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Knowledge Management and Profitability: The Critical Role of Breakthrough Innovation as a Catalyst

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ABSTRACT

Objective: in today's volatile and knowledge-intensive business environment, knowledge management has become a key driver of organizational profitability beyond traditional cost- and productivity-based measures. This study addresses a gap in the literature by empirically examining how tacit and explicit knowledge contribute to profitability, with particular attention to the mediating role of breakthrough innovation. **Methods:** a quantitative research design was adopted using a structured questionnaire. Data were collected from 189 valid respondents, randomly selected from an initial sample of 240, ensuring a respondent-to-item ratio of 15:1. The relationships among tacit knowledge, explicit knowledge, breakthrough innovation, and organizational profitability were analyzed using SPSS and AMOS. **Results:** the findings reveal that both tacit and explicit knowledge exert significant positive effects on organizational profitability. A one-unit increase in tacit knowledge leads to a 0.26-unit increase in profitability and a 0.32-unit increase in breakthrough innovation. Likewise, explicit knowledge increases profitability by 0.21 units and breakthrough innovation by 0.10 units. When both knowledge types increase simultaneously, profitability rises by approximately 0.10 units, confirming the mediating role of breakthrough innovation. **Conclusions:** empirical evidence on the knowledge–profitability nexus, particularly within the healthcare sector, remains limited. This study advances the literature by demonstrating how breakthrough innovation translates knowledge assets into competitive advantage. The results also highlight the strategic importance of medical teaching institution (MTI) reforms in fostering innovation-driven performance. Overall, the study offers valuable theoretical and practical implications for developing knowledge-centric strategies to sustain organizational competitiveness.

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INTRODUCTION

Knowledge is an organizational source of competitiveness and supports decision-making, innovation, accelerated learning, agility, and efficiency. In today's fast-paced and cutthroat business environment, the organization's ability to effectively utilize knowledge guarantees survival (Janjua et al., 2025). Organizational knowledge collection and strategic application are driving a rapid shift in competitive advantages (Paliwal et al., 2025). Being unique by nature, information arises in the human mind and takes many forms, most notably explicit and tacit knowledge (Hadjimichael et al., 2024; Özveren & Gürpinar, 2024). Both explicit knowledge, which is readily codifiable and transportable (Cisneros-Pérez et al., 2024), and implicit knowledge, which is firmly anchored in personal experiences, are important factors influencing innovation (Terhorst et al., 2024). A key transition in altering this knowledge into organizational success may be breakthrough innovation, which overturns markets and generates novel value propositions (Sandvik et al., 2024). Investigating the mediating function of breakthrough innovation in the connection between tacit and explicit knowledge and organizational profitability is the goal of this study.

Tacit knowledge, often referred to as 'know-how,' is intensely entrenched within the individual and cannot be simply articulated or apprehended in a tangible form. In contrast, explicit knowledge, known as 'know-what,' encompasses information and data that can be readily codified, communicated, and transferred in a concrete form (Özveren & Gürpinar, 2024). Tacit knowledge, however, is distinct in that it is typically acquired through application and shared gradually through personal interaction, emphasizing a 'people-to-people' transfer mechanism. This sort of knowledge is regarded as distinctive due to its fiercely personal and subjective nature (Özveren & Gürpinar, 2024). While the literature offers differing perspectives on the corresponding significance of tacit versus explicit knowledge (López-Cabarcos et al., 2024), knowledge-intensive businesses continue to participate in activities that use both types of information. These businesses frequently use a cyclical process called the 'knowledge spiral,' in which tacit and explicit knowledge interact and reinforce one another to create continual learning and innovation (Kivijärvi, 2024).

The resource-based theory advocates that an organization's competitiveness is tied to its ability to acquire, develop, and retain valuable resources (Kivijärvi, 2024), and knowledge precisely fulfills these requirements.

Moreover, organizational knowledge has conventional strategic importance by extending the enactment of resource-based theory to the content of a knowledge-based theory (Osobajo & Bjeirmi, 2021; Thomas & Paul, 2019). Knowledge-based theory advocates that enterprises mainly require integrating and effectively utilizing organizational tacit knowledge (López-Cabarcos et al., 2020). Considering the uniqueness and inimitability characteristics, tacit knowledge is regarded as a source of competitiveness, whereas explicit knowledge is characterized by imitation (López-Cabarcos et al., 2020).

Researchers have highlighted the importance of codification (Ferenhof et al., 2024), information and communication technologies (Di Vaio et al., 2021), and their role in organizational performance. Thomas and Gupta (2022) revealed that tacit knowledge is a source of competitiveness in terms of creativity and innovation. Considering the strategic importance of knowledge retention and utilization in the face of technological revolution, there was a dire need to shift from traditional working processes/procedures to medical teaching institutions (MTIs) reforms. This reform is likely to address inefficiencies and gaps in traditional healthcare systems to improve healthcare deliverables by providing better outcomes and patient experiences. In this regard, to boost health sector performance and profitability, the government of Khyber Pakhtunkhwa (a province of Pakistan) instituted significant reforms, so-called medical teaching institutions (MTIs). This reform brought about breakthrough innovation in work structure, processes/procedures/practices, and management, which required integrated (tacit–explicit) knowledge.

Breakthrough innovation is a complex process comprising assessing priorities, information flow, and revamping systems and structures by emphasizing redundancies and restructuring organizational roles (Zhong et al., 2024). Moreover, the role of breakthrough innovation with explicit/tacit knowledge has not yet been meticulously discussed in the literature (Bhatti et al., 2024; Kucharska & Erickson, 2023).

Considering the significance of knowledge management, coupled with the complexity of breakthrough innovation and its relationship with organizational profitability, has attracted the attention of academics and researchers to conduct a research study to scientifically examine the phenomenon. For this purpose, a study was conducted to articulate the mediation effect of breakthrough innovation conjointly between tacit and explicit knowledge and organizational performance. The findings of this study extend the existing body of knowledge by filling the literature gap and further scientifically examine the validity of organizational learning through resource-based theory in the presence of breakthrough innovation. The findings of this study are helpful for practitioners concerning high profitabil-

ity through effective knowledge utilization and breakthrough innovation. Although previous studies have examined knowledge management in various contexts, limited empirical research has addressed how the interplay between tacit and explicit knowledge translates into profitability through breakthrough innovation, particularly in public healthcare reform environments. The unique context of Khyber Pakhtunkhwa's MTI reform offers a valuable opportunity to explore this interplay, given the structural, procedural, and policy innovations implemented.

THEORETICAL BACKGROUND

Two contiguous theories were adopted from a theoretical perspective: organizational learning theory and resource-based view theory. In the 1970s, Chris Argyris and Donald Schön developed the organizational learning theory, mainly focusing on how organizations acquire, interpret, and utilize knowledge for greater profitability. This theory involves converting individual knowledge into organizational knowledge (Thomas & Gupta, 2022).

Moreover, the resource-based view (RBV) theory emphasizes sustainable organizational competitiveness as the outcome of organizational resources that are valuable, rare, inimitable, and non-substitutable (Barney et al., 2021). Accordingly, the knowledge construct, that is, tacit and explicit knowledge, fulfills these RBV characteristics. Tacit knowledge is profoundly personal, embedded in individuals' experiences and skills, and considered a source of competitiveness, as unique competencies trigger organizational differentiation and are therefore difficult to find and replicate. Explicit knowledge comprises documented processes, patents, databases, or other codified information and is also a strategic asset within the RBV. Such explicit knowledge can be easier to transfer and replicate across the organization, leading to operational efficiency and innovation. This contributes to the development of capabilities that enhance organizational competitiveness. These theoretical perspectives collectively provide the foundation for this study. While the RBV underscores knowledge as a valuable, rare, inimitable, and non-substitutable resource driving competitive advantage, the organizational learning theory (OLT) focuses on how knowledge is acquired, shared, and institutionalized within organizations. This study integrates these perspectives by proposing that breakthrough innovation serves as the learning mechanism (OLT) through which knowledge resources (RBV) are transformed into profitability outcomes. The interplay between the two theories enables a richer understanding of how knowledge assets are accumulated and activated through innovation.

Research gap

The resource-based theory and knowledge-based theory highlight the strategic importance of organizational knowledge as a source of sustained competitive advantage. However, limited empirical research examines how such knowledge translates into enhanced organizational performance through breakthrough innovation. Despite its complexity and transformative impact on structures and systems, breakthrough innovation's mediating role amid explicit/tacit knowledge and organizational performance has not yet been adequately examined (Bhatti et al., 2024; Kucharska & Erickson, 2023). This literature gap is evident especially in healthcare sector reforms, such as the medical teaching institutions (MTIs) in Khyber Pakhtunkhwa, Pakistan, where significant innovation and knowledge integration are required. Therefore, there is a need for empirical research that examines how tacit and explicit knowledge contribute to organizational performance via breakthrough innovation, particularly within the context of public sector healthcare transformation.

LITERATURE REVIEW

Knowledge and profitability

Knowledge management (KM) involves sharing and using information by improving accessibility and structure, which helps reduce knowledge gaps (Özveren & Gürpinar, 2024 It is an organizational strategy aimed at creating new knowledge as well as developing and effectively utilizing existing knowledge (Antunes & Pinheiro, 2020). Successful KM involves generating, developing, and integrating knowledge to improve profitability (Becker, 2024; Kucharska, 2022). Knowledge encompasses various constructs, such as personalization, codification, tacit, and explicit knowledge (López-Cabarcos et al., 2024.

Tacit knowledge reflects personal experiences, values, and ideas and is difficult for others to articulate or transfer (Mahura & Birollo, 2021; Nazir & Pinsonneault, 2021; Summerscales, 2024). Conversely, explicit knowledge is system-based, documented, and codified, and is shared through procedures, policies, schedules, manuals, or market data (Ren et al., 2024; Schoenherr et al., 2014). Explicit knowledge can be easily transmitted (Gamble, 2020), codified (Jarmooka et al., 2021; Le et al., 2020), and used when needed (Berraies et al., 2021; Ren et al., 2024).

Relying only on explicit knowledge limits profitability because it lacks unique and innovative qualities. Tacit knowledge is also constrained when it is not codified, documented, reused, or integrated. However, tacit and explicit knowledge are highly interconnected (Lai, 2013; Shi, 2023) and together support greater profitability (Di Vaio et al., 2021; Schoenherr et al., 2014; López-Cabarcos et al., 2020). Both tacit and explicit knowledge are important for improving profitability.

Tacit knowledge and profitability

Tacit knowledge is an intangible asset built through individual learning and mental schemas (Özveren & Gürpinar, 2024). It is dynamic and highly human-oriented (Gamble, 2020; Jarmooka et al., 2021). Developing tacit knowledge requires strong social interaction. It emphasizes practical 'know-how' (Gamble, 2020).

Tacit knowledge spreads through direct communication and social networks. It fosters creativity and innovation, which enhance profitability. It is inimitable (Osobajo & Bjeirmi, 2021), not easily shared, and contributes to high profitability (Gamble, 2020). Acquiring tacit knowledge increases organizational profitability. Firms that focus on tacit knowledge achieve long-term profitability by strengthening innovation, creativity, exploration, and integration (López-Cabarcos et al., 2020). Using tacit knowledge effectively is a major source of profitability.

Explicit knowledge and profitability

Explicit knowledge includes strategies to collect, create, use, and document information so it can be easily accessed and reused (Al-Omoush et al., 2020; Becker, 2024). It is built through writing, rewriting, sharing, and resharing, which then serve as analytical or methodological tools (Lei et al., 2021).

Explicit knowledge spreads easily and supports profitability, especially where employee interaction is limited (Gamble, 2020; Kucharska, 2022; Shehabat, 2020). Although knowledge cannot be installed or removed from individuals easily (Dabic et al., 2020), explicit knowledge benefits from easy documentation, codification, reuse, and integration with personal knowledge to improve profitability.

Breakthrough innovation and profitability

Breakthrough innovation helps firms create future products and supports long-term survival (Wu et al., 2024). It is a key source of competitive advantage in the current business environment. It enhances firm profitability by enabling unique value creation (Jaka et al., 2022; Wilden et al., 2013). Profitability refers to returns on investment and is a central measure of performance (Özveren & Gürpinar, 2024).

Organizations achieve operational efficiency through innovative and ethical business practices, often stemming from breakthrough innovation (Cheng, 2020; Durand Haans, 2022). Breakthrough innovation includes experimentation, creativity, and discovery, which help generate new products, services, or processes (Rakic, 2020). It relies on transforming ideas into impactful and disruptive outcomes (Jarmooka et al., 2021). It supports both immediate creativity and long-term innovation. Firms can gain larger market shares through unique offerings (Li & Liu, 2014), which increases profitability (Arifin & Frmanzah, 2015). Recent studies confirm that breakthrough innovation improves efficiency and competitiveness (Jin et al., 2021). It helps organizations achieve long-term differentiation and growth. Empirical evidence shows a strong link between breakthrough innovation and profitability (Wang & Feng, 2020).

Breakthrough innovation mediates the relationship between knowledge and profitability through absorptive capacity, which allows organizations to recognize, assimilate, and exploit knowledge. Tacit knowledge strengthens absorptive capacity through deep experiential learning, while explicit knowledge supports it through structured information. Innovation ambidexterity also explains how breakthrough innovation converts knowledge into profitable outcomes.

H1: Tacit knowledge has a positive impact on profitability

H2: Explicit knowledge has a positive impact on profitability

H3: Breakthrough innovation has a positive impact on profitability

Mediating role of breakthrough innovation

Knowledge management is essential for achieving high profitability (Govindarajan, 2016; Nakash & Bouhnik, 2023; Shahzad et al., 2020). Breakthrough innovation plays a crucial role in converting knowledge into profitability. Research shows positive relationships between knowledge, breakthrough innovation (Jarmooka et al., 2021; Sheehan et al., 2023), and profitability (D'Attoma & Pacei, 2018; Jajja et al., 2017).

Strategic variations in knowledge management significantly influence differences in innovation and profitability (Stefani et al., 2020). Breakthrough innovation enables organizations to turn internal knowledge into high-value solutions. Firms that capture, share, and use tacit and explicit knowledge create environments that support radical innovation and stronger financial outcomes (López-Cabarcos et al., 2024). Knowledge management enhances learning and supports the recombination of diverse knowledge assets, which is crucial for breakthrough innovation (Özveren & Gürpinar, 2024). Organizations with strong knowledge management systems show greater agility and innovation capacity. This leads to sustained profitability and competitive advantage.

Profitability and breakthrough innovation are interdependent and rely heavily on organizational knowledge (Jarmooka et al., 2021). Evaluating knowledge–profitability relationships without considering breakthrough innovation gives an incomplete picture. Therefore, breakthrough innovation is expected to mediate these relationships.

H4: Breakthrough innovation mediates the relationship between tacit knowledge and profitability by leveraging the absorptive capacity embedded in experience-based learning.

H5: Breakthrough innovation mediates the relationship between explicit knowledge and profitability through innovation ambidexterity and structured codification.

CONCEPTUAL FRAMEWORK

Figure 1 demonstrates the relationship between dependent, independent, and mediating variables and presents the research hypotheses developed for this study. The figure below shows that tacit knowledge directly impacts profitability, a research hypothesis developed, denoted by H1. Similarly, explicit knowledge directly impacts profitability, and the research hypothesis is denoted as H2. Further, breakthrough innovation is a mediator between tacit and explicit knowledge and profitability; accordingly, the research hypothesis is denoted as H3. Moreover, the figure shows an association between tacit knowledge and breakthrough innovation, and the research hypothesis is denoted as H4. Furthermore, the figure shows a relationship between explicit knowledge and breakthrough innovation, and the research hypothesis is denoted as H5.

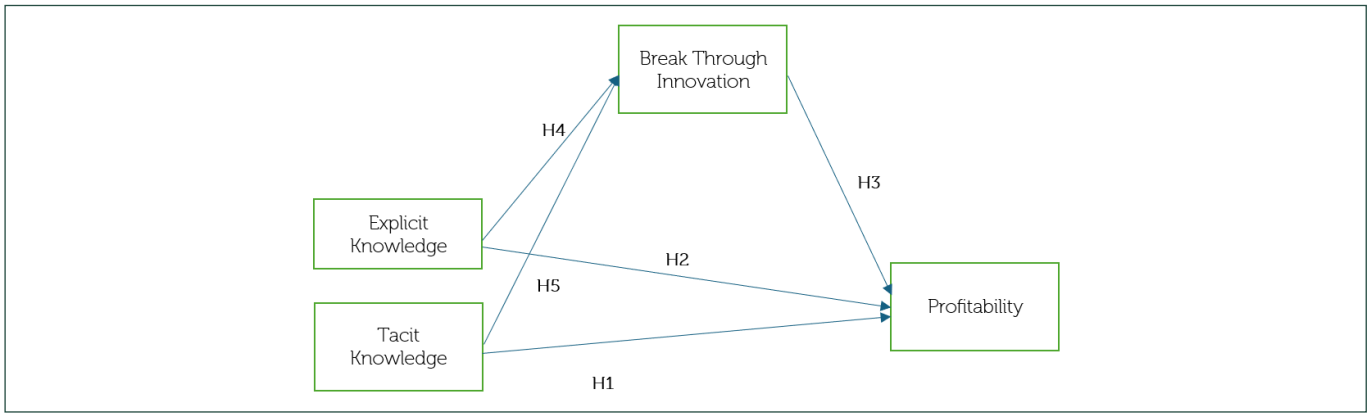

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Figure 1. Conceptual framework research hypotheses.

RESEARCH METHODOLOGY

This quantitative study was undertaken to comprehend the impact of tacit and explicit knowledge on organizational profitability, with the mediating role of breakthrough innovation in the context of Pakistan. Healthcare institutions in Khyber Pakhtunkhwa were chosen due to their frontline role in carrying out the Medical Teaching Institution (MTI) Reforms Act. These organizations operate within a unique public sector environment characterized by increasing demands for decentralization, transparency, and outcome-based governance. The ongoing structural changes present a valuable opportunity to examine how knowledge strategies and innovation processes affect organizational outcomes such as profitability. Given their systemic relevance and evolving institutional dynamics, these settings are well suited for applying and testing theoretical models like RBV and OLT. For the effective implementation of the reform, employees applied their implicit as well as explicit knowledge.

A multistage random sampling method was used to ensure the study population's representativeness. In the first stage, a random selection was made from the 117 operational public healthcare institutions across Khyber Pakhtunkhwa. A total of 30 institutions were chosen as the primary sampling units. In the second stage, eight managerial or administrative personnel were randomly selected from each institution, resulting in a target sample size of 240 respondents. This sampling approach was guided by the recommendation of Hair et al. (2010), which suggests a minimum of 10–15 respondents per indicator for structural equation modeling.

Data were collected using a structured questionnaire consisting of 16 items aligned with the constructs under investigation. Before full deployment, a pilot test involving 20 respondents was conducted to ensure the con-

textual appropriateness and reliability of the instrument. Out of the 240 distributed questionnaires, 189 were fully completed and used for data analysis.

Data analysis was performed using SPSS and AMOS software. SPSS was used to compute descriptive statistics, test for normality, and assess reliability and validity. structural equation modeling (SEM) was conducted in AMOS to test the hypothesized relationships and mediation effects within the conceptual model.

Control for common method bias and endogeneity

To mitigate common method bias, Harman's single-factor test was conducted, which showed no dominant factor. In addition, procedural remedies such as varied item scales and reverse-coded items were used. Endogeneity concerns were minimized by employing a two-stage estimation strategy and conducting robustness checks using bootstrapped standard errors, ensuring the reliability of the observed mediation effects.

Table 1. Selected healthcare institutes.

Healthcare institute	Sample	Healthcare institute	Sample
Ayub Teaching Hospital Abbottabad	08	Khalifa Gul Nawaz Teaching Hospital Bannu	08
Mufti Mahmood Teaching Hospital D.I. Khan	08	DHQ Hospital Timergara	08
Hayatabad Medical Complex Peshawar	08	DHQ Kohat	08
Bacha Khan Medical Complex Swabi	08	King Abdullah Teaching Hospital Mansehra	08
Saidu Group of Teaching Hospital Saidu Sharif	08	Mardan Medical Complex Mardan	08
DHQ Hospital Charsadda	08	Khyber Teaching Hospital Peshawar	08
DHQ Hospital Daggar (Buner)	08	Govt Lady Reading Hospital Peshawar	08
DHQ Hospital Chitral	08	DHQ Hospital Swabi	08
DHQ Hospital Haripur	08	DHQ Hospital Battagram	08
DHQ Hospital Karak	08	T.H.Q Hospital Tangi	08
DHQ Hospital Lakki Marwat	08	THQ Hospital Chakdara	08
DHQ Hospital Batkhela	08	DHQ Hospital Hangu	08
DHQ Hospital Nowshera	08	City Hospital Lakki Marwat	08
DHQ Hospital Alpuri	08	THQ Takht Bhai Mardan	08
Women and Children Hospital Kohat	08	Police & Services Hospital Peshawar	08

Note. Developed by the authors.

Measurement scale

The measurement scale for both tacit and explicit knowledge comprised four items, as suggested by Choi and Lee (2003). However, the measurement scale for breakthrough innovation comprises five items proposed by Subramaniam and Youndt (2005) and organizational profitability comprises three items suggested by Dess and Robinson (1984) and Powell and Dent-Micallef (1997). The measurement scales were evaluated using a five-point Likert scale (strongly disagree to strongly agree).

DATA ANALYSIS AND RESULTS

A questionnaire was adopted and molded according to the local context. Therefore, we evaluated and established a questionnaire and proposed model using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Cronbach's alpha was used to examine reliability. The statistical values shown in Table 2 were greater than the suggested value of 0.7 (Gliem & Gliem, 2003).

Table 2. Reliability analysis.

Variable(s)	Cronbach's alpha	No. of items
Tacit knowledge	.934	04
Explicit knowledge	.977	04
Breakthrough innovation	.993	05
Profitability	.963	03

Note. Developed by the authors.

Table 3. Factor analysis and goodness of fit of proposed model.

KMO and Bartlett's test		
Kaiser-Meyer-Olkin measure of sampling adequacy		.808
Bartlett's test of sphericity	Approx. chi-square	10030.159
	Df	120
	Sig.	.000

Note. Developed by the authors.

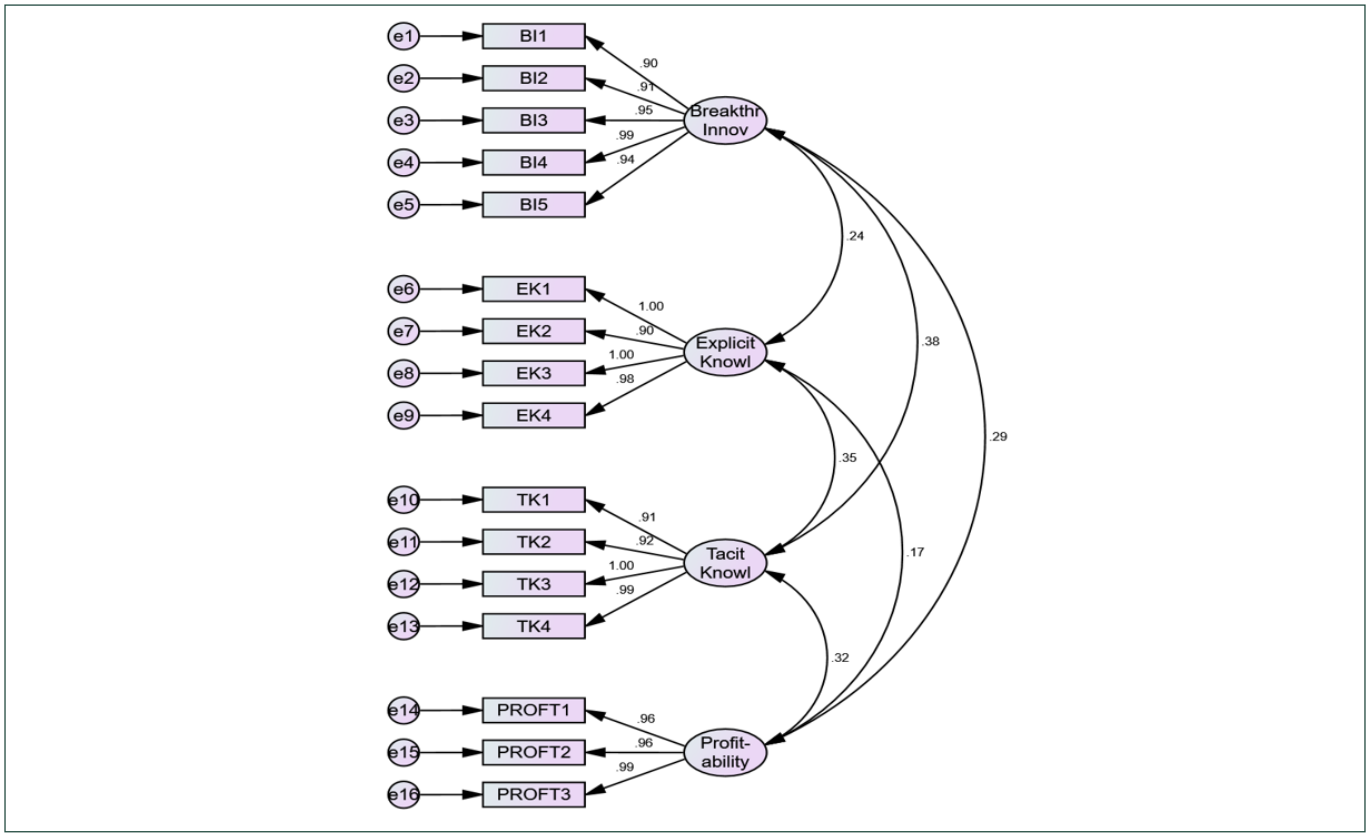
Table 3 shows the data goodness of fit and suitability for factor analysis. The table reflects the values of the Kaiser–Meyer–Olkin (KMO) and Bartlett's test. The values were found to be greater than 0.5 (acceptable range), showing goodness of fit, and the data were suitable for factor analysis.

Table 4. Factor loading and communalities values.

Rotated component matrix[a]					
	Component				Communalities extraction
	1	2	3	4	
TK1			.911		.905
TK2			.920		.913
TK3			.943		.973
TK4			.942		.959
PROFT1				.955	.955
PROFT2				.952	.953
PROFT3				.960	.977
EK1		.970			.982
EK2		.927			.898
EK3		.973			.988
EK4		.966			.972
BI1	.911				.871
BI2	.921				.883
BI3	.926				.913
BI4	.954				.962
BI5	.934				.909

Note. Extraction method: principal component analysis. Rotation method: varimax with Kaiser normalization.a. Rotation converged in 5 iterations. TK = Tacit knowledge; Profit = Profitability; EK = Explicit knowledge; BI= Breakthrough innovation.

Confirmatory factor analysis was used to examine the factor loadings of the variables. Table 4 shows factor loadings and communality values, revealing that all factors loaded on the respective variables, and statistical values of all latent factors were found to be greater than 0.70 (acceptable range). As a result, no items were dropped. Moreover, the communality values were greater than the acceptable values.



Source: Developed by the authors.

Figure 2. Proposed model goodness of fit.

The goodness of fit of the proposed model, shown in Figure 2, was evaluated using the model fitness indices. The comparative fit index (CFI), Tucker–Lewis index (TLI), and root mean square error of approximation (RMSEA) were used to examine the model. The statistical values of all the indices were higher than the acceptable range (Table 5), as suggested by Hu and Bentler (1999).

Table 5. Proposed model fitness.

Model	TLI	CFI	RMSEA	AIC	SRMR
Proposed model	.974	.938	0.45	3096.298	0.25

Note. Developed by the authors.

Model validity

Model validity was ensured through CR, AVE, and MSV. The statistical values in Table 6 indicate that all the values are greater than the suggested values (Hair et al., 2010). Accordingly, there is no issue of validity concern, and the model was found to be well fitted.

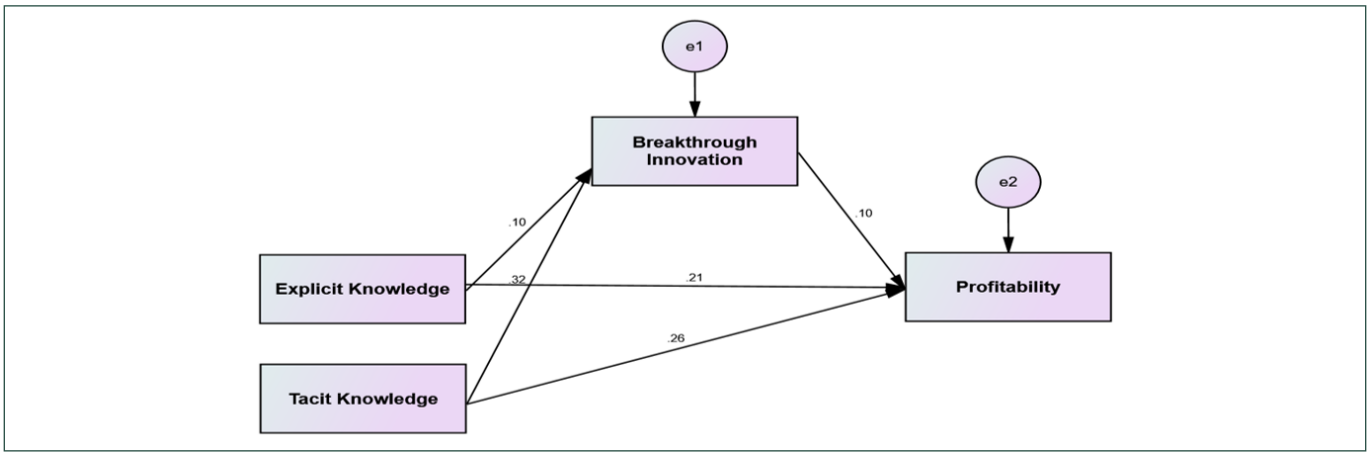
Table 6. Model validity.

	CR	AVE	MSV	MaxR(H)	1	2	3	4
Breakthrough nnovation	0.974	0.882	0.145	0.988	**0.939**			
Explicit know	0.985	0.944	0.120	1.015	0.238***	**0.971**		
Tacit know	0.976	0.911	0.145	1.000	0.380***	0.346***	**0.955**	
Profitability	0.980	0.942	0.100	0.992	0.294***	0.171**	0.316***	**0.971**

Note. Developed by the authors.

Mediation analysis through SEM

Figure 3 demonstrates the impact of tacit and explicit knowledge on organizational profitability. Furthermore, we show the impact of tacit and explicit knowledge on organizational profitability with the mediating role of breakthrough innovation. The statistics in the figure, based on standardized path coefficients obtained through structural equation modeling (SEM), indicate that a one-unit standardized change in explicit knowledge corresponds to a 0.21-unit change in profitability (β = 0.21) and a 0.10-unit change in breakthrough innovation (β = 0.10). Similarly, a one-unit standardized change in tacit knowledge leads to 26% and 32% changes in profitability and breakthrough innovation (β = 0.26 and β = 0.32), respectively. Moreover, a one-unit standardized change in the combined construct of tacit and explicit knowledge leads to a 10% change in profitability (β = 0.10) through the mediation effect of breakthrough innovation. Moreover, the mediation effect was tested through a bootstrapping procedure with 5,000 resamples, ensuring robustness of the indirect effects. The confidence intervals (95% bias-corrected) for these indirect paths did not include zero, indicating statistical significance of the mediating role of breakthrough innovation in the relationship between knowledge constructs and organizational profitability.



Source: Developed by the authors.

Figure 3. Proposed model goodness of fit.

Table 7 contains the estimates, standard errors (S.E.), critical ratios (C.R.), and p-values. The statistical values of the estimates represent the magnitude and direction of the relationship, showing that there is a significant positive relationship between breakthrough innovation and tacit knowledge, with a high C.R. value (4.735) and a highly significant p-value (***) (less than 0.05). Similarly, statistical values of explicit knowledge and breakthrough innovation show a significant positive relationship between breakthrough innovation and tacit knowledge with a C.R. value (of 2.133) and a p-value of .004, less than 0.05 (significant value). The statisti-

cal values of breakthrough innovation and profitability show a significant positive relationship between profitability and breakthrough innovation, with a C.R. value of 1.980 and a p-value of .025. The statistical values of tacit knowledge and profitability show a significant positive relationship between profitability and explicit knowledge, with high C.R. values (4.796) and low p-values (***) being highly significant. The statistical values of explicit knowledge and profitability show a significant positive relationship between profitability and tacit knowledge, with a high C.R. value (5.048) and a low p-value (***) being highly significant.

Table 7. Measurement model statistics.

			Estimate	S.E.	C.R.	P	Label
BI	<---	TK	.317	.067	4.735	***	
BI	<---	EK	.096	.044	2.133	.004	
Profit	<---	BI	.103	.052	1.980	.025	
Profit	<---	TK	.259	.054	4.796	***	
Profit	<---	EK	.207	.041	5.048	***	

Note. Developed by the authors.

Table 8 represents the standardized total effects, which show the total impact of each independent variable (i.e., tacit knowledge, explicit knowledge, and mediator) on the dependent variable (profitability), considering both direct and indirect effects. Furthermore, the table shows the standardized direct effects, representing the direct impact of each independent variable (i.e., tacit knowledge, explicit knowledge, and mediator) on the dependent variable (i.e., profitability) without considering the indirect effects. The table further presents the standardized indirect effects that show the indirect impact of each independent variable (i.e., tacit knowledge, explicit knowledge, and mediator) on the dependent variable (i.e., profitability) without considering direct effects.

Table 8. Direct, indirect, and total effect.

		EK	TK	BI
Standardized total effects	BI	.096	.317	.000
	Profit	.217	.291	.103
Standardized direct effects	BI	.096	.317	.000
	Profit	.207	.259	.103
Standardized indirect effects	BI	.000	.000	.000
	Profit	.010	.033	.000

Note. BI = Breakthrough innovation; EK = Explicit knowledge; TK = Tacit knowledge; Profit = Profitability.

DISCUSSION

This study aimed to analyze the direct impact of tacit and implicit knowledge on breakthrough innovation and profitability, and the mediating mechanism of breakthrough innovation between knowledge and a company's profitability.

Through the lens of organizational learning and resource-based view theories, the authors framed the present phenomenon regarding the types of knowledge and profitability in Pakistan's health sector. The authors investigated the impact of tacit knowledge on profitability (as H1). The study finding (H1) shows that tacit knowledge in the health sector is an important element in increasing a company's profitability. This finding of the study supports the previous research conducted by Mohaghegh et al. (2024) and López-Cabarcos et al. (2020). Further investigation shows that explicit knowledge has a significant positive direct effect on organizational profitability (H2) (standardized direct effect: 0.096, $p < 0.05$). These results support H2 and strengthen the findings of previous studies conducted by Kucharska (2022) and Shehabat (2020), which highlighted the significant role of explicit knowledge in a company's profitability. This research study tested the impact of breakthrough innovation on profitability in the health sector, proposed as H3. The study finding supported the proposed H3 (standardized direct effect: 0.103, $p < 0.05$) and verified the findings of previous research that highlight the importance of breakthrough innovation in increasing profitability (D'Attoma & Pacei, 2018; Jajja et al., 2017).

Additionally, the authors investigated the types of knowledge and breakthrough innovation in Pakistan's health sector. They tested the mediating role of breakthrough innovation in the relationship between knowledge and profitability. Explicit knowledge has a significant positive direct effect on breakthrough innovation (H4) (standardized direct effect: 0.10, $p < 0.05$). This

finding supports the previous research conducted by Govindarajan (2016) and Lai (2013). Further study results show that the tacit knowledge has a significant positive direct effect on breakthrough innovation (H5) (standardized direct effect: 0.317, $p < 0.05$). This finding is consistent with the authors' statement that tacit knowledge has a direct effect on organizational breakthrough innovation (Govindarajan, 2016; Shahzad et al., 2020). The results show that breakthrough innovation is an important element that needs to be combined with knowledge to improve a company's profitability. Previous findings have revealed a significant positive relationship between tacit and explicit knowledge and breakthrough innovation (Govindarajan, 2016; Lai, 2013). This study supports previous findings in the context of an emerging country, extending them to the health sector. Thus, H4 and H5 are supported.

THEORETICAL AND PRACTICAL IMPLICATIONS

Theoretical implications

The findings of this study contribute to the theoretical understanding of the existing body of knowledge and innovation dynamics in the field of tacit and explicit knowledge to enhance profitability through breakthrough innovation. This study contributes to the literature on mediation models by providing empirical evidence of breakthrough innovation as a mediator between tacit and explicit knowledge and organizational profitability. Furthermore, it empirically validates organizational learning theories by providing insights into how tacit and explicit knowledge contribute to learning processes. The findings also refine the RBV by exploring the mechanisms through which tacit and explicit knowledge contributes to breakthrough innovation, thus enhancing a firm's resource portfolio.

Practical implications

The findings of this study will help formulate strategies that foster the integration of tacit and explicit knowledge. This could involve cross-functional teams, knowledge-sharing platforms, and mentorship programs. It involves implementing innovation frameworks that promote breakthrough ideas; encourage employees to draw from their combined creative problem-solving and idea-generation knowledge; introduce incentive programs that reward employees for contributing to breakthrough innovation — this may be related to implementing ideas and their impact on profitability; establish digital repositories, collaboration tools, and communication channels that facilitate the sharing of tacit and explicit knowledge and support breakthrough innovation; and continuous monitoring and tracking of the implementation of knowledge integration and innovation strategies should be carried out. We use the defined profitability and innovation metrics to evaluate the impact of these strategies.

Limitations and future research

The study's limitations include data collection from the health sector of Khyber Pakhtunkhwa, the possibility of not including other host factors, and the limited generalizability of results as data were collected from one province. Future longitudinal studies may need to articulate and track the long-term effects of tacit and explicit knowledge on organizational profitability, considering other host factors as moderators and mediators, such as organizational culture, leadership styles, and industry dynamics. It is further recommended to conduct comparative studies across provinces or countries, with the inclusion of objective performance metrics. Future research may also include comparative analyses across sectors such as education and municipal governance to enrich contextual understanding.

Based on the study findings, it is recommended that organizations create a culture of knowledge sharing that encourages a smooth flow of information and platforms on which employees can freely exchange insights, experiences, and expertise; recognize and reward individuals who actively contribute to knowledge sharing; and encourage employees to develop mechanisms to document employee experiences, problem-solving approaches, and lessons learned. Techniques such as storytelling, peer mentoring, and communities of practice facilitate knowledge transfer. Organizations need to invest in breakthrough innovation that fosters profitability through knowledge sharing. Implementation of intranets, collaboration tools, and social platforms that enable employees to connect, collaborate, and share insights regardless of their physical location promotes cross-functional collaboration to facilitate knowledge exchange across different departments and teams; encourage employees from diverse backgrounds to work together on projects, enhancing their potential for knowledge transfer; and create a visual knowledge map that highlights areas of expertise and identifies key individuals with valuable tacit knowledge. This map can guide employees in seeking specific insights and encourage interactions between knowledge holders and seekers.

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