

Strengthening Innovative Work Behavior via Psychological Capital: A Moderated Mediation Framework

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Abstract

Drawing on social cognitive theory, this study examines the mediating impact of virtual social support network between psychological capital and innovative work behavior and the moderating impact of resistance to digitalization between psychological capital and virtual social support network. Multisource, multiwave data (N=365) were collected from faculty of medical colleges and universities of Pakistan. PROCESS macro-Hayes (Model 4 and 7) were applied to confirm the hypotheses. The results indicate that psychological capital is significantly associated with innovative work behavior, with virtual social support and resistance to digitalization observed as a mediator and boundary condition, respectively. Moderated mediation analysis confirmed the collective effects of psychological capital, virtual social support, and resistance to digitalization on innovative work behavior. The findings suggest that health teaching institutes should provide psychological capital to their faculty to promote virtual social support and innovative work behavior. This study provides healthcare policymakers with insights into mitigating resistance to digitalization risk.

Keywords: Psychological capital; virtual social support network; resistance to digitalization; innovative work behavior; social cognitive theory

Citation: Khalil Nasir khan, Dr. Mutahir Hussain Shah. 2025. Strengthening Innovative Work Behavior via Psychological Capital: A Moderated Mediation Framework. FishTaxa 36(1s): 90-101.

Introduction

Innovation plays a pivotal role in adapting to rapid technological advancements and evolving educational demands in contemporary healthcare and academic environments. **Social cognitive theory (Bandura, 1986) offers a theoretical justification by emphasizing the reciprocal interactions among cognitive, behavioral, and environmental factors that shape individual innovation behaviors.** Particularly in medical colleges and universities (MCUs) of Pakistan, fostering innovative work behavior (IWB)—the intentional generation, promotion, and implementation of novel ideas, technologies, and processes—is essential to enhancing educational outcomes, research effectiveness, and healthcare service delivery. A very limited amount of efforts have been made to study influence factors for innovative behavior among faculty at medical institutions in Pakistan despite broad recognition of its importance.

The four elements of psychological capital (PsyCap) – self-efficacy, resilience, optimism and hope – have a major impact on how employees are motivated to behave innovatively (Hanif et al., 2022, Çavuş & Gökçen, 2015). Social cognitive theory views PsyCap as core cognitive assets that enable faculty members to take active part in innovation activities (Luthans et al., 2015). PsyCap shows a need for more thorough investigation on its conversion methods toward innovative behavior within academic contexts experiencing digital transformation (Khoshaim, 2024). The current study will introduce virtual social support networks (VSSNs), or virtual (online) peer (mutual) support groups, as mediating tools which turn psychological resources into innovative outcomes by providing online collaboration and resource sharing opportunities. The role of social and environmental resources including virtual networks receives backing from social cognitive theory because these elements strengthen individual capabilities and generate innovation-related results (Peng, 2022; Masoud et al., 2021).

The evaluation includes resistance to digitalization which describes the reluctance or unwillingness of parties to adopt new digital technologies for affecting VSSN effectiveness (Prakash & Das, 2022; Muneeb et al., 2021). The likelihood of resistance diminishes the positive effects that PsyCap has on innovative work behavior which virtual social connections provide (Mishra et al., 2019). The concept of social cognitive theory emphasizes people's environmental reactions to change together with their perception processes therefore this exploration of digitalization resistance as an essential moderating variable becomes vital (Ahmed, 2023). Understanding this restraining function is essential for Pakistani medical academic institutions because their different levels of digital implementation affect the innovation capabilities of teaching staff (Khan et al., 2021). Understanding these relationships between variables becomes vital for every institution which intends to achieve technology integration success and academic excellence sustainability. Therefore,

there is a need to embrace a validated theoretical model founded on social cognitive theory that integrates PsyCap and VSSN variables alongside resistance to digitalization to study innovative work behavior.

This study validates the relationships between MCU faculty members in Pakistan by providing evidence which aids institutions in developing practical approaches to decrease digital resistance and utilize virtual support structures and boost psychological capital to stimulate innovative conduct. The research adds theoretical depth along with practical applications that help academic administrators and government officials enhance innovation and organizational outputs in medical education and healthcare systems. This study had two primary objectives. The first was to examine the positive effects of PsyCap on VSSN and innovative work behavior, and examining the moderating effect of resistance to digitalization in the association between PsyCap and VSSN was the second objective. The structure of the manuscript is as follows: First, we explain by outlining the conceptual framework and context suitability. Second, we elucidate the theoretical foundation before formulating the study hypotheses. Third, we describe the research approach, which includes measures along with analytical strategy. Fourth, after the interpretation of the results, the study proceeds with discussion and findings. Fifth, the theoretical and practical implications were presented. Finally, limitations and future recommendations along with conclusion are provided at the end of the manuscript.

Literature Review And Hypotheses Development

Mediating role of virtual social support network

Psychological Capital (PsyCap)—comprising optimism, resilience, hope, and self-efficacy—has been widely recognized as a key driver of innovative work behavior (Luthans et al., 2007). Faculty members with high PsyCap exhibit greater confidence, motivation, and persistence in developing and implementing novel ideas (Li et al., 2023). However, the specific mechanisms through which PsyCap enhances innovation remain underexplored, particularly in the context of academic institutions (Naseem et al., 2025). Given the increasing integration of digital tools in education, it is crucial to examine how virtual interactions can facilitate innovation among faculty members (Ashraf et al., 2021). In medical colleges and universities in Pakistan, where digital transformation is reshaping educational and healthcare practices, fostering an environment that enhances innovative capabilities is particularly relevant (Jabeen et al., 2024). Despite growing research on workplace innovation, limited studies focus on how PsyCap interacts with digital platforms to drive innovative behavior in academic settings.

Virtual Social Support Networks (VSSNs) represent an important mediator because they let faculty members collaborate and exchange knowledge, and seek digital support (Raza et al., 2020). Faculty members gain quick access to multiple sources of knowledge through these networks that promotes innovative problem-solving and supports perpetual learning (Asghar et al., 2022). Active participation in virtual support networks among faculty members results in better encouragement along with new ideas and practical solutions that lead to better abilities for implementing innovative teaching methods and research protocols and healthcare delivery approaches (White & Dorman, 2001). Research data now demonstrates that VSSNs enhance workplace innovation because colleagues connect through the internet to psychologically boost one another (Restler & Woolis, 2007). Digital collaboration platforms developed by organizations yield superior employee creativity and knowledge-sharing which demonstrates the powerful academic transformation potential of VSSNs (Eysenbach et al., 2004).

Virtual support networks assist stakeholders by lowering their psychological resistance to innovation while they overcome both self-doubt and concerns about failure (Kumar et al., 2023, Hanif et al., 2023). The involvement of faculty members in VSSNs leads them to view innovation collectively instead of seeing it as an individual performance challenge so they become more active in research and creative endeavors (Kozinets et al., 2008). This networking system acts as a psychological shield that protects individuals from stress and helps develop resilience which are PsyCap components that lead to stronger innovative job behavior. Educational institutions need VSSNs because they promote cognitive reinforcement while providing emotional support which leads to extended innovation sustainability.

Social Cognitive Theory provides foundation for the mediating function of VSSNs because it demonstrates how human action emerges from interactions between cognitive processes environmental factors and behavioral elements (Bandura, 1986; Lin, 2010). The concept suggests that external environments which include virtual networks impact individual capabilities (PsyCap) to develop behavioral outcomes (innovation). Innovation within faculty members grows by using virtual networks as external sources which enable real-time feedback and social support access (Flynn et al., 2013). Through this theoretical explanation schools can create enabling environments which support long-term innovative efforts through the establishment of empowered virtual support networks that enhance psychological resource utilization across their membership (Suresh et al., 2021). Higher education institutions need to directly implement structured VSSNs because their digital dependence requires these measures to link psychological strengths with creative results for maintaining ongoing academic and professional expansion. Based on arguments, we proposed the hypothesis:

Hypothesis 1 (H1): Virtual social support network mediates the association between psychological capital and innovative work behavior.

Moderating role of resistance to digitalization

Virtual Social Support Networks (VSSNs) function as essential professional collaboration tools because they allow faculty members to trade knowledge while obtaining guidance and forming digital communities (Cabiati, 2021). The networks promote active participation through social networks that enable faculty members to find solutions and create new ideas (Cavinato et al., 2021). Personal factors affect how much individual faculty members adopt virtual resources for their work (Kalaitzaki et al., 2021). Resistance to digitalization weakens the effectiveness of VSSNs because faculty members show reluctance or fear toward digital adoption tools thus reducing professional growth opportunities and innovative possibilities (Scholkmann, 2021). The understanding of resistance toward digital adoption remains essential for medical colleges and universities in Pakistan to enhance their digital transformation strategies.

Resistance to digitalization modifies the connection between PsyCap and VSSNs to affect faculty member participation in virtual collaboration activities. People with less resistance tend to use VSSNs more frequently because these platforms enhance their psychological benefits for knowledge-sharing and fostering creativity (Nawaz & Liu, 2025, Sin et al., 2021). Faculty members who show strong resistance to digital tools tend to avoid VSSNs which results in diminished effectiveness of psychological resources for social collaboration. The effectiveness of VSSNs as professional interaction facilitators depends on handling resistance features since digitalization keeps expanding in educational and research environments (Nawaz et al., 2024, Fang et al., 2022).

The moderated mediation analysis draws its theoretical base from Social Cognitive Theory (Bandura, 1986) that explains how cognitive abilities create behavioral reactions and environmental elements interact. Digital resistance functions as a barrier in the environment which can boost or diminish the influence that psychological strengths have on virtual engagement (Hanif et al., 2025, Ma & Lee, 2019). The Virtual Social Support Network (VSSN) becomes an encouraging element that boosts participation and knowledge exchange within receptive digital settings (Zhang et al., 2025, Wang & Kim, 2024). Academic workers will cease their digital interactions, in situations of high digital resistance thus breaking down the PsyCap-VSSN framework (Simsek & Sali, 2014). The need arises for institutions to implement three categories of interventions starting with training programs and investing in infrastructure systems and providing digital literacy skills to help faculty members utilize Virtual Strategic Social Networks effectively for personal and career development.

Empirical research needs to confirm which digitalization-related conditions produce most resistance to new technology adoption in workplace settings (Nawaz et al., 2025, Burmann et al., 2023). For instance, it remains unclear whether faculty members' resistance stems primarily from technological complexity, perceived inefficacy, institutional policies, or cultural attitudes toward digitalization. Additionally, the interplay between digital resistance and other contextual factors, such as organizational support and leadership influence, warrants deeper examination (Agarwal & Prasad, 1999). Without addressing these nuances, institutional interventions may fail to adequately reduce resistance, limiting the effectiveness of virtual support networks in fostering innovation. Based on arguments, we proposed the hypothesis:

Hypothesis 2 (H2): The positive, indirect relationship between psychological capital and innovative work behavior through virtual social support network is moderated by resistance to digitalization, such that this indirect relationship is 1) weaker when the workplace contains high resistance to digitalization and 2) stronger when the workplace contains low resistance to digitalization.

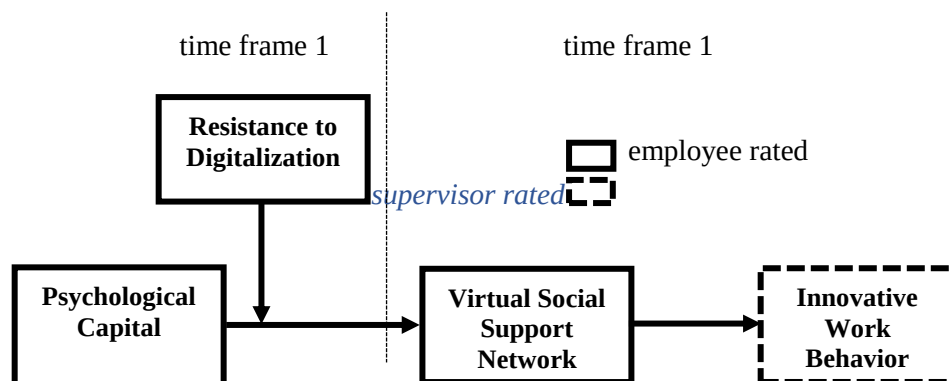


Figure 1. The conceptual framework

METHODS

Sample and Procedure

Primary data were gathered from the faculty of medical colleges and universities (MCU) operating in Pakistan. There were 15 MCU selected randomly, among them just 8 responded the survey questionnaire. Respondents were approached through e-mails and personal visits. Considering the theme of study, convenience sampling technique was employed for data collection. Following Min et al. (2016), data were collected in a dyad (multi-source) consisting of faculty and head of departments as their supervisors, to mitigate common method bias. To ensure that participants were paying attention throughout the survey, we implemented four attention checks at various points (such as “please select strongly disagree”) as suggested by Meade and Craig (2012). The data were collected at two distinct time points (multi-wave). The data pertaining to psychological capital and resistance to digitalization were gathered from employees at Time 1 (T1). Data pertaining to VSSN were collected from the same employees, and data pertaining to innovative work behavior were obtained from their head of departments during Time 2 (T2).

To ensure that the observations would not be buried under a sea of supervisors, we assigned unique identifiers to each questionnaire and sent them to both the employees and their immediate heads (Lee et al., 2013). The human resources department (HRD) assisted in the random pairing of employees with their direct supervisors. To ensure that supervisors and employees provided combined feedback on same instrument, we administered the same number of surveys to each group. HRD helped us to obtain all participants' employee IDs and apply issue-coding schema to match the time lag. During the data collection procedure, measures were taken to ensure that respondents were not subjected to any mental or emotional interruptions.

A total of 702 questionnaires were distributed during T1, resulting in a response rate of 64.81%, with 455 employees provided responses. During T2, the same employees and their supervisors were contacted, and after dealing with missing values and outliers, the data resulted in a total of 365 valid responses of employees. Since, the study primarily focused on innovative work behavior of faculty of MCU rated by their head of departments, therefore their demographic details are provided. The responses were as follows: 190 (52.05%) were male, 210 (57.53%) were in the age bracket of 40-50, 251 (68.77%) having 16-year of education, 90 (24.66) belongs to city Lahore, and 260 (71.23) were in married status.

Table 1. Demographic details

Variable	Category	N	Percentage (%)
Gender	Male	190	52.05
	Female	175	47.95
		365	100
Age	30-39	100	27.4
	40-50	210	57.53
	51-60	55	15.07
		365	100
Education	14 years of education	60	16.44
	16 years of education	251	68.77
	18 years of education	54	14.79
		365	100
Province (Punjab)	Lahore	90	24.66
	Faisalabad	75	20.55
	Multan	70	19.18
	Rawalpindi	65	17.81
	Gujranwala	65	17.81
		365	100
Marital Status	Married	260	71.23
	Single	105	28.77
Total		365	100

Note: N (sample), source: authors' work

Measures

The Luthans et al. (2007) scale, which has twelve items, was used to measure the *Psychological capital*. Each item was rated by the participants on a 5-point Likert scale, with 1 denoting "strongly disagree" and 5 denoting "strongly agree." "I feel confident presenting information to a group of colleagues" is one example of a sample item. The measurement of VSSN was conducted using a set of 8 items adapted by (Leimeister et al., 2008). The evaluation of these items was conducted using a 5-point Likert scale, with response options ranging from 1 "never" to 5 "frequently". A sample item includes "when I need advice there is always someone there is always someone available for me." *Resistance to digitalization* was scored using the three-item scale developed by Merhi and Ahluwalia (2019). The three items were assessed using a 5-point Likert scale, with response options ranging from 1 "strongly disagree" to 5 "strongly agree". A sample item includes "The innovations in my organization's digital transformation policies and technologies unsettle me". *Innovative work behavior* was measured using a supervisor-rated original six-item scale developed by Scott and Bruce (1994). Supervisors were asked to rate their subordinated employees on a 5-point Likert scale ranging from 1 "not at all" to 7 "an exceptional degree". A sample item is "searches out new technologies, processes, techniques and/or product ideas" (Scott & Bruce, 1994, p. 601). *Control variables* were age, education, gender, and marital status. They usually affect subordinate innovative work behavior; thus, we adjusted for them (Yang et al., 2016). We used codes for demographic factors provided by subordinates, for example, for education 1= matriculation, 2= intermediate, 3= bachelor's, 4= master's, 5= PhD, for gender 1= male, 2= female, and measured age and organizational tenure continuously.

Results

Data pertaining to outliers, multicollinearity, and normality were examined due to their fundamental assumptions for the application of the structural equation modeling (SEM) technique. Few missing values were identified, which were handled by "replacing with mean" formula through the statistical package for social sciences (SPSS). The stem-and-leaf method was employed to identify outliers, resulting in the identification of eight responses that exhibited problematic values. Consequently, the final analysis did not include these responses. Moreover, the skewness and kurtosis values were within the corresponding limits of ± 1 and ± 3 . Furthermore, the absence of multicollinearity was indicated by correlation coefficients between the variables that were less than 0.70 (Tabachnick & Fidell, 2007).

Factor Loading

We first conducted factor loading analysis before the execution of confirmatory factor analysis (CFA) because items must load on their respective constructs. The factor loading of the items was examined using the Kaiser-Meyer-Olkin (KMO) and Bartlett's tests, employing the maximum likelihood extraction method. The value of KMO was determined to be 0.866 through the analysis of item loading. This study includes an appropriate item for each construct's unidimensionality, the minimum threshold of items' loading was ≤ 0.50 on their respective component was item number 4 VSSN (i.e., I have a moral obligation to uphold the principles of fairness), which was deleted to maximize the effectiveness of results as suggested by Netemeyer et al. (2003). In addition, Table 2 displays the Cronbach's alpha (α) values, which were determined to be above the minimum criterion of 0.70 for all research variables (Taber, 2018).

Table 2. Factor loadings and cronbach' alpha

Sr no.	Items	Factor Loading	Cronbach Alpha
<i>Psychological Capital</i>			0.961
1	Item 1	.552	
2	Item 2	.758	
3	Item 3	.883	
4	Item 4	.876	
5	Item 5	.930	
6	Item 6	.782	
7	Item 7	.676	
8	Item 8	.618	
9	Item 9	.649	
10	Item 10	.855	
11	Item 11	.850	
12	Item 12	.918	
<i>VSSN</i>			0.885
1	Item 1	.565	
2	Item 2	.752	
3	Item 3	.743	

4	Item 4	.543	
5	Item 5	.597	
6	Item 6	.722	
7	Item 7	.810	
8	Item 8	.865	
	Resistance to digitalization		0.911
1	Item 1	.993	
2	Item 2	.790	
3	Item 3	.950	
4	Item 4	.624	
	Innovative work behavior		0.925
1	Item 1	.723	
2	Item 2	.862	
3	Item 3	.807	
4	Item 4	.853	
5	Item 5	.801	
6	Item 6	.777	

Composite Reliability, Convergent, and Discriminant Validity

Composite reliability (CR) measures the internal consistency of scale items (Netemeyer et al., 2003). For scale composite reliability, Hair et al. (2010) proposed that if the threshold value of CR is ≥ 0.70 , the scale will be reliable. In this study, all the values of CR were > 0.70 ; therefore, all the scales were reliable for further analyses (see Table 3).

Convergent and discriminant validity has been evaluated through the technique suggested by Hair et al. (2010), which determines whether the constructs converge with and are distinct from each other. Following Hair et al. (2010), we found no issue with convergent and discriminant validity in this study because 1) all the values of AVE are > 0.50 , and 2) all the values of MSV are $<$ the values of AVE (see Table 1). Furthermore, none of the off-diagonal values exceeded the respective diagonal values, revealing that all constructs fulfilled the condition of discriminant validity.

Table 3. Composite Reliability, Convergent and Discriminant Validity

Variable	CR	AVE	MSV	MaxR(H)	RD	PsyCap	VSSN	IWB
RD	0.911	0.725	0.002	0.990	0.852			
PsyCap	0.959	0.668	0.169	0.993	-0.047	0.817		
VSSN	0.888	0.614	0.176	0.993	-0.014	0.338	0.784	
IWB	0.926	0.677	0.176	0.994	-0.039	0.411	0.419	0.823

Note: CR = composite reliability, AVE = average variance extracted, MSV = maximum shared variance, MaxR(H) = maximum reliability or H reliability, RD = resistance to digitalization, PsyCap = psychological capital, VSSN = virtual social support network, IWB = innovative work behavior

Confirmatory Factor Analysis (CFA)

By following the assumptions to conduct CFA given by Hair et al. (2010), the values for CR, AVE, and α (i.e., ≥ 0.60 , ≥ 0.50 , and ≥ 0.70 , respectively) were evaluated first. Then, while performing CFA, we found that the initial values of the model fit were not within the standard values, such as $\chi^2=5602.34$, $\chi^2/DF=17.29$, GFI=0.43, IFI=0.47, TLI=0.42, CFI=0.47, SRMR=0.17, RMSEA=0.21. However, the model fit values improved after co-varying only a few items of PsyCap with greater modification indices (M.I.). Hence, the CFA results advocated that the full measurement model (i.e., four-factor model) is excellent fit, because the values meets the thresholds, such as $\chi^2=756.63$, $\chi^2/DF=2.42$, GFI=0.87, IFI=0.95, TLI=0.95, CFI=0.95, SRMR=0.41, RMSEA=0.06. Statistics in Table 4 show that the model fit values are better than A, B, and C. We found hypothesized model values are within the standard brackets.

Table 4. Fit Statistics from Measurement Model Comparison

Models	χ^2	DF	χ^2 / DF	GFI	IFI	TLI	CFI	SRMR	RMSEA
Factor Model D (full measurement model)	756.63	312	2.42	.87	.95	.95	.95	.41	.06

Factor Model C (three-factor model)	2838.61	321	8.84	.63	.74	.72	.74	.09	.14
Factor Model B (two-factor model)	4180.47	323	12.94	.55	.61	.58	.61	.12	.18
Factor Model A (one-factor model)	5602.34	324	17.29	.43	.47	.42	.47	.17	.21

Note: n = 601, All models are compared with the full measurement model.

Descriptive Statistics, Reliability, and Correlation Analysis

Demographic were taken as control variables, Table 3 presents the statistical measures of the central tendency (mean), dispersion (standard deviation), and associations (correlations) among the variables. The observed correlations, which aligned with the expected outcomes, offered preliminary evidence in favor of the hypothesized associations.

Participants displayed consensus in their views on variables as, psychological capital (M = 4.01), VSSN (M = 2.88), innovative work behavior (M = 3.53), and resistance to digitalization (M = 3.47). A significant positive correlation was found between psychological capital and VSSN ($r = 0.32$, $P < 0.01$) and between psychological capital and innovative work behavior ($r = 0.390$, $P < 0.01$). An insignificant inverse relationship of moderator (resistance to digitalization) was identified with other variables, since resistance to digitalization is a moderating variable so its direct correlation with other variables is not concern of study. Further, a significant correlation was observed between VSSN and innovative work behavior ($r = 0.40$, $P < 0.01$) (see Table 5).

Table 5. Correlation analysis

Variables	Mean	1	2	3	4	5	6	7	8
1 Age	2.24	1							
2 Gender	1.87	.132*	1						
3 Education	1.50	-.043	-.006	1					
4 Marital status	1.51	.600*	.095	-.037	1				
5 PsyCap	4.01	.127*	.038	-.046	.140**	1			
6 VSSN	2.88	.108*	.067	-.086	.143**	.325**	1		
7 Innovative work behavior	3.53	.111*	-.012	-.062	.192**	.390**	.401*	1	
8 Resistance to digitalization	3.47	.013	.015	-.068	.008	-.030	-.020	-.044	1

Note: ** $p < 0.01$, * $p < 0.05$

Hypotheses Testing

We employed the PROCESS macro-Hayes (Model 4) methodology to examine the mediation mechanism of VSSN between the association of PsyCap and innovative work behavior, as presented in Table 6, results revealed that PsyCap significantly influence innovative work behavior ($\beta = 0.37$, LL = 0.25, UL = 0.49, $p < 0.01$). Similarly, PsyCap significantly influence VSSN ($\beta = 0.40$, LL = 0.28, UL = 0.53, $p < 0.01$). We also found that the direct effect (PsyCap $\rightarrow$ innovative work behavior) was significant ($\beta = 0.37$, LL = 0.25, UL = 0.49, $p < 0.01$) and higher than the indirect effect (PsyCap $\rightarrow$ VSSN $\rightarrow$ innovative work behavior), which was also significant ($\beta = 0.12$, LL = 0.07, UL = 0.19, $p < 0.05$). These results support H1 of the study. Since along with the indirect effect, the direct effect is also significant; therefore, VSSN partially mediates the association between PsyCap and innovative work behavior.

Table 6. Mediation Analyses

Relationships	β	SE	95% Confidence	
			LL	UL
PsyCap $\rightarrow$ innovative work behavior	0.37**	0.06	0.25	0.49
PsyCap $\rightarrow$ VSSN	0.40**	0.06	0.28	0.53
VSSN $\rightarrow$ innovative work behavior	0.31**	0.05	0.21	0.41
Mediation of VSSN				
Direct path	0.37**	0.06	0.25	0.49
Indirect path	0.12*	0.03	0.07	0.19

Note: OCB = organizational citizenship behavior, ** $p < 0.01$, * $p < 0.05$, Source: Authors'

We employed the PROCESS macro-Hayes (Model 7) methodology to examine the moderated mediation (see Table 7 and Figure 2). We examined the effects of 1) PsyCap, resistance to digitalization, and their interaction term on innovative work behavior, and 2) PsyCap and VSSN on innovative work behavior. We found that resistance to digitalization weakens the mediating relationship between PsyCap and innovative work behavior. To assess the significance of the moderated mediating effect, the bootstrapping method proposed by Preacher and Hayes (2004) was employed. This method involved conducting 5,000 replicates, and the results indicated a significant effect at a p -value of less than 0.05. H2 was based on a comparative analysis of the magnitude of the conditional indirect impact of PsyCap on innovative work behavior through VSSN at different levels of resistance to digitalization. The results indicated that while increasing the magnitude (i.e., -1SD to +1SD) of resistance to digitalization, its effect size decreased. For example, the effect size was 0.14 when the moderator had a standard deviation below the mean (-1SD), 0.12 at the mean, and 0.10 above the mean (+1SD).

Moderated mediation was assessed through a direct check as well. This check also included the evaluation of the index of moderated mediation and its corresponding confidence interval (C.I.). The calculated index value was 0.01, and its confidence interval (LL = -0.01, UL = -0.05) did not encompass the value of 0. This shows that resistance to digitalization reduces the positive indirect association between PsyCap and innovative work behavior through VSSN, thereby supporting H2. We extracted moderation line graphs to further investigate the intensity of moderator at different levels, as suggested by Aiken and West (1991).

Table 7. Assessment of Moderated Mediation

Relationships	GRG	β	S.E.	p
PsyCap $\rightarrow$ innovative work behavior	0.21	0.37	0.06	***
VSSN $\rightarrow$ innovative work behavior	0.18	0.31	0.04	***
$R^2 = 0.23$				
PsyCap $\rightarrow$ VSSN	0.13	0.23	0.20	**
Resistance to digitalization $\rightarrow$ VSSN	-0.11	-	0.21	Insig.
PsyCap * resistance to digitalization $\rightarrow$ VSSN	0.07	0.04	0.05	*
$R^2 = 0.10$				
	Effect size	S.E.	Bootstrap 95% C.I.	
			LL	UL
-1 SD of resistance to digitalization	0.14	0.03	0.05	0.18
Mean (0) of resistance to digitalization	0.12	0.31	0.07	0.19
+1 SD of resistance to digitalization	0.10	0.39	0.08	0.24
Index of moderated mediation	0.01	0.02	-	-0.05

Note: *** $p < 0.01$, * $p < 0.10$, S.E. = standard errors, LL = lower limit, UL = upper limit, GRG = grey relational grade. Source: Authors'

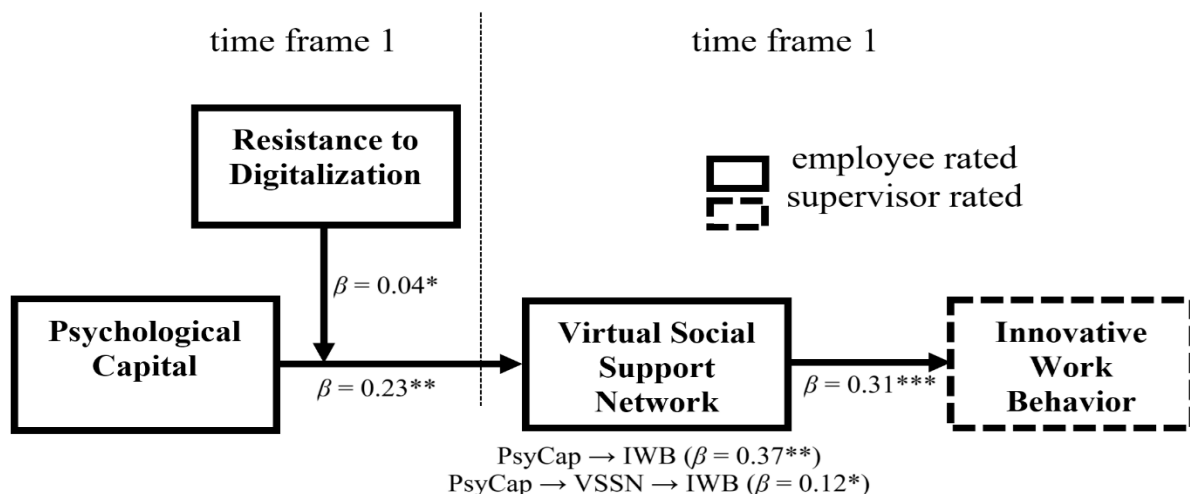


Figure 2. The structural model (Source: Authors' work)

To further understand the effect of low and high PsyCap we draw slopes. The lines are not parallel, as they have different slopes and y-intercepts. We found that the VSSN of employees is comparatively low at a low level of PsyCap and a high level of resistance to digitalization. The moderator (resistance to digitalization) is divided based on standard deviations (SDs), wherein in the presence of +1SD (high resistance to digitalization) the VSSN of respondents is high as compared to when there is -1SD (low resistance to digitalization). When PsyCap is high, then even at low resistance to digitalization, VSSN is comparatively high, which shows that although resistance to digitalization is important, PsyCap is more important in improving VSSN. Inline, at low I-PsyCap, there are highly significant differences among the three resistance to digitalization groups, and the slope of the line (rate of change of VSSN) is high when there is low resistance to digitalization. Therefore, MCU must improve the PsyCap of their faculty to stimulate their VSSN, and resistance to digitalization should be coped with (see Figure 2).

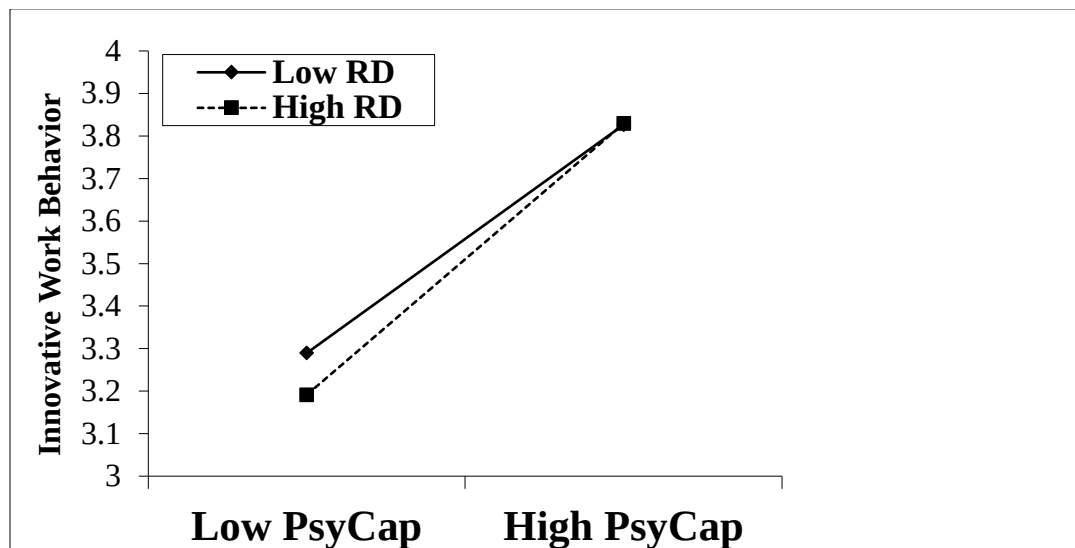


Figure 3. Moderating effects of resistance to digitalization on the relationship between Psychological capital and VSSN.

Discussion

Considering the importance innovative work behaviour in health-related teaching institutes, we aim to shed light on the emerging concepts of virtualization and digitalization in these institutes in current period. Specifically, our study aims to extend the literature by examining how the PsyCap through VSSN evokes employees' innovative work behavior. In addition, we explored the resistance to digitalization conditional effects between PsyCap and VSSN in Pakistan. Based on 365 responses, VSSN was found to be significant mediator between the association of PsyCap and innovative work behavior, whereas resistance to digitalization was found to be significant moderator between the association of PsyCap and VSSN. Our findings contribute to the existing body of knowledge both theoretically and practically.

Theoretical Implications

This study makes several theoretical contributions to the literature. First, the direct association between PsyCap and job-related outcomes of employees has been primarily examined in previous studies; however, there is a lack of attention to their process (Alwali, 2024; Bak et al., 2022). To fill this gap, this study highlights the dual paths (direct and indirect) through which PsyCap influence innovative work behavior. More specifically, this study extends the scope of PsyCap to VSSN, which explains the positive relationship between PsyCap and innovative work behavior, as Monica and Krishnaveni (2019) contended that social support can be an important factor in influencing employees' innovative work behavior. When employees perceive social support virtually, they are more likely to exhibit positive behavior, even in the absence of rewards, because they perceive their behavior as appropriate.

Another unique aspect of our research is a more detailed comprehension of the conditional role of resistance to digitalization between the association of PsyCap and VSSN. Existing literature has not adequately addressed the specific circumstances and reasons for the intersection between PsyCap and resistance to digitalization and how this intersection influences VSSN and innovative work behavior. Research considerations of this nature are essential for advancing the field of digital organizational psychology, as they offer valuable insights into the potential negative impacts of resistance. Considering this gap, our study contributes to the literature on digitalization in the Asian context and finds that resistance to digitalization diminish the potential benefits of PsyCap. Although the literature has highlighted that the socio-cultural context of Asia emphasizes obedience to authority and respect for hierarchy (Chaudhary *et al.*, 2023), our findings take this existing debate in another direction by exacerbating the challenges associated with resistance to digitalization. This study added that nowadays, employees who were brought up even in high-power cultures (Asian) don't perceive change in positive way, which affects behaviors.

Finally, this research advances the theoretical framework's applicability by integrating VSSN into social cognitive theory. The theory posits that when people observe a model performing a behavior and the consequences of that behavior, they remember the sequence of events and use this information to guide subsequent behaviors (Bandura, 1986). Therefore, the conceptual framework of this study provides theoretical justification by emphasizing the reciprocal interactions among cognitive, behavioral, and environmental factors that shape individual innovation behaviors. This study contextualized social cognitive theory within a specific cultural milieu by demonstrating how PsyCap and VSSN interact under resistance to digitalization to improve innovative work behaviour, thus offers a more nuanced theoretical model.

Practical Implications

Our findings have implications for both academicians and practitioners. First, by improving PsyCap of employees, management can create a virtual supportive work environment that helps them work with full potential and concentration. PsyCap should not only be viewed as to improve job performance, but also as a strategic tool to boost employees' innovative work behavior. The study highlights the importance of training programs that focus on frameworks to develop hope, self-efficacy, optimism and resilience to improve VSSN. To institutionalize this practice, PsyCap must be focused on priority. Consistency in the developing PsyCap framework may decrease employees' perceptions of favoritism, which otherwise undermines VSSN.

Owing to the importance and outcomes of VSSN, this study suggests embedding supportive environment in organizational practices. For example, being supportive and transparent in performance evaluation processes, employee involvement in decision-making, and recognizing rewarding behavior can reinforce employees' moral fabric in the workplace.

Fourth, resistance to digitalization severely damages workplace outcomes, in line with the literature our findings indicate that management tends to discourage resistance to digitalization. Management is suggested to train employees who are to be promoted on the flourishing acceptance digitalization, and training programs should include the following norms of the organization in accepting the change considering the current demand of workplace. Although few studies have examined the effectiveness of digitalization in certain settings, it cannot motivate employees to perform beyond their formal job descriptions which is the need of the hour.

Limitations and Future Suggestions

First, there are several limitations to the current study that future researchers should be aware of. First, this study is limited to the health-care institutes. Future studies can investigate the proposed model in other sectors as well to increase its generalizability. Second, although our study primarily focuses on the positive PsyCap to obtain positive outcomes, the virtual side of consequences is still missing. Therefore, we suggest that future researchers further understand PsyCap, their benefits, and costs in terms of virtual digitalization. Third, we employed a cross-sectional time-lagged study design to tackle common method bias, where data were collected in dyads, however, this limits our inferences regarding causality. Thus, we suggest that future researchers investigate the proposed model by utilizing an experimental and/or longitudinal study design to provide firm evidence of causation. Moreover, conducting research using qualitative or mixed-methods approaches could also offer a comprehensive understanding of both Asian and Western organizational settings.

Fourth, contributing to social cognitive theory, we identify VSSN as a potential mediator between PsyCap and innovative work behavior. Future studies should investigate other unexplored connections between PsyCap and employees' job-related outcomes, such as AI-driven job performance, digital resilience and adaptability. Fifth, the collected data is limited, therefore, the grey system theory along with social cognitive theory can also be applied for analysis in future studies, as it is best suited to analyze limited data (Nawaz et al., 2024; Liu and Yang, 2023). Finally, we consider resistance to digitalization as a conditional variable, and there is also a need to understand how acceptance of digitalization would affect this moderated mediation model. In addition, personality shapes individuals' behavior; therefore, examining various positive personality traits would further extend the literature on VSSN and digitalization.

Conclusion

This study examined the impact of PsyCap on innovative work behavior through the moderated mediation mechanism of VSSN and resistance to digitalization in the healthcare sector teaching institutes of Pakistan. The findings reveal that VSSN mediates the association between PsyCap and innovative work behavior. Resistance to digitalization mitigates the positive indirect relationship between PsyCap and innovative work behavior through VSSN. The study suggests that MCU should implement training and mentorship programs for their faculty to enhance innovative work behavior. The study also contributes to the literature on human resource development, organizational psychology and social cognitive theory. The study is associated with the healthcare challenges faced by developing countries, as they are seeking increased global attention, as their progress in addressing health issues has become increasingly recognized.

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