



Harnessing Knowledge Management for Sustainable Excellence: Unveiling the Sequential Synergy of Technological Competence and Organizational Innovation

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ABSTRACT

This study investigates how Knowledge Management (KM) drives Sustainable Organizational Performance (SOP) through the sequential mediation of Technological Competence and Organizational Innovation in IT-intensive organizations in Punjab, Pakistan. Using a cross-sectional design, data were collected in two phases, one month apart, via a structured self-administered survey, resulting in 265 valid responses from 678 participants. The research builds on theoretical frameworks such as the Resource-Based View (RBV), Dynamic Capabilities Theory, and Knowledge-Based View (KBV) to explore the pathways through which KM impacts performance. Descriptive, correlation, and regression analyses were conducted using SPSS, while Structural Equation Modeling (SEM) in AMOS tested the hypothesized sequential relationships. Results reveal that KM significantly enhances technological competence, which in turn promotes organizational innovation, ultimately leading to improved SOP. This sequential synergy highlights KM's crucial role in enabling organizations to leverage technology and innovation for sustainable success. Focusing on IT-intensive firms, the study enriches existing literature by demonstrating how integrating KM with technological competence and innovation drives long-term performance. Future research should consider broader contexts and diverse sampling to strengthen the generalizability of these findings.

Introduction

In today's dynamic and competitive business landscape, achieving Sustainable Organizational Performance (SOP) is a top priority for firms seeking long-term success and resilience. One of the foundational enablers of SOP is Knowledge Management (KM) which is a strategic process involving the creation, sharing, and application of knowledge to enhance decision-making, innovation, and adaptability (Nonaka & Takeuchi, 1995; Grant, 2021). While KM is widely recognized for its contribution to operational efficiency and competitive advantage, its influence on performance is often mediated by other organizational capabilities, such as technological competence and organizational innovation (Zhao et al., 2021; Shih et al., 2022).

Organizational innovation is defined as the development of new products, processes, or business models acts as a vital mechanism through which KM impacts performance outcomes (Chen et al., 2021). However, innovation alone does not fully explain the KM-Performance link. Technological competence, or an organization's ability to adopt and integrate technology effectively, plays a pivotal role in enhancing both KM practices and innovation outcomes (Teirlinck et al., 2020; Zhou et al., 2021). Despite growing recognition of these relationships, few studies have examined how KM, technological competence, and innovation interact in a sequential mediation model to influence SOP.

This research addresses this critical gap by proposing and testing an integrated model where technological competence and organizational innovation sequentially mediate the relationship between KM and SOP. Although prior research has examined these constructs in isolation or pairwise, a comprehensive framework that explores their interdependencies remains lacking (Shin & Kim, 2021; Wu et al., 2021). This study aims to fill that void by exploring not only direct and indirect effects but also the underlying pathways that link KM to sustainable performance through technological and innovative capabilities.

To guide this investigation, the study addresses the following key questions:

1. How does organizational innovation mediate the KM–SOP relationship?
2. How does technological competence mediate the KM–innovation link?
3. Do technological competence and organizational innovation sequentially mediate the KM–SOP relationship?
4. What are the practical implications for organizations seeking to enhance SOP through KM, technology, and innovation?

These questions aim to clarify how KM can be leveraged more strategically to drive sustainable outcomes and to identify the enabling role of technological capabilities and innovation dynamics. The research contributes to the literature in several meaningful ways. First, it enhances theoretical understanding of how KM fosters SOP through a dual-mediation process involving innovation and technological competence (Kebede & Lee, 2021; Schaltegger & Wagner, 2021). Second, it underscores the importance of digital readiness, offering a refined view of how technological competence shapes the KM-Innovation-Performance nexus (Hussain et al., 2021; Wu et al., 2022). Finally, it provides actionable insights for practitioners aiming to align knowledge strategies with innovation and technology to meet sustainability goals (Hansen & Möller, 2020; Teece, 2020).

This study is organized into 4 sections. Following this introduction, Section 2 reviews the relevant literature and builds the conceptual framework. Section 3 presents the results and hypotheses testing. Section 4 discusses the findings and implications for theory and practice.

Literature Review

In the contemporary business landscape, organizations are under constant pressure to achieve long-term success while navigating rapidly changing market conditions, technological advancements, and evolving consumer demands (Mikalef *et al.*, 2023). As organizations strive for competitive advantage and sustainable performance, the management of knowledge, innovation, and technology becomes increasingly crucial (Teece, 2020). Knowledge Management (KM) plays a pivotal role in fostering organizational growth by enabling the effective capture, sharing, and utilization of critical knowledge (Zhao *et al.*, 2021). Furthermore, technological competence has emerged as a key enabler, facilitating the seamless integration of new technologies into organizational processes, thereby enhancing innovation (Zhao & Anand, 2021). Organizational innovation, driven by KM and technological capabilities, acts as a critical mediator in achieving sustainable organizational performance (SOP) (Wu *et al.*, 2022).

This literature review aims to explore the interconnected relationships between KM, technological competence, organizational innovation, and SOP, focusing on how these elements work together to drive sustainable performance and competitive advantage in the modern business environment. Through a comprehensive examination of recent studies, this review highlights the key themes and insights that underpin these relationships and sets the foundation for the research objectives of this study.

Sustainable Organizational Performance (SOP)

Sustainable Organizational Performance (SOP) represents an organization's ability to consistently deliver long-term value while adapting to changes in its environment. As businesses face increasing pressures from competitive markets and regulatory frameworks, organizations are compelled to innovate, improve, and maintain performance over time. Recent literature emphasizes that SOP is not just about operational efficiency but is also strongly linked to adaptability and innovation (Mikalef *et al.*, 2023). As businesses evolve, aligning their strategic objectives with core capabilities while embracing innovative practices becomes essential for sustainable growth. Organizations that integrate technological advancements and innovation into their operations are more likely to achieve and sustain long-term success (Barney *et al.*, 2020).

Moreover, dynamic capabilities are seen as a critical factor in maintaining SOP, as organizations must continuously innovate and adapt to external shifts, such as technological advancements or consumer behavior changes (Teece, 2020). These capabilities enable organizations to respond effectively to disruptions and sustain competitive advantage. Research indicates that technological capabilities, in particular, play a key role in driving innovation and supporting the integration of new practices that align with sustainability goals (Mikalef *et al.*, 2024). This underscores the importance of innovation processes in achieving SOP, particularly in industries facing rapid technological changes.

Knowledge Management (KM)

Knowledge Management (KM) has become central to modern organizations, enabling innovation and sustainable performance (Davenport & Prusak, 1998). Initially focused on explicit knowledge codification, KM now also embraces tacit knowledge derived from personal experience and intuition which is crucial for organizational learning and growth (Nonaka & Takeuchi, 1995). This

broader view helps organizations manage both formalized knowledge and harder-to-articulate insights essential for solving complex problems and making informed decisions.

Recent studies highlight the importance of fostering knowledge-sharing through collaborative platforms, data-sharing systems, and repositories, facilitating the exchange of tacit and explicit knowledge to drive innovation (Jussupow et al., 2023). Such practices cultivate a collaborative culture that enhances adaptability and competitive advantage in a dynamic business environment (Tsai et al., 2024). KM's link to innovation is well-established; organizations prioritizing knowledge-sharing are better positioned to stimulate creativity and implement new ideas (Jussupow et al., 2023). By managing critical knowledge effectively, organizations improve efficiency, agility, and long-term success by aligning knowledge with innovation and performance goals.

Organizational Innovation

Organizational innovation has become a critical mediator between KM practices and sustainable performance outcomes. This process involves the introduction of novel practices, technologies, or business models that provide competitive advantage (Damanpour, 1991). Innovation is no longer limited to product development but also encompasses process innovation, business model transformation, and service innovation, all of which significantly contribute to an organization's adaptability and sustainability (Teece, 2018). In this context, KM plays a pivotal role in fostering innovation by providing the knowledge resources necessary for the development of new solutions (Foss et al., 2021).

Recent research underscores the importance of organizational innovation as a driver of both financial and operational performance. Studies have shown that organizations with robust KM systems are better positioned to innovate, resulting in higher market share, product differentiation, and long-term sustainability (Zhao et al., 2021). Moreover, technological advancements, such as AI and data analytics, are increasingly used to accelerate innovation cycles and enhance product development processes, further reinforcing the relationship between KM, innovation, and SOP (Wu et al., 2022). The integration of KM and innovation creates a feedback loop that improves organizational performance by aligning knowledge resources with strategic goals.

Technological Competence

Technological competence refers to an organization's ability to effectively utilize technology to support operations, drive innovation, and enhance competitive advantage. It is increasingly recognized as a critical enabler in the relationship between Knowledge Management (KM) and organizational performance (Gatignon et al., 2018). Technological competence extends beyond technical skills to include the integration of systems, tools, and platforms that enable organizations to manage and leverage knowledge more effectively for strategic purposes (Teece, 2018).

The role of technological competence in enhancing KM practices is crucial in today's knowledge-intensive industries. Organizations with high technological competence are better equipped to deploy KM tools, thereby improving knowledge sharing, collaboration, and decision-making. These organizations can better capture, store, and disseminate knowledge across teams and departments, facilitating quicker responses to challenges and fostering an environment of continuous improvement. Recent studies highlight that technological competence acts as a key facilitator in the KM-innovation-performance relationship, providing the necessary infrastructure and resources for effective knowledge management and innovation (Alavi & Leidner, 2022).

Additionally, technological competence enhances innovation by enabling organizations to adopt and apply new technologies more effectively, leading to faster innovation cycles and improved market positioning (Pereira *et al.*, 2020). In industries such as IT, healthcare, and manufacturing, the synergy between KM and technological competence is essential for organizations that aim to maintain a competitive edge and achieve sustainable performance outcomes (Choi & Lee, 2022). Therefore, technological competence not only supports KM practices but also plays a crucial role in ensuring that organizations can effectively leverage knowledge for continuous innovation and long-term success.

Theoretical Framework

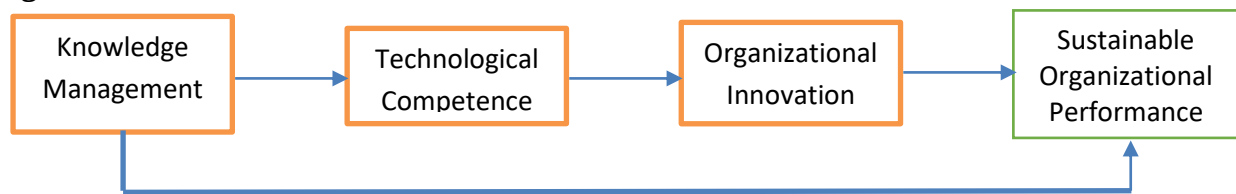
This research aims to explore the relationships between knowledge management (KM) and sustainable organizational performance (SOP), considering the sequential mediating effects of technological competence and organizational innovation. The literature offers substantial evidence supporting the role of knowledge management in enhancing organizational performance and sustaining a competitive advantage in business organizations (Arduini *et al.*, 2023). The evolution of knowledge management theory, with an increasing focus on human and social capital, has highlighted new challenges for knowledge-driven and technology-enabled innovation (Beyer *et al.*, 2011). Numerous studies have identified organizational innovation (OI) as a critical mediator in the KM-SOP relationship (Hutomo *et al.*, 2018). Furthermore, organizational innovation has often been shown to mediate the effects of various organizational resources, such as KM and technological competence, on organizational performance (Foss *et al.*, 2021).

In line with the literature, Sweis *et al.* (2020) argue that knowledge management directly influences organizational innovation, which, in turn, enhances organizational performance. Similarly, technological competence enables firms to effectively implement and scale innovative solutions, creating a synergistic relationship between KM, technology, and innovation (Rhee *et al.*, 2022). Several studies have shown that technological competence strengthens the positive effects of KM on organizational innovation (Zhang *et al.*, 2021). Specifically, organizations with high technological competence can share and integrate knowledge more efficiently, accelerating the development and implementation of innovative solutions. Moreover, technological competence facilitates the rapid dissemination of knowledge and the swift execution of innovative ideas, which ultimately contributes to greater organizational agility.

In contrast to moderation, where one variable affects the strength of a relationship, the current study focuses on sequential mediation, suggesting that the relationship between KM and SOP is influenced by a chain of mediating processes. Ho *et al.* (2022) propose that the sequential effects of technological competence and organizational innovation play a critical role in improving organizational performance. Organizations with higher technological competence can leverage KM tools to streamline processes and enhance sustainability initiatives, which, in turn, leads to improved long-term performance outcomes. In industries such as renewable energy and green technology, the integration of technological competence into KM practices is recognized as a key determinant of sustainability and innovation (Alvarez & Santos, 2023).

Based on these insights from the literature, the following conceptual framework is developed, illustrating the sequential mediation of technological competence and organizational innovation in the relationship between KM and sustainable organizational performance.

Figure-2.1:



Hypotheses Development

The dynamic relationship between Knowledge Management (KM), Organizational Innovation (OI), Technological Competence (TC), and Sustainable Organizational Performance (SOP) has been extensively explored in recent literature. KM serves as a strategic enabler by organizing and leveraging knowledge assets, thereby enhancing decision-making, efficiency, and innovation. This knowledge-centric approach not only improves SOP directly but also facilitates the development of innovative practices that align with long-term sustainability goals. Organizational innovation, characterized by new ideas, methods, and solutions, strengthens SOP and often acts as a mediator through which KM exerts its influence. Moreover, technological competence is an organization's ability to adopt and implement relevant technologies has emerged as a key driver that both supports innovation and enhances performance outcomes. Researchers argue that these elements do not function in isolation but are interlinked through direct and mediated pathways. Notably, the sequential mediation of OI and TC explains how KM translates into sustainable outcomes through innovation and technological readiness. Based on these theoretical insights and empirical findings, the following four hypotheses are proposed:

Hypotheses:

- **H1:** Knowledge Management (KM) has a positive relationship with Sustainable Organizational Performance (SOP).
- **H2:** Organizational Innovation (OI) has a positive relationship with Sustainable Organizational Performance (SOP).
- **H3:** Organizational Innovation (OI) mediates the relationship between Knowledge Management (KM) and Sustainable Organizational Performance (SOP).
- **H4:** Organizational Innovation (OI) and Technological Competence (TC) sequentially mediate the relationship between Knowledge Management (KM) and Sustainable Organizational Performance (SOP).

Data Analysis and Results

This section outlines the data analysis process and hypothesis testing. It begins with data screening, handling missing values and outliers, and assessing normality, followed by a demographic overview of respondents. Descriptive statistics, correlations, and construct reliability are reported, and the hypothesized sequential mediation model is tested using Structural Equation Modeling (SEM).

AMOS 23.0 and SPSS 23.0 were employed to ensure rigorous analysis. AMOS facilitated testing the direct and indirect relationships among Knowledge Management (KM), Organizational Innovation (OI), Technological Competence (TC), and Sustainable Organizational Performance (SOP), while SPSS supported descriptive and regression analyses to complement inferential findings. Together, these tools provided robust validation of the study's model.

The survey included 265 respondents from service and IT sectors. Of these, 63% were male and 37% female. Age-wise, 23% were aged 20-29, 37% aged 30-39, 32% aged 40-49, and 8% aged 50-60. Educationally, 13% held intermediate qualifications, 61% held undergraduate degrees, and 26% had postgraduate or higher education. In terms of experience, 37% had 1-5 years, 43% had 6-10 years, and 20% had over 10 years of work experience.

Table 3.1: Demographics

Demographics	Dimension	Frequency	Percentage (%)
Gender	Male	167	63%
	Female	98	37%
Age	20-29 Years	61	23%
	30-39 Years	98	37%
	40-49 Years	85	32%
	50-60 Years	21	8%
Education	Intermediate/ADP (12-14 years)	34	13%
	Undergraduate (16 years)	162	61%
	Graduate/Masters and above	69	26%
Experience	1-5 Years	98	37%
	6-10 Years	114	43%
	11 Years or above	53	20%

Descriptive Statistics

Descriptive statistics are crucial for summarizing and understanding the main characteristics of the sample population in this study. As noted by Bickel and Lehman (1975), these statistics provide essential insights into the central tendencies and variability of the data, which are vital for analyzing how variables relate to Knowledge Management (KM) practices and Sustainable Organizational Performance (SOP). Measures like means and medians offer a view of the central location of the data, while standard deviations and inter-quartile ranges help evaluate the spread of data points. Sekaran (2000) emphasizes the importance of frequency and percentage distributions in summarizing categorical data, which in this study includes SOP, KM, Organizational Innovation (OI), and Technological Competence (TC). By examining these variables, the study aims to uncover patterns and relationships, offering a deeper understanding of how KM practices influence organizational performance (Ferreira & Oliveira, 2014).

The mean and standard deviation were calculated to better understand the demographic characteristics, including gender, age, education, and job experience. These factors are crucial for assessing the diversity of the sample and understanding how they might impact the relationships between KM, TC, OI, and SOP outcomes. Table 3.3 below summarizes the mean and standard deviation for each variable.

Table 3.3: Descriptive Statistics

No.	Variables	Mean	SD
1	Sustainable Organizational Performance	3.28	0.84
2	Organizational Innovation	3.78	0.86
3	Technological Competence	3.97	0.87
4	Knowledge Management	3.42	0.92

Construct Reliability

The reliability and internal consistency of the study's instruments were evaluated using Cronbach's alpha for each key construct: Knowledge Management (KM), Technological Competence (TC), Organizational Innovation (OI), and Sustainable Organizational Performance (SOP). All constructs exceeded the acceptable threshold of 0.70, confirming strong internal consistency (Nunnally & Bernstein, 1994). A pretest with 25 respondents helped refine the survey for clarity and relevance (Brislin, 1980). These results affirm that the measurement items are both reliable and valid, providing a solid foundation for further statistical analysis (Field, 2013). The table below presents the Cronbach's alpha values for each construct:

Table 3.4: Construct Reliability

Variables	No. of Items	Cronbach's Alpha
Sustainable Organizational Performance	6	0.87
Organizational Innovation	8	0.94
Technological Competence	4	0.94
Knowledge Management	5	0.88

Correlation Analysis

Correlation analysis was performed to assess the strength and direction of the linear relationships among the key constructs: Knowledge Management (KM), Technological Competence (TC), Organizational Innovation (OI), and Sustainable Organizational Performance (SOP). Following McMillan's (1993) guidelines, correlation coefficients between 0.1-0.3 indicate weak relationships, 0.3-0.7 moderate, and above 0.7 strong. Statistical significance was determined using p-values, with $p < 0.05$ considered significant.

Pearson's bivariate correlations were calculated for all variable pairs using responses from employees in the service and IT sectors, based on a 5-point Likert scale. The results show that SOP is moderately and significantly correlated with OI ($r = 0.33$, $p \leq 0.01$), TC ($r = 0.28$, $p \leq 0.01$), and KM ($r = 0.33$, $p \leq 0.01$). OI is also significantly correlated with TC ($r = 0.35$, $p \leq 0.01$) and KM ($r = 0.31$, $p \leq 0.01$), while TC shows a positive correlation with KM ($r = 0.22$, $p \leq 0.01$).

These statistically significant correlations confirm the interconnectedness of the constructs and support their inclusion in the structural model examining their influence on sustainable performance. Detailed correlation coefficients are presented in Table 3.5.

Table 3.5: Correlation Analysis

Variables	Mean	SD	1	2	3	4
Sustainable Organizational Performance	3.28	0.84	(.87)			
Organizational Innovation	3.78	0.86	.337**	(.94)		
Technological Competence	3.97	0.87	.282**	.359**	(.94)	
Knowledge Management	3.40	0.87	.334**	.315**	.227**	(.88)

** $p \leq 0.01$, * $p \leq 0.05$. Parentheses forming diagonal represent Cronbach's alpha (α).

Construct Validity

Construct validity assesses how well a measurement tool captures the theoretical constructs it intends to measure (Cronbach & Meehl, 1955). This study evaluated construct validity using a

two-step process: Exploratory Factor Analysis (EFA) followed by Confirmatory Factor Analysis (CFA).

Exploratory Factor Analysis (EFA)

EFA was conducted to uncover the underlying structure of the key constructs; Knowledge Management (KM), Technological Competence (TC), Organizational Innovation (OI), and Sustainable Organizational Performance (SOP) and to verify that measurement items accurately represent these latent variables (Hair et al., 2010; Field, 2013). Results confirmed that items loaded appropriately on their respective factors, supporting the conceptual framework and guiding the subsequent CFA and SEM.

Confirmatory Factor Analysis (CFA)

CFA validated the measurement model by assessing the fit between observed variables and latent constructs (Hair et al., 2010; Byrne, 2010). The six-factor model showed good fit indices ($\chi^2/df = 2.153$, RMSEA = 0.061, CFI = 0.90, NNFI = 0.90), meeting established criteria (Hu & Bentler, 1999; Cheung & Rensvold, 2002). In contrast, the one-factor model exhibited poor fit, reinforcing the multidimensional structure of the constructs and confirming the reliability and validity of the measurement model.

Table 3.6: Confirmatory Factor Analysis

Variables	χ^2	d.f	Ratio $\chi^2 / d.f$	CFI	NNFI	RMSEA
1-factor frame ^a	3220.021	229	14.061	0.443	0.385	0.204
2-factor frame ^b	1947.590	227	8.580	0.680	0.643	0.156
3-factor frame ^c	1574.807	225	6.999	0.749	0.718	0.138
4-factor frame ^d	500.851	222	2.256	0.948	0.941	0.063

a. SOP, OI, TC and KM, all put into one factor.

b. KM, TC and SOP united as one factor. OI as second factor.

c. KM and TC united as one factor. SOP as second factor. OI as third factor.

d. KM, TC, OI and SOP as one factor.

Factor Loading

Factor loading is a crucial metric that indicates the strength of the relationship between observed variables and their corresponding latent constructs. It reflects how much each observed variable contributes to the underlying latent factor (Hair *et al.*, 2010). Higher factor loadings suggest a stronger correlation between the observed variable and the latent construct, indicating that the variable is a reliable measure of the construct. According to Nunnally and Bernstein (1994), factor loadings above 0.70 are considered adequate, implying a strong relationship between the observed variables and the latent constructs.

In this study, the factor loadings for Knowledge Management (KM), Technological Competence (TC), Organizational Innovation (OI), and Sustainable Organizational Performance (SOP) were assessed to ensure that each construct's items accurately measured the intended variables. The results showed high factor loadings for all constructs, confirming the validity and reliability of the measurement model for further analysis. The analysis shows the factor loading values are either above or very close to the threshold of 0.70.

Evaluation of Measurement Model

The evaluation of the measurement model focuses on assessing both reliability and validity to ensure the instruments effectively measure the intended constructs. Reliability is examined through Cronbach's alpha and composite reliability (CR), with values exceeding 0.7 indicating acceptable internal consistency (Hair *et al.*, 2017). Convergent validity is assessed using the average variance extracted (AVE), where values above 0.5 are considered satisfactory (Fornell & Larcker, 1981). Discriminant validity is verified using the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT) (Henseler *et al.*, 2015).

Factor loadings should ideally be above 0.7 to confirm that the measurement items are strong indicators of their respective constructs (Anderson & Gerbing, 1988). Goodness-of-fit indices such as the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Residual (SRMR) are used to ensure that the model fits the data well (Hu & Bentler, 1999). These evaluations ensure the measurement model is robust, reliable, and suitable for further structural equation modeling (SEM).

Table 3.7: Convergent and Discriminant Validity

	CR	AVE	MSV	MaxR (H)	1	2	3	4
TC	0.937	0.788	0.149	0.943	(0.888)			
KM	0.883	0.602	0.167	0.960	0.252	(0.776)		
OI	0.940	0.662	0.243	0.976	0.386	0.344	(0.814)	
SOP	0.870	0.529	0.169	0.984	0.310	0.375	0.371	(0.727)

1. The values in diagonal are the square root of AVE

2. TCA – Technological Competence, KMA – Knowledge Management, OIA – Organizational Innovation and SOP – Sustainable Organizational Performance

3. Correlation is significant at 0.01 level (2-tailed)

Common Method Bias

To minimize common method bias, both qualitative and quantitative approaches were used in this study, following established recommendations (Podsakoff *et al.*, 2012). A multi-wave survey design was employed to address this issue, with data collection occurring in two phases. In the first phase (T1), data on knowledge management and demographic variables were collected. In the second phase (T2), conducted 15 days later, data on technological competence, marketing competence, organizational innovation, big data analytics, and sustainable organizational performance were gathered.

Moreover, Harman's single-factor test (Podsakoff *et al.*, 2003) was applied to detect common method bias. The results revealed that the single latent factor accounted for only 28.8% of the total variance, well below the 50% threshold proposed by Mattila and Enz (2002), indicating no significant common method bias.

Path Analysis

Path analysis is a statistical technique used to examine both direct and indirect relationships among variables within a conceptual model, commonly utilized in structural equation modeling (SEM). This approach allows researchers to test hypothesized causal relationships and assess both direct effects (e.g., the influence of one variable on another) and indirect effects (e.g., the impact of one variable on another through a mediator) (MacKinnon, 2008). Path analysis assumes linear

relationships between variables and is especially valuable in validating theoretical models with clear causal structures (Schumacker & Lomax, 2016). Recent advancements in path analysis have allowed for more complex models that account for non-linear relationships and latent variables (Hair *et al.*, 2021).

In this study, path analysis fully supported both hypotheses, confirming positive relationships between Knowledge Management (KM) and SOP and Organizational Innovation (OI) and Sustainable Organizational Performance (SOP). The results in Table 3.8 indicate that both direct relationships; $KM \rightarrow SOP$ and $OI \rightarrow SOP$ are positive.

Table 3.8: Direct Path Analysis

Hypothesis	Results	Estimate	Lower	Upper	P-Value
H ₁	KM → SOP	0.351	0.205	0.459	0.028
H ₂	OI → SOP	0.296	0.196	0.383	0.012

Estimate based on 10,000 bootstrap with 95% confidence interval

SOP: Sustainable Organizational Performance// OI: Organizational Innovation // KM: Knowledge Management

Indirect Path Analysis

The results presented in Table 3.9 indicate that all four indirect relationships are positive. This means that, in each case, the indirect effect mediated through Organizational Innovation (OI) positively contributes to the outcome, Sustainable Organizational Performance (SOP). In other words, OI strengthens the relationship between the initial factors—Knowledge Management (KM), Technological Competence (TC), and Marketing Competence (MC)—and SOP. The positive direction of these relationships suggests that when KM, TC, and MC are combined with OI, they play a key role in improving sustainable performance within organizations. Therefore, the findings support the notion that OI is a crucial mediator, enhancing the positive impact of KM, TC, and MC on SOP.

Table 3.9: Indirect Path Analysis

Hypothesis	Results	Estimate	Lower	Upper	P-Value	Conclusion
H ₃	KM → SOP	0.351	0.205	0.459	0.028	Partial
	KM → OI → SOP	0.163	0.075	0.251	0.018	Médiation

Estimate based on 10,000 bootstrap with 95% confidence interval

SOP: Sustainable Organizational Performance// OI: Organizational Innovation // KM: Knowledge Management

Sequential Mediation Analysis

The results presented in Table 4.10 reveal that the sequential mediation hypothesis (H₄) exhibits significantly positive relationship. This indicates that the sequential mediation path involving Technological Competence (TC) and Organizational Innovation (OI) have a positive and statistically significant impact on Sustainable Organizational Performance (SOP). In other words, TC, when coupled with OI, significantly influence SOP through a sequential mediation process. The analysis underscores the critical role of OI as an intermediary factor, enhancing the impact of Knowledge Management (KM) on SOP via TC. Thus, the findings suggest that Technological Competence has a significant sequential mediation effect on the relationship between KM and SOP.

Table 3.10: Sequential Mediation Analysis

Hypothesis	Results	Estimate	Lower	Upper	P-Value	Conclusion
H ₄	KM→SOP	0.351	0.205	0.459	0.028	Partial
	KM→TC→OI→ SOP	0.057	0.029	0.088	0.013	Médiation

Discussions and Research Implications

The findings of this study offer compelling evidence supporting the pivotal role of knowledge management (KM) in achieving sustainable organizational performance (SOP), affirming the central thesis of this research. All four proposed hypotheses were accepted, underscoring the integrated and sequential influence of KM, organizational innovation (OI), and technological competence on sustainability outcomes. The acceptance of H₁, which confirms a direct positive relationship between KM and SOP, reinforces existing literature asserting that well-structured KM practices enhance organizational efficiency, adaptability, and decision-making quality. This result aligns with prior work by Iqbal et al. (2019) and Ferraris et al. (2019), indicating that knowledge-based capabilities are foundational to long-term value creation.

The validation of H₂, which establishes a significant positive relationship between organizational innovation and SOP, substantiates the notion that innovation is a critical driver of sustainable excellence. This is consistent with findings from Hongming et al. (2022) and Gunday et al. (2022), suggesting that organizations capable of continually transforming their processes, products, and structures are better positioned to meet environmental, economic, and social sustainability goals.

Moreover, H₃ confirmed that organizational innovation plays a mediating role between KM and SOP, highlighting the indirect pathway through which KM contributes to sustainability. This supports the theoretical argument that KM alone may not suffice; rather, its true value emerges when it translates into actionable innovation. This finding is well aligned with the work of Zhao et al. (2021) and Lee et al. (2020), who emphasized innovation as a key mechanism through which knowledge resources are transformed into competitive advantages and sustainable outcomes.

Finally, the acceptance of H₄ that technological competence and organizational innovation sequentially mediate the KM–SOP relationship which represents a major contribution of this study. It illustrates a layered dynamic where technological capabilities serve as the enabler of innovation, which in turn converts knowledge into sustainable performance. This result complements and extends the work of Zhang et al. (2021) and Wu et al. (2022), offering a nuanced understanding of how digital maturity and innovation culture jointly operationalize the benefits of KM.

Taken together, these findings reveal a cohesive framework for achieving sustainable excellence: knowledge must be effectively managed, channeled into innovative action, and supported by strong technological competence. This sequential synergy not only enriches existing KM and innovation literature but also offers practical insights for managers aiming to build resilient and future-ready organizations.

Research Implications

This study offers both theoretical and practical implications that contribute meaningfully to the existing literature and managerial practice. Theoretically, it advances understanding of the complex interplay between Knowledge Management (KM), Technological Competence (TC), Organizational Innovation (OI), and Sustainable Organizational Performance (SOP). By validating four hypotheses including two direct effects, one mediation, and one sequential mediation, the

study strengthens various theoretical perspectives. The direct influence of KM on SOP reaffirms the Resource-Based View (RBV) and Dynamic Capabilities Theory, emphasizing knowledge as a core strategic asset for long-term competitive advantage. Similarly, the confirmed direct effect of OI on SOP supports Innovation Diffusion Theory and highlights innovation as a dynamic capability crucial for sustainable outcomes. The study also demonstrates that OI mediates the KM-SOP relationship, thereby contributing to the Knowledge-Based View (KBV) and Absorptive Capacity Theory by clarifying how innovation enables organizations to translate knowledge into improved performance. Most notably, the sequential mediation involving TC and OI introduces a novel theoretical contribution, suggesting that technological competence lays the groundwork for innovation, which then drives sustainable performance. This insight extends Dynamic Capabilities and Technological Innovation Theory by presenting a more integrated pathway for achieving sustainable excellence through knowledge-driven strategies.

From a practical standpoint, the findings offer clear guidance to organizations aiming to improve their performance sustainably. The demonstrated effect of KM on SOP encourages firms to implement systems and practices that support knowledge sharing, learning, and documentation. In parallel, fostering an innovation-oriented culture by investing in creative capabilities and encouraging experimentation is vital for translating knowledge into impactful outcomes. The mediating role of OI suggests that knowledge alone is insufficient unless it is harnessed through innovation. Furthermore, the sequential mediation of TC and OI reveals that technological infrastructure is essential for enabling innovation to emerge from effective knowledge management. Therefore, organizations should align KM, technological tools, and innovation strategies cohesively, supported by investments in digital platforms, AI, and data systems. Doing so will allow them to optimize performance and maintain competitive advantage in a rapidly evolving environment.

While the study offers robust insights, it is not without limitations. Its cross-sectional design restricts the ability to draw causal inferences over time; future research using longitudinal methods could provide a more dynamic understanding of the observed relationships. Additionally, reliance on self-reported data introduces potential response biases, which can be mitigated through the inclusion of objective metrics and multi-source data in future studies. The limited sample size and geographic concentration also reduce generalizability, suggesting the need for broader, more diverse samples across industries and regions. Moreover, the study does not explore moderating variables such as leadership style, organizational structure, or external environmental conditions as all of which may influence the relationships examined. The growing relevance of digital transformation and emerging technologies such as big data, AI, and cloud computing also warrant future investigation to understand their impact on KM, TC, OI, and SOP.

Looking ahead, future research can explore how organizational culture, especially dimensions like openness, risk-taking, and collaboration, shapes the relationship among KM, TC, OI, and SOP. Comparative studies across different sectors would also help determine whether the proposed model holds consistently in various contexts. Investigating the long-term effects of KM, TC, and OI through longitudinal studies could offer deeper insights into their dynamic impact on SOP. Furthermore, incorporating employee-level factors such as motivation, engagement, and skill development could enrich the analysis and provide a more granular understanding of how these constructs operate at the individual level. Collectively, these directions can help refine and expand the model, making it more adaptable and valuable for both scholars and practitioners navigating an increasingly knowledge- and innovation-driven business landscape.

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