOC, 2021). As a result, the COVID-19 pandemic has become a cause of public health emergencies worldwide (WHO, 2021; Xie et al., 2020).

Mental and social ailments caused by such pandemic environments have substantially disturbed the working environment and routine life. Employees' fear of being affected by the COVID-19 pandemic causes elevated anxiety, stress, and psychological disorders (Montani & Stagliano, 2022). In addition, worries within communities

have increased due to the continuously growing number of deaths, misinformation, and emotional confusion that lead to control behavior, which is a great source of stress. Therefore, there is a dire need to tackle stress during pandemics.

This pandemic has severely affected all industries and their ways of working worldwide. In particular, the education sector is one of the most deeply affected. During the first wave of this deadly virus, the education system in Pakistan suddenly closed on March 16 (UNICEF, 2020). When the institutions rebounded and eventually started to open, the second wave hit the country more severely, and the education system had to be shut down again. Thereafter, the third wave of coronavirus hit the country with even greater intensity in March 2021, and, again, the government decided to close educational institutions in highly affected areas. During the first wave, the decision to close institutions was made overnight. There was a shortage of resources and a lack of information and communication technology (ICT). Most of the teachers were not well prepared and had inadequate knowledge of online teaching. For example, they did not know about various online teaching software names. Most students also live in remote areas where they do not have access to ICTs. These

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circumstances made the conditions worse, which led to anxiety and stress.

Stress significantly affects employees' ability to accomplish tasks; more precisely, decision-making inefficiency, concentration deficiency, and lack of motivation lead to poor job performance and unusual errors (Jun et al., 2020; Wolor et al., 2020). Liu and Liu (2020) found that job stress negatively influences employees' creativity, which causes poor job performance and job satisfaction. Moreover, Sadiq (2022) described that changes in workload caused by drastic shifts in working conditions and increased job demands due to the COVID-19 pandemic devoured employees' energy with regard to their psychological resources. In such conditions, more resources are needed. Therefore, due to the limitations of resources, employees remained incapable of fulfilling their job roles (such as creative solutions to the problems). In addition, Bani-Melhem et al. (2018) explained that high levels of stress harm employees' willingness to be innovative.

Researchers have confirmed the relationship between job stress and innovative work behavior (IWB). They studied various types of stress, such as work-related stress, mobile workplace stress, workplace stress, and role (overload, ambiguity, conflict) stressors, respectively (Bani-Melhem et al., 2018; Bani-Melhem et al., 2020; Montani et al., 2017; Wang et al., 2022). Previous studies on the relationship between stress and IWB are scarce and which are available, having unbalanced and mixed findings. Likewise, previous studies have not evaluated the influence of stress instigated by catastrophic extra-institutional events on employees' innovations. This gap needs to be addressed urgently, as stress impairs R&D effectiveness (Montani & Stagliano, 2022; Nisar & Rasheed, 2020).

Innovation in this pandemic is not only imperative in the medical field but also in all other sectors of the economy (Montani & Stagliano, 2021; Rafique et al., 2021), particularly in higher education sector. Furthermore, innovation is only possible with the cooperation of individual workers because organizational performance is the product of innovation grounded on individuals' IWB (Akram et al., 2020; Park & Jo, 2018). Most previous studies were conducted in the private sector (Montani & Stagliano, 2022), and organizational behavior theories and methods can rarely be applied to public sector organizations due different organizational contexts. Furthermore, only a few previous studies have focused on environmental factors (Bani-Melhem et al., 2018; Luoh et al., 2014); however, studies on employees' IWB in such pandemic environments are rare.

Therefore, this study examines the factors that influence employees' IWB in the current pandemic environment of COVID-19, such as pandemic-induced job stress (PJS) and transformational leadership (TL), predominantly in public sector universities in developing countries like Pakistan. TL is "an approach by which leaders motivate followers to comply with organizational goals and interests to perform beyond expectations" (Großelj et al., 2020). By contrast, job stress is described as "the experience of a person who is required to deviate from normal or self-desired functioning at the workplace due to unexpected constraints" (Parker & Decotiis, 1983, p.165). In this study, we are studying the job stress caused by the current COVID-19 pandemic.

IWB is defined as "an individual's behavior directed towards the initiation and intentional introduction of new and useful ideas, processes, products or procedures, and towards implementing those ideas" (Jong & Hartog, 2008). This study also investigates the moderation role of knowledge sharing (KNS), defined as "the provision of task-related information and knowledge to benefit others" (Wang & Noe, 2010) between the relationship of PJS and IWB and the mediation role between TL and IWB. According to the transaction theory of stress, stressful experiences and work outcomes depend on coping strategies such as KNS (Lazarus & Folkman, 1987). Furthermore, according to Arsawan et al. (2020) and Montani and Stagliano (2021), KNS has been recognized as a foundation for innovations and is documented to augment research and development effectiveness.

Arsawan et al. (2020) also highlighted the importance of KNS as a tool to grapple with difficult situations at work.

Literature review and hypotheses development

Pandemic job stress and innovative work behavior

Stress is a much-investigated concept in psychology that generally refers to the psychological response to environmental situations (MacIntyre et al., 2020). According to Karatepe et al. (2018), more than 50% of all employees observe deep stress, and almost two-thirds confront complications in jobs because of stress. In particular, stress creates tensions that lead to mental and physical exhaustion, which worsens further conditions, such as hypertension, sleep disorders, personal dysfunction, muscle stiffening, and diabetes, causing chronic stress (Wong et al., 2021; Yu et al., 2021). Due to employees' exposure to stress, organizations directly have an impact on their functions. It has been found that stress is linked with employees' commitment to their work and satisfaction, which shapes their behavior and ultimately affect organizational performance (Bani-Melhem et al., 2020). Researchers have argued that work stress has a detrimental negative effect on employees' mental and physical health and directly damages the company's performance (Dima et al., 2021; Said & El-Shafei, 2021).

Past studies on the relationship between job stress (stress not induced by pandemics) and IWB are limited and have delivered mixed findings. According to Ren & Zhang (2015), stress may generate or obstruct creativity, and employees' IWB depends on its source. Therefore, they investigated whether stress could have a positive impact when there was a challenge, such as tight targets to achieve. On the other hand, they also discovered that stress could have a negative effect when there are dominant factors, such as job insecurity or the situation of different organizational events. Numerous studies have found that job stress has a negative impact on employees' innovations (Bani-Melhem et al., 2020; Montani & Stagliano, 2022), while other studies have found a non-significant relationship between job stress and innovations (Bani-Melhem et al., 2018). Moreover, studies on the relationship between job stress induced by the COVID-19 pandemic (pandemic job stress PJS) and IWB are rare, which urged us to explore this relationship, particularly in the current context of the COVID-19 pandemic, to analyze how this relationship varied compared to pre-COVID-19 environment.

The outbreak of the COVID-19 pandemic is an extra-organizational stressful event that provokes depression, anxiety, and anger at work, emotions that can impede employees' creative aptitude (Talaee et al., 2022). When job stress arises, employees engage in coping strategies that devour extensive energy, leading them to deviate from and restrict their recreational activities at work. Hence, they have little ability or willingness to innovate. Therefore, we proposed H1:

H1. Pandemic-induced job stress is negatively related to employees' innovative work behavior.

Transformational leadership and innovative work behavior

In the last couple of decades, there has been an increased focus of studies on transformational leadership (TL) (Sudibjo & Prameswari, 2021), and it is recognized as one of the critical elements to stimulate organizational innovations (Afsar et al., 2019). Most studies bolster the notion of a positive relationship between TL and IWB. According to Kim & Park (2020), TL makes followers enthusiastic to surpass their benefits for the dignity of their organization, and it motivates followers to embrace creative methods to deal with multifaceted work conditions. Likewise, Sudibjo & Prameswari (2021) investigated how transformational leaders arouse their subordinates to assist them in accomplishing their entrepreneurial intentions by persuading their followers of IWB. They also elaborated on how TL

supports revolution, change, and reforms and how it encourages employees to think critically and solve complex problems innovatively.

George & Zhou (2007) argued that idea generation to idea implementation takes time and confrontation from management and stakeholders, further ingraining the fear of strangeness. Additionally, the idea initiator has another distress: the credit for the successful execution of the idea might be transferred to the immediate supervisor or departmental head. These sorts of things demotivate subordinates from instigating new ideas. However, this type of situation can be overcome under the leadership of transformational leaders, as TL grants personalized attention and stands for employees' necessities and requirements that lead to employees being engaged in creative activities. Consequently, it is proposed that TL inspires individuals by aligning employees' futures to the organization's future and motivating them to engage in creative behavior by mounting a robust sense of shared vision.

Furthermore, the study conducted by Afsar et al. (2019) revealed that the environment of shared trust boosts intrinsic motivation in subordinates to innovate recurrently. Hence, the link between TL and IWB has been examined by several studies (Afsar et al., 2019; Chung & Li, 2021), but these studies were not conducted in a catastrophic environment, which places more responsibilities on transformational leaders. Therefore, we investigated the role of TL in boosting employees' IWB, particularly in the COVID-19 pandemic environment, which is novel to this study. Thus, we proposed H2:

H2. Transformational leadership is positively related to employees' innovative work behavior.

Transformational leadership and knowledge sharing

Many researchers have acknowledged that knowledge management is the collection of capabilities through which an organization can achieve a competitive advantage by creating, sharing, and applying knowledge (Afriyie et al., 2020; Choi et al., 2016; Lei et al., 2020; Martins et al., 2019; Sudibjo & Prameswari, 2021). KNS is the core component of the knowledge management process. It is recognized as the process of exchanging information, data, skills, expertise, and know-how among employees to execute their duties and achieve organizational goals, and it helps generate new knowledge (Lei et al., 2020; van den Hooff & de Ridder, 2004; van den Hooff & Hendrix, 2004). According to the knowledge-based view (KBV) put forward by Grant (1996), an organization's dominant role is the application of currently available knowledge to improve the delivery of goods or services, and Afriyie et al. (2020) explain that knowledge and skills lead to a competitive advantage. They stated that organizations are dependent on their knowledge capabilities for their survival and sustained growth in the current competitive environment.

Previous studies (Akram et al., 2020; Elrehail et al., 2018; Kim & Park, 2020; Lei et al., 2020) have found that TL is a substantial predictor of numerous outcomes and performances. By supporting and inspiring individuals, transformational leaders develop an organizational climate (Kim & Park, 2020), stimulate knowledge sharing (Al-Kurdi et al., 2018), and encourage organizational learning (Elrehail et al., 2018). According to Afsar et al. (2019), TL creates a favorable climate for KNS and influences individuals' KNS behavior. Additionally, under TL, individuals share information and become more resourceful in cultivating advanced notions (Sudibjo & Prameswari, 2021). Moreover, when involved in KNS behavior, individuals engender synergies in organizations, as the knowledge flows between leaders and followers, making them more capable, which generates new knowledge to boost innovation (IWB) (Afsar et al., 2019; Sudibjo & Prameswari, 2021). Previous studies have recognized that the transformational leadership style is most suitable for building a trusting environment and helps develop a knowledge-centered atmosphere, which boosts KNS behavior in organizations (Afsar et al.,

2019; Elrehail et al., 2018; Suhana et al., 2019). Therefore, the role of TL is more decisive in boosting the KNS environment to overcome traumatic conditions, such as the pandemic environment of Covid-19. Previous studies (Afsar et al., 2019; Al-Kurdi et al., 2018; Elrehail et al., 2018; Sudibjo & Prameswari, 2021) have acknowledged the relationship between TL and KNS, but no study was found that investigated the relationship between TL and KNS, particularly in the pandemic environment, which is novel to this study. Therefore, to overcome this gap, based on the above-cited literature, we suggest that TL is a potential predictor for KNS in organizations to overcome extra-organizational events such as the Covid-19 pandemic. Therefore, we proposed H3:

H3. Transformational leadership is positively related to knowledge sharing.

Knowledge sharing and innovative work behavior

The importance of knowledge has been identified as providing organizations with a competitive edge as they endeavor to grapple with the knowledge-based economy (Akram et al., 2020; Al-Kurdi et al., 2018; Nielsen & Cappelen, 2014). To gain a competitive advantage, organizations employ available sources and strategies to manage, store, and publicize organizational knowledge. Elrehail et al. (2018) argued that there are prevailing norms of KNS in organizations. As a result, leaders have more opportunities to receive practical suggestions, opinions, and information that lead them to comprehensive solutions to problems. Moreover, in the knowledge-sharing process, the participants involved in KNS first translate the knowledge into an understandable form; this capability boosts the contributor's ability to generate new ideas, which is the foundation of IWB (Kang & Lee, 2017). KNS helps to promote communication and mutual trust among employees as they exchange their experiences and knowledge, which positively enhances employees' IWB and increases organizational performance (Aldabbas et al., 2020).

According to Martins et al. (2019) and Akram et al. (2017), KNS stimulates the cognitive process of elucidation, which accepts employees with new insights and suggests a way forward when meeting challenges at work. If individuals have the appropriate knowledge, information, tools, and applicable ideas at work, they are more inclined to act innovatively. Many studies support the idea that KNS positively impacts employees' IWB (Al-Kurdi et al., 2018; Choi et al., 2016; Elrehail et al., 2018). However, some researchers consider KNS to be a delicate process that is risky and potentially unsteady (Kang, 2016), while others (Aldabbas et al., 2020) argue that KNS does not have a direct relationship with organizational performance. These contradictions require further attention to explore the link between KNS and IWB.

Moreover, in the current pandemic environment, the importance of KNS has increased. Knowledge becomes a tool for handling such a critical situation. Employees are bound to work from home and learn new tools and techniques to accomplish their tasks, stimulating employees' creative behavior that leads to better performance. Consequently, we proposed H4:

H4. Knowledge sharing positively impacts employees' innovative work behavior.

The moderating role of knowledge sharing between PJS and IWB

A stressful environment such as that caused by the COVID-19 pandemic outbreak creates anxiety, depression, and anger at the workplace (Liu et al., 2020), which can impede employees' innovative capability (Montani & Staglianò, 2022). However, the experience of crises can lead to the adaptation of creativity, interrupt the ordinary way of thinking, and accelerate the detection of new perspectives (Damian, 2017), thus providing the productive base for creating

innovative ideas. Our study identifies the factor that can reduce the harmful effects of stress caused by catastrophic events and that can positively enhance employees' innovation. The study is based on the transactional theory of stress by Lazarus & Folkman (1984), which states that KNS works as a vital coping behavior that supports employees facing stress and thus boosts their innovation. According to this theory, effective coping behavior leads employees to exercise change-oriented struggles that make organizational accomplishments smooth.

Montani and Staglianò (2021) described KNS as a dynamic coping behavior that is supposed to be a salient feature that stimulates proactive, creative actions to confront the stress induced by the COVID-19 pandemic. The benefits of KNS for enhancing innovations in the workplace have been extensively supported by theoretical and empirical evidence. For instance, Tranfield et al. (2003) provide theoretical evidence in their "process model of knowledge sharing" that KNS has been acknowledged as involving multiple procedures that trigger organizational innovation. By contrast, Ahmed et al. (2020) and Kim & Park (2017) provide empirical evidence that individuals who engage in KNS are more expected to be concerned with creating and using novel and applicable ideas. Researchers (Alam et al., 2020; Huang et al., 2010; Mittal & Dhar, 2015; Montani & Staglianò, 2021) have also studied the moderation role of KNS between various predictors and criterion variables. However, studies on KNS as a moderator between PJS and IWB, particularly in the pandemic, are rare, making this study novel.

According to Nielsen & Cappelen (2014), KNS can serve as a potent coping behavior. Workers can constructively manage the stress caused by the pandemic and increase their creative performance, and the stressed employees share knowledge about the stressful pandemic environment (Montani & Staglianò, 2022). This allows them to concentrate fully on such stressful conditions and consider whether their perspective fits with prevailing practices, which helps them focus on detecting opportunities to cope with a change. We argue that employees in stressful situations attempt to explore unconventional cognitive pathways that encourage the inception of innovative solutions to problems induced by the stressful experience of pandemics. They become readily available to identify the potential barriers and obstacles to innovation that lead them to successfully promote and implement their innovative ideas. Therefore, the above-cited literature proposes that a high degree of KNS enhances employees' IWB and vice versa in response to stress induced by the COVID-19 pandemic. Accordingly, we proposed H5:

H5. Knowledge sharing moderates the relationship between pandemic-induced job stress and employees' innovative work behavior.

The mediation role of knowledge sharing between TL and IWB

Knowledge is the foundation of any innovation process. Leaders play a significant role in establishing the KNS environment, where they have more opportunities to receive suggestions and creative ideas to work on for better outcomes. Elrehail et al. (2018) argued that TL is more capable of figuring out the prevailing problems and accepting changes in the KNS environment, where employees get involved in a high degree of KNS. Furthermore, existing problems are continuously revisited in the KNS environment, and new solutions are found to cope. Thus, KNS can help identify existing problems and future challenges that lead employees to creative solutions in the workplace. Al-Husseini et al. (2021) explained that TL is a significant persuading factor in innovation and knowledge management systems. It has been observed that organizations that can exploit the knowledge that shapes organizational innovation, such as the faster solution of problems and rapid corrective actions to changing environments, become more productive, and sustain their competitive position (Sun & Huang, 2020).

According to Bandura's (1986) social cognitive theory (SCT), individuals, because of knowledge-gaining, associate with others by exercising their experiences, external media influences, and social relations. This theory elaborates on how employees gain knowledge and skills primarily from two sources: enactive mastery experience, which belongs to individuals' firsthand experience of tasks or skills, and mastery modeling experience, which encompasses the circumstances in which individuals determine, learn, and absorb from experts, such as leaders (Bandura, 1986). Furthermore, this theory explains that knowledge building happens in a social framework with vibrant and mutual relations between individuals, surroundings, and behaviors. The theory also asserts that individuals should persistently administer knowledge through discussion, recombination, and transformation of knowledge to exhibit innovative ideas (Almulhim, 2020; Zhu & Zhang, 2020) and KNS and IWB are the core concepts associated with SCT.

KNS is concerned with the mutual exchange of information and experiences or giving extra awareness to workers about tasks (Al-Husseini et al., 2021; Ha, 2020; Montani & Staglianò, 2022). According to the KBV, KNS is an immaterial source that is fundamental for competitive advantage and enhancing workers' efficiency in the most dynamic environment (Almulhim, 2020). According to van den Hooff & de Ridder (2004), KNS comprises two components: knowledge donating and knowledge collecting. Knowledge collecting happens in organizations when individuals encourage their colleagues to share intellectual capital through mutual consultation. Knowledge donating happens when people transmit their intellectual capital to their co-workers. Hence, we can say that KNS enhances individuals' job satisfaction, leading to innovations in the workplace (Almulhim, 2020; Jnaneswar & Ranjit, 2021).

Choi et al. (2016) confirmed that employees working under TL are fond of knowledge. Accordingly, they share essential knowledge of their work with their colleagues, which sharpens their IWB. Additionally, employees interested in mounting their capabilities and proficiencies learn new things and share them with their co-workers. They acquire their colleagues' knowledge, as TL nurtures a collective vision; this KNS ultimately boosts their IWB. Hence, KNS helps to promote coordination between employees and ensures smooth processes of outsourcing, planning, and organizing, which enhances the employees' IWB. Researchers (Jnaneswar & Ranjit, 2021; Wang et al., 2017; Zhu & Zhang, 2020) have tested the mediating role between various predictors and criterion variables. However, no study was found that tested the mediating role of KNS between TL and IWB in the pandemic situation; therefore, we decided to conduct this study. Consequently, we proposed H6:

H6. Knowledge sharing plays a significant mediating role between transformational leadership and innovative work behavior.

Methodology

Sampling and procedure

The data were collected from the academic staff (faculty members) of Pakistan's public sector universities in four provinces (Punjab, Sindh, Khyber Pakhtunkhwa, and Baluchistan). The reason for selecting academic staff is that they represent the single most important source of innovations and the primary source of innovations in the education sector (Mykhailishyn et al., 2019). Moreover, innovations in education are notably more critical for a sustainable future. According to Serdyukov (2017), innovations in education are widely acknowledged by researchers, as countries' economic and social well-being rely heavily on the quality of education, and the academic staff is the key resource to educate students and research scholars. We interviewed 13 university faculty members with at least 10 years of academic experience; therefore, we considered them experts in

Table 1
Demographics of respondents.

Demographics of Respondents		Frequency	Percentage
Gender	Male	233	65.27
	Female	124	34.73
Level of Education	Masters	129	36.13
	PhD	228	63.87
Experience (in Years)	1–5	93	26.05
	6–10	103	28.85
	11–15	92	25.77
	16–20	47	13.17
	21–25	22	6.16
Designation	Lecturer	103	28.85
	Assistant Professor	139	38.94
	Associate Professor	81	22.69
	Professor	34	9.52
Sample size from different provincial universities	Punjab	129	36.13
	Sindh	90	25.21
	Peshawar	77	21.57
	Quetta	61	17.09

this study. These faculty members were aware of the purpose of this study and helped refine and finalize the questionnaire.

The data were collected between March 2021 and June 2021. We employed the convenience sampling method and collected data using a self-administered online questionnaire (Dell'Olio et al., 2018; Sekaran & Bougie, 2009). The reason for choosing convenience sampling was to avoid maximum personal contact due to the severe prevailing conditions of the COVID-19 pandemic worldwide. Because of the pandemic, the education sector was online for most of the study, and the physical availability of faculty members was not possible. The questionnaire was developed in English, translated into Pakistan's national language (Urdu), and then translated into English by two bilingual experts (Brislin, 1986). Before the final data collection, we conducted a pilot study to check the reliability and validity of the questionnaire.

A cover letter was attached to the questionnaire describing the purpose of the study. Moreover, the data adhered to complete ethical guidelines, and the respondents were informed that their identities would not be disclosed. The survey instrument was composed of two sections. One was related to the respondents' profiles and the other to the constructs of the study based on a five-point Likert scale (1 for strongly disagree to 5 for strongly agree). A total of 1200 questionnaires were shared, of which 508 were returned (response rate = 42.33%). According to Sekaran & Bougie (2009), a response rate of 30% or above is acceptable in an online survey. Of the 508 questionnaires received, 151 were incomplete. The respondents' profiles are given in Table 1.

Measures

The constructs were adapted from previous literature, with minor changes made to meet this study's context. Appendix I shows the questionnaire items and the construct sources.

Results and analysis

Common method biases and multicollinearity tests

The issue of common method biases may arise in the cross-sectional design of the study when the researchers use similar scales with the same number of response options (Vinzi et al., 2010). According to Harman (1976), a single factor with a value of more than 50% of variance demonstrates common method bias. The first factor showed 37.4% of the variance in this study, which indicates that there was no common method bias issue in this study. According to Mason and Perreault Jr. (1991), the variance inflation factors (VIF)

Table 2
Results of the confirmatory factor analysis.

Constructs	Items	Loadings	Cronbach's Alpha	Composite Reliability	AVE
Innovative work behavior	IWB1	0.829	0.911	0.931	0.695
	IWB2	0.847			
	IWB3	0.887			
	IWB4	0.873			
	IWB5	0.694			
	IWB6	0.858			
Knowledge Sharing	KNS1	0.798	0.937	0.948	0.694
	KNS2	0.863			
	KNS3	0.859			
	KNS4	0.877			
	KNS5	0.766			
	KNS6	0.774			
	KNS7	0.876			
	KNS8	0.843			
Pandemic Job Stress	PJS1	0.736	0.907	0.928	0.684
	PJS2	0.747			
	PJS3	0.809			
	PJS4	0.889			
	PJS5	0.865			
	PJS6	0.901			
Transformational Leadership	TL1	0.835	0.893	0.915	0.608
	TL2	0.842			
	TL3	0.876			
	TL4	0.719			
	TL5	0.769			
	TL6	0.723			
	TL7	0.672			
AVE Average Variance Extracted					

Note: All factor loadings are significant at the $p < 0.001$ level.

values should remain under 10.0 or tolerance values should be under 0.1 to avoid multicollinearity issues. Our study observed VIF values between 1.723 and 4.264 within the limit and showed no multicollinearity issues.

Measurement model

The measurement model was assessed using confirmatory factor analysis (Hair et al., 1998), and convergent and discriminant validities were tested. The measurement model shows the connections between the indicators and the constructs (Temme et al., 2010). The minimum threshold value for factor loadings should be 0.50 (Hair et al., 1998), and the required threshold value for composite reliability is 0.70 (Ringle et al., 2020; Hair et al., 2012). The threshold value for the average variance extracted (AVE) is 0.50 (Ringle et al., 2020). In our study, the values for Cronbach's alpha were higher than 0.893. The values for composite reliability were higher than 0.915, and the values for AVE were higher than 0.608.

Subsequently, discriminant validity was measured. According to Henseler et al. (2009), the square roots of the AVE should be higher than the other corresponding constructs for discriminant validity. Moreover, factor loadings should be higher than the acceptable threshold value and higher with other corresponding constructs. Tables 2 and 3 show good convergent and discriminant validities. Table 4 depicts satisfactory items and cross-loadings.

Table 3
Correlation among constructs.

Constructs	AVE	Cronbach's Alpha	IWB	KNS	PJS	TL
IWB	0.695	0.911	0.834			
KNS	0.694	0.937	0.463	0.833		
PJS	0.684	0.907	0.515	0.286	0.827	
TL	0.608	0.893	0.480	0.390	0.334	0.780

IWB Innovative work behavior, PJS Pandemic Job Stress, KNS Knowledge Sharing, TL Transformational Leadership, AVE Average variance extracted.

Table 4
Items and cross-loadings.

	IWB	KNS	PJS	TL
IWB1	0.829	0.345	0.413	0.326
IWB2	0.847	0.335	0.425	0.462
IWB3	0.887	0.452	0.534	0.424
IWB4	0.873	0.387	0.440	0.445
IWB5	0.694	0.355	0.304	0.306
IWB6	0.858	0.431	0.427	0.418
KNS1	0.508	0.798	0.212	0.289
KNS2	0.469	0.863	0.237	0.326
KNS3	0.460	0.859	0.213	0.352
KNS4	0.301	0.877	0.172	0.320
KNS5	0.189	0.766	0.159	0.275
KNS6	0.178	0.774	0.130	0.338
KNS7	0.461	0.876	0.399	0.397
KNS8	0.329	0.843	0.309	0.280
PJS1	0.323	0.245	0.736	0.283
PJS2	0.365	0.204	0.747	0.346
PJS3	0.462	0.242	0.809	0.334
PJS4	0.446	0.288	0.889	0.295
PJS5	0.450	0.220	0.865	0.223
PJS6	0.479	0.226	0.901	0.204
TL1	0.396	0.314	0.230	0.835
TL2	0.458	0.356	0.327	0.842
TL3	0.535	0.421	0.336	0.876
TL4	0.182	0.195	0.171	0.719
TL5	0.299	0.264	0.196	0.769
TL6	0.260	0.249	0.198	0.723
TL7	0.314	0.220	0.294	0.672

IWB Innovative work behavior, PJS Pandemic Job Stress, KNS Knowledge Sharing, TL Transformational Leadership.

Structural model

This study examined three positive relationships and one negative, one mediating, and one moderating relationship using the Smart-PLS bootstrapping method (Hoque, 2016). We found that TL ($\beta = 0.261$, $t = 3.880$, $p = 0.000$) and KNS ($\beta = 0.260$, $t = 4.628$, $p = 0.000$) positively influence IWB. Therefore, H2 and H4 are supported. We also found that TL ($\beta = 0.390$, $t = 5.541$, $p = 0.000$) positively influences KNS. Therefore, H3 is supported Fig. 1.

We proposed that PJS would have a negative impact on IWB, but the findings ($\beta = 0.353$, $t = 6.523$, $p = 0.000$) showed that H1 is rejected. In this relationship (H1), the p and t values were found to be significant, but the β coefficient was in the opposite direction of the proposed one; therefore, we considered H1 a rejected hypothesis (Bélanger & Carter, 2008). Fig. 2 describes the factor loadings, β , and R-square values. Fig. 3 describes the t statistics.

On the other hand, we found that KNS moderates the relationship between PJS and IWB ($\beta = -0.140$, $t = 2.719$, $p = 0.007$). Consequently,

H5 is accepted. The results of the direct relationships are presented in Table 5, while Table 6 describes the moderation test results.

The mediating relationship was tested using the variance accounted for values (Chudhery et al., 2021; Wong, 2016), presented in Table 7. We analyzed the direct effect (0.467), indirect effect (0.127), total effect (0.594), and variance accounted for values (21%) and concluded that KNS partially mediates the relationship between TL and IWB.

Discussions

Studies on job stress, particularly in the pandemic environment, are scarce. To overcome this gap, we aimed to conduct empirical research to investigate the effect of job stress caused by the COVID-19 pandemic on the IWB of academic staff in public sector universities in developing countries like Pakistan. The results show that PJS has a positive but significant impact on IWB. This outcome is contradicted by the studies conducted by Bani-Melhem et al. (2020) and Montani & Staglianò (2022), who found that job stress has a negative relationship with IWB. Their study was conducted on frontline employees working in five-star hotels in the UAE and R&D-related employees working in United States and United Kingdom technology-based firms. On the other hand, the study conducted by Bani-Melhem et al. (2018) partially supported our results. Their study proposed a negative relationship between job stress and IWB, but their findings depicted a positive but insignificant relationship between job stress and IWB; their study was conducted on a sample of employees from four- and five-star hotels in the UAE.

Another study by Luis et al. (2020) found a positive and significant link between job stress and IWB. However, they studied occupational stress, not stress induced by catastrophic events, such as the current COVID-19 pandemic. Their study sample included respondents from multiple fields, such as banking, healthcare, finance, retailing, and education. Moreover, Anderson et al. (2004) also supported the idea that stress can lead to higher learning motivation and IWB. They described how various stressors, such as threats, could enhance IWB. Bani-Melhem et al. (2020) also observed that job stress does not always have a detrimental negative effect, but also supports employees to become capable and encourages them to create novel ideas to overcome traumatic conditions.

The results show that TL has a positive but significant impact on IWB. Although previous studies have examined the positive link between TL and IWB (Afsar et al., 2019; Khalili, 2016), this connection has only been investigated among hotel industry employees and multi-sector organizations. Our study confirms the results of the study conducted by Elrehail et al. (2018), who found that TL was positively related to IWB; they conducted their study on the academic staff of private universities in Jordan. Conversely, Sudibjo &

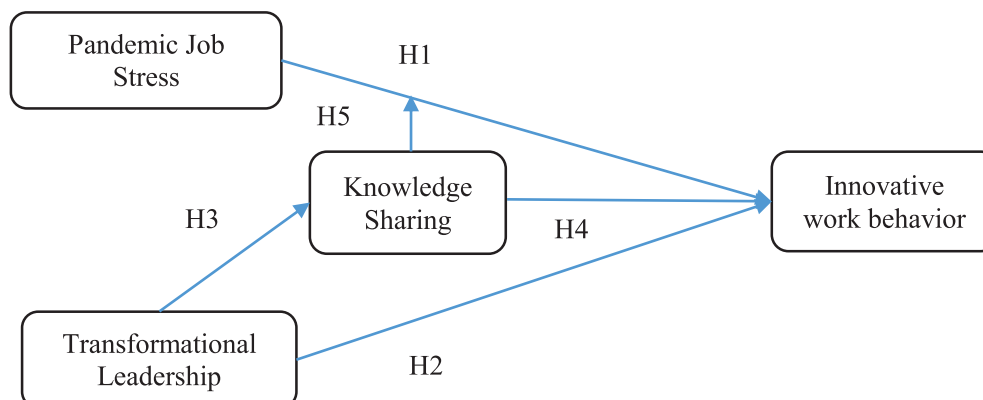


Fig. 1. Research Model.

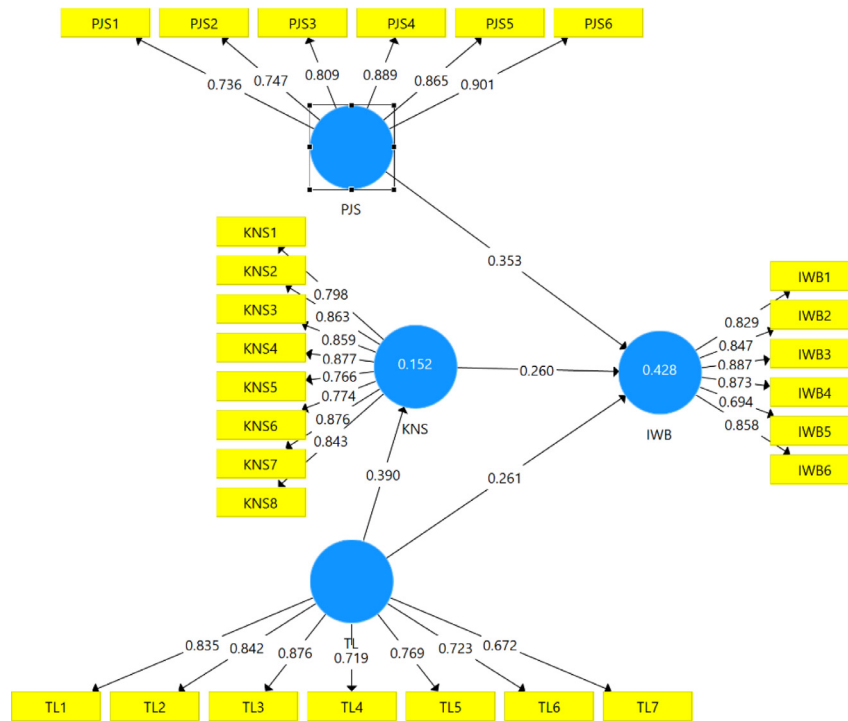


Fig. 2. Results of Research Model (Factor Loadings, β , and R Square Values).

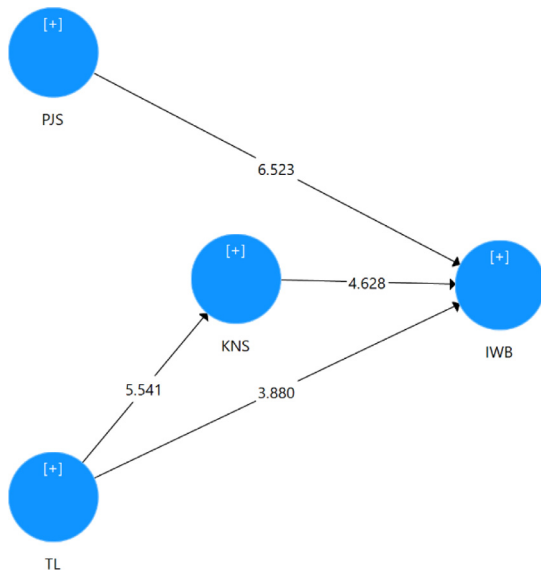


Fig. 3. Results of Research Model (t statistics).

Table 5
Research model results.

Hypotheses	β	T Statistics	P Values	Remarks
H1 PJS → IWB	0.353	6.523	0.000	Rejected**
H2 TL → IWB	0.261	3.880	0.000	Accepted
H3 TL → KNS	0.390	5.541	0.000	Accepted
H4 KNS → IWB	0.260	4.628	0.000	Accepted

IWB Innovative work behavior, PJS Pandemic Job Stress, KNS Knowledge Sharing, TL Transformational Leadership.

** The path is significant. However, H1 is not supported since the coefficient sign is in the opposite direction of the prediction (Bélanger & Carter, 2008).

Prameswari (2021) examined the negative relationship between TL and IWB while studying elementary school teachers in Jakarta, Indonesia. Bednall et al. (2018) found no curvilinear relationship between TL and IWB in the USA and the Netherlands.

In addition, our results demonstrate a positive and significant relationship between KNS and IWB. This outcome is consistent with past studies (Al-Husseini et al., 2021; Choi et al., 2016) and contradicted the study by Usmanova et al. (2020), in which they found no significant relationship between KNS and IWB; their study was conducted on employees in Chinese multinational companies in Kazakhstan. The reason behind the contradiction in the results is the context of the studies. Our results show that academic staff's willingness to share their knowledge (donating and collecting knowledge) ultimately improves the quality of education in terms of research output, curricula development, and new technology adoption to support academic activity.

Moreover, the results demonstrate that KNS plays a significant moderating role between PJS and IWB. The study by Montani and Staglianò (2021) supports our findings. In their study, they found that job-related stress can harm employees' innovations only when employees do not engage in KNS. On the other hand, employees who engage in KNS in the workplace report a high potential for innovation, particularly in the stressful environment of COVID-19. This contributes to the sustainable growth of the organization because, in the process of KNS, individuals share their knowledge mutually and therefore achieve organizational success (Le & Lei, 2019). Moreover, Alam et al. (2020) support the moderation role of KNS; in their study, they empirically proved that employees involved in the KNS process are more vigilant and expected to create novel ideas to overcome problematic situations better. Arsawan et al. (2020) also

Table 6
Moderating effect of KNS.

Relationship	β	T Statistics	P Values	Remarks
PJS → IWB	-0.141	2.719	0.007	Supported

Table 7
Mediation testing.

Relationship	DE	IE	TE	VAF	Mediation
H5: TL → KNS → IWB	0.467	0.390 × 0.325 = 0.127	0.127 + 0.467 = 0.594	21%	Partial

DE: direct effect; IE: indirect effect; TE: total effect; VAF: variance accounted for; IE = Path 1 × Path 2; TE = IE + DE; VAF = IE/TE; VAF value > 80% = Full mediation; VAF value between 20% and 80% = partial mediation; VAF value < 20% = no mediation.

acknowledged KNS as a tool for coping with traumatic situations at work. Moreover, [Mittal & Dhar \(2015\)](#) witnessed the moderation role of KNS. They claimed that individuals who engage in KNS are more curious and consider the new challenging situations to be less stressful, adapting more certainly to the new environment.

[Mittal & Dhar \(2015\)](#) showed that individuals with a high level of KNS are more likely to deploy their creative aptitudes to innovative outcomes. Moreover, when employees under stress engage in KNS behavior, it leads them to overcome traumatic conditions. Accordingly, KNS was a key enabler of employee innovations against Covid-19 stress ([Montani & Staglianò, 2022](#)). [Ghani Al-Saffar & Obeidat \(2020\)](#) also acknowledged that KNS behavior boosts employees' creativity and improves their performance. Furthermore, the study by [Kucharska & Erickson \(2020\)](#) has shown that KNS helps achieve the desired performance through the creation, storage, and application of useful knowledge, which facilitates the work in organizations that leads to innovation by introducing new things through training and dialog between team members.

Furthermore, our results demonstrate that KNS partially mediates the association between TL and IWB. This outcome matches the previous study conducted by [Al-Husseini et al. \(2019\)](#). They found that KNS partially mediates the TL and IWB relationship; their study addressed academic staff in public sector universities in Iraq. Our results show that when TL couples with KNS, it enhances employees' IWB. In addition, [Choi et al. \(2016\)](#) support the mediation role of KNS between TL and IWB. They found that TL motivates individuals to share knowledge, which ultimately leads them to create behaviors and [Le & Lei \(2019\)](#) also examined the mediation role of KNS between TL, product innovation, and process innovation and proved that TL positively influences KNS and consequently augments the employees' and the firm's innovation. [Al-Husseini et al. \(2019\)](#) also acknowledged the mediation role of KNS, and they found that individuals under TL feel trusted and involved in the KNS process and are more willing to collect and donate knowledge. [Mohamad \(2012\)](#) also supports our findings that leaders who foster trust and respect among employees lead them to acquire and share knowledge among organizational members.

Lastly, our results show that KNS is positively connected to TL and IWB in higher education institutions. This would advocate that KNS is crucial for organizations that can be recognized as an accelerating condition for the role of TL and guide institutions toward innovations. Knowledge that can thrive as a result of KNS is strategically acknowledged as an organizational source that becomes the foundation for competitive advantage ([Janteng & Tan, 2017](#)). [Dwivedi et al. \(2020\)](#) established a strong relationship between TL and employee efficiency, which leads to innovations in organizations. This relationship can be enhanced further when mediated by KNS, which supports our findings. Thus, it can be acknowledged that organized and continuous KNS can lead to innovations in higher education institutions.

Conclusions

This study explores the effect of PJS and TL on academic staff IWB and the mediating and moderating role of KNS using Smart-PLS in public sector universities in Pakistan. The results showed that PJS and TL are positively related to IWB, while KNS moderates the relationship between PJS and IWB while partially mediating TL and IWB. This

is one of the earlier studies investigating how PJS is related to academic staff IWB in developing countries, particularly in the environment of the COVID-19 pandemic.

Implications

Theoretical implications

Our study results make some relevant contributions to research and theory. First, we developed a comprehensive model to investigate inconsistent findings on the relationship between job stress (stress not induced by organizational events) and IWB. Second, this is the first study investigating the moderation role of KNS between the association of PJS and IWB and the mediation role of KNS between TL and IWB, especially in public sector universities in developing countries like Pakistan. Studying these constructs in the environment of extra-organizational events is a novelty. Moreover, the outcomes of this study discovered how PJS could produce positive energy in employees to fight back and become capable of overcoming the deprived conditions that lead them to creative thinking and find new ways to accomplish goals.

In addition, KNS was a significant component in enhancing employees' IWB, particularly in the COVID-19 pandemic. The study results revealed that when KNS behavior is high, the IWB of employees is high (or vice versa). This study also proved that the transformational style of leadership is more crucial even in times of catastrophic events compared to other types of leadership that can stimulate idea generation capabilities, which are critical to handling unexpected situations, and this supports the previous findings ([Afsar et al., 2019](#); [Khalili, 2016](#)).

Practical implications

This study provides insightful points on practical implications for decision makers and practitioners, particularly in the academic sector. This study recommends that employees who are intensively involved in research activities should have their pandemic stress levels monitored regularly to ascertain any deviations from standards. Moreover, employees' IWB can be boosted by identifying stress factors. This study also broadens stress management interventions by extending prior studies on crisis management, recommending that unexpected and occasional crises can lead to cognitive rigidity that can obstruct creative thinking and positively impact innovations when employees engage in KNS behaviors.

Our study finds KNS to be a coping behavior that enhances employees' innovative performance, specifically in the pandemic environment that negatively influences cognitive thinking. Therefore, organizations should create a fertile environment for mutual KNS among employees to overcome stressful conditions and manage crises. KNS is the exchange of experiences, expertise, skills, and information. [Elrehail et al. \(2018\)](#) found that in the KNS environment, leaders are in better positions to receive feedback and suggestions from subordinates, which helps them make effective decisions. Therefore, leaders should focus on information and communication technologies, networking development, and mutual knowledge exchange among employees to create a KNS environment. Informal communication, coaching, and brainstorming sessions are also

helpful; they can help stimulate innovative projects successfully in the face of a stressful environment.

This study demonstrates the significance of TL in the academic sector, predominantly in the pandemic environment, where leaders' sense of responsibility increases. Consequently, universities should foster the presence of transformational leaders who trigger their employees' behavior for innovative performance. This type of leadership provides a clear direction and develops an environment for mutual respect and trust, where everyone asserts their efforts for a common cause. Furthermore, innovations are based on the sharing of knowledge, and transformational leaders are the leaders who create a knowledge-sharing environment, which boosts the employees' intellectual capabilities that lead them to innovative performance.

Limitations and future recommendations

This study also has certain limitations. Data collection was limited to public sector universities, predominantly in developing countries, such as Pakistan. For the general applicability of the findings, other sectors, such as the manufacturing and services industries, may also be considered for data collection in future which may provide different results. This study investigated the impact of pandemic-induced job stress on IWB. Future studies could also examine other stress factors, such as poor interpersonal relations, emotional exhaustion, lack of recognition, and IWB.

Additionally, organizational support and individual resilience are essential components, particularly in the COVID-19 environment, where their influencing role cannot be neglected, which can be explored in future studies. Likewise, this study is based on a cross-sectional design and self-reporting data, which can cause a common method bias; employees' nature and perceptions may also change over time. Therefore, the current study may be replicated by taking others' reported measures and self-reporting data to minimize the risk of common method bias. Similarly, a longitudinal study may also be recommended for more accurate inferences in future research.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix. Questionnaire

Items	Construct
INNOVATIVE WORK BEHAVIOR Source: (Scott & Bruce, 1994)	
IWB 1	While working in this institution, I have come up with innovative and creative notions
IWB 2	While working in this institution, I try to propose my creative ideas and convince others.
IWB 3	While working in this institution, I seek new service techniques, methods, or techniques
IWB 4	While working in this institution, I provide a suitable plan for developing new ideas.
IWB 5	While working in this institution, I try to secure the funding and resources needed to implement innovations.
IWB 6	Overall, I consider myself a creative member of my team in this department.
PANDEMIC JOB STRESS Source: (Hochwarter et al., 2008)	
PJS1	The recent string of COVID-19 has had an adverse impact on my job.
PJS2	COVID-19 has made things more stressful at work.
PJS3	The consequences of COVID-19 have caused many to worry about keeping their jobs.
PJS4	COVID-19 has caused me to work harder and faster.
PJS5	COVID-19 has caused me to work longer hours. (dropped due to low factor loading)
PJS6	COVID-19 has made work more demanding.
TRANSFORMATIONAL LEADERSHIP Source: (Carless et al., 2000)	
TL1	My leader communicates a clear and positive vision of the future.
TL2	My leader treats staff as individuals, support and encourages their development.
TL3	My leader gives encouragement and recognition to staff.
TL4	My leader fosters trust, involvement, and cooperation among team members.
TL5	My leader encourages thinking about problems in new ways and questions assumptions.
TL6	My leader is clear about his/her values and practices what he/she preaches.
TL7	My leader instills pride and respect in others and inspires me by being highly competent.
Knowledge Sharing Source: (van den Hooff & de Ridder, 2004)	
KNS1	When I have learned something new, I tell my colleagues about it.
KNS2	I share the information I have with my colleagues.
KNS3	I think it is important that my colleagues know what I am doing.
KNS4	I regularly tell my colleagues what I am doing
KNS5	When I need certain knowledge, I ask my colleagues about it.
KNS6	I like to be informed of what my colleagues know.
KNS7	I ask my colleagues about their abilities when I need to learn something.
KNS8	When a colleague is good at something, I ask them to teach me how to do it.

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