

Advancing Firm Performance through Knowledge Management Process: Mediating Role of Innovation Capabilities and Moderating Role of Organization Size

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ABSTRACT

This study investigates the influence of knowledge management processes (KMP) on firm performance (FP) in the ready-made garments industry. It also observes the mediating role of product (PDI) and process innovation (PCI). Additionally, the moderating effect of organization size (OS) is also studied. By integrating KMP with operational and innovation perspectives, the research aims to provide actionable insights for improving production efficiency and competitiveness. Grounded on the Resource-Based-View, the study employs a quantitative research approach. Data were collected from 273 respondents across 77 firms. Analysis are performed using partial least square structural equation modelling (PLS-SEM) and multi-group method (MGA). Results reveal that KMP significantly enhance FP, with PCI emerging as a significant mediating factor in the relationship of KMP and FP. This is in contrast to the non-significant mediating role of PDI. The findings from the MGA suggest medium and large firms generate greater performance improvements than small firms due to superior technological resources and operating competencies. This study provides new insights that differentiate between the mediating roles of PDI and PCI in the KMP relationship within Bangladesh's RMG sector a context underrepresented in innovation literature. It uniquely demonstrates that only PCI significantly mediates this link, challenging assumptions that treat innovation as a unified construct. Besides, it shows how OS moderates such dynamics, with medium and large firms benefiting more due to superior resources.



Introduction

The Ready-Made Garment (RMG) industry in Bangladesh is a significant economic cornerstone, serving as a primary driver of the nation's economic development, employment generation, and overall socio-economic progress (Rahman & Chowdhury, 2020). Operating in a fiercely competitive international marketplace, firms in this sector are constantly under pressure to establish and sustain a competitive advantage. To this end, Knowledge Management Processes (KMP), defined as the means by which organizational knowledge assets—such as design expertise, production practices, quality control, and market trends—are formally tapped (Y. Li et al., 2022), have become increasingly essential in defining Firm Performance (FP). Since knowledge is widely regarded as a valuable organizational asset, understanding how KMP can systematically optimize performance is imperative for the RMG industry. However, despite KMP's recognized value, there remains a substantial gap in understanding the precise mechanisms through which these processes translate into performance gains, particularly concerning the distinct roles of different types of innovation capabilities within labor-intensive industries like the Bangladeshi RMG sector.

Effective knowledge management achieves this enhancement by capturing, organizing, sharing, and leveraging the knowledge base within the firm to drive innovation, competitive advantage, and ultimately, improvement in firm performance (Baquero, 2024 & Rashid et al., 2020). This view is strongly supported by the Resource-Based View (RBV), which holds that knowledge resource creation and dissemination over time benefit RMG firms in gaining and sustaining competitive advantages (Saha et al., 2022; Saha et al., 2024). Furthermore, firms possess a competitive edge through innovative processes, better decision-making, and distinguished products enabled through strong KMP systems (Naeem et al., 2024; Azeem et al., 2021). Innovation, in turn, is the critical interface, allowing firms to meet consumer requirements and distinguish themselves from competitors (Adama et al., 2024). Particularly, Process Innovation (PCI) and Product Innovation (PDI) are considered essential to organizational efficacy and expansion in the RMG environment. PDI encompasses the creation of new or fundamentally better products, while PCI focuses on the improvement of internal processes and production techniques to reduce costs, maximize quality, and achieve maximum efficiency (Achi et al., 2021; Saha et al., 2024; Freije et al., 2021). While PDI allows knowledge to be converted into new product launches (Migdadi, 2020), studies often treat innovation as a singular construct. This leads to an empirical ambiguity regarding which type of innovation—PDI or PCI—serves as the more potent mediating link between KMP and FP, a distinction that is particularly critical in the operationally focused RMG sector.

Despite the recognized importance of knowledge management in enhancing performance, a significant research gap remains in fully understanding the mechanisms at play in the RMG sector of Bangladesh (Uddin et al., 2023). Specifically, the mediating channels through which knowledge is converted into improved outcomes, particularly through the dual lens of innovation (PDI and PCI), are not fully addressed. Although literature has acknowledged the general role of innovation in firm success, the specific, differential mediating effects of PDI and PCI in the KMP-FP relationship have received limited attention (Bashir et al., 2024). Furthermore, because firm size (OS) fundamentally dictates the way internal resources (like KMP) are utilized and innovation capabilities are developed for enhancing FP, it ought to be investigated as a crucial boundary condition. This heterogeneity remains largely unexplored in this context. To address these critical gaps, the present study raises the following research questions:

1. Does KMP have a positive and significant impact of FP in RMG industry?
2. Does the innovation process significantly mediate the relationship of KMP and FP?
3. Does organizational size play a moderating role in adopting innovation-driven knowledge?

o address these questions, this study undertakes a comprehensive empirical investigation grounded in the RBV theory. Recognizing knowledge as a valuable, rare, and strategic asset, the study conceptualizes KMP as a critical internal resource that enhances FP when aligned with differentiated innovation capabilities. Specifically, it examines the distinct mediating roles of product and process innovation, which helps uncover the precise mechanisms through which knowledge is transformed into competitive advantage within the manufacturing context of the RMG sector. In addition, the study incorporates the moderating role of organizational size (OS), aiming to explore whether the strength of these relationships varies across different firm levels. By integrating these dimensions, the study contributes to both theory and practice. Theoretically, it extends the RBV framework by linking KMP and innovation as sequential resources that interact with firm-specific contexts. Practically, it offers actionable insights for managers and policymakers in the RMG sector, guiding how to design and scale knowledge and innovation processes for optimal performance. Research articulation is presented in figure 1.

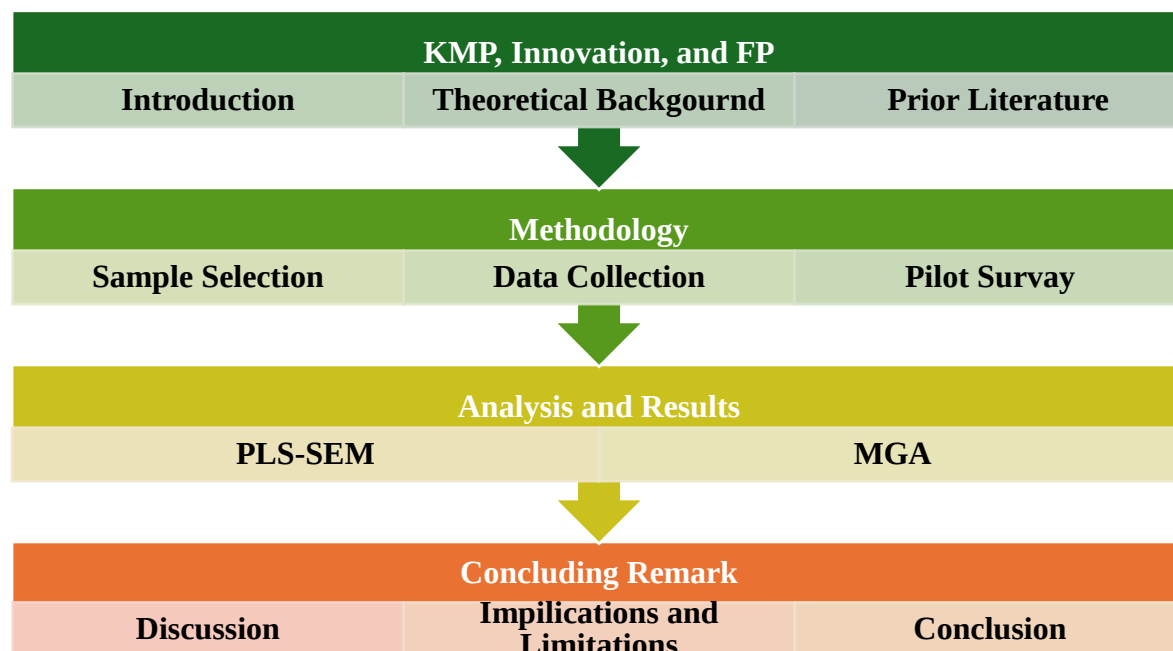


Figure 1: Research flowchart.

Theoretical Background and Hypotheses Formulation

Theoretical Background and Framework

Knowledge Management (KM) has received significant attention in the business world, resulting in an extensive and diverse body of literature that can be challenging to organize and interpret effectively (Chen & Yu, 2024). A persistent challenge in this field is the development of a coherent theoretical foundation to explain the processes and impact of KMP (Pereira & Bamel, 2021). To address this, it is essential to clarify the underlying theoretical frameworks, and among the prominent approaches, the Resource-Based View (RBV) has been extensively used. Formulated in 1991, the RBV posits that firms require not only tangible and intangible resources but also the capability to effectively utilize these resources to drive performance. This framework explains how firms capitalize on their unique resources, particularly knowledge, to acquire a competitive advantage and achieve superior performance (Nayak et al., 2023 & Zahra, S. A 2021). Within this context, knowledge is considered a core intangible asset, especially in the Ready-Made Garment (RMG) industry, where effective KMP enable firms to enhance production efficiency, anticipate fashion trends, and align with customer demands. The ability to systematically extract and apply

knowledge is thus recognized as a strategic resource that significantly influences Firm Performance (FP) in the garment sector (Azeem et al., 2021). Building on the RBV, innovation is considered a dynamic capability that organizations adopt over time in response to competitive pressure and changing market conditions. The RBV identifies innovation as a critical mechanism for utilizing valuable knowledge resources to create value, enhance business growth, and increase overall performance (Do et al., 2021). Therefore, both product (PDI) and process (PCI) innovations act as vital pathways through which KMP can influence FP. A key theoretical distinction in this study, supported by RBV, is that the strategic value of Process Innovation—focused on improving efficiency, reducing waste, and standardizing production—may be more immediately valuable in the operationally intensive RMG sector than Product Innovation. This differential value justifies studying them as separate mediators. Furthermore, organizational size (OS) plays a critical role in shaping a firm's ability to manage and leverage resources. Larger firms are typically better positioned to access, integrate, and utilize a broader range of resources, including sophisticated knowledge management systems and greater capital for innovation. This advanced access often contributes to better performance and a higher innovation capacity. According to the RBV, while KMP is a valuable resource and innovation is a dynamic capability, firm size can determine how effectively these elements are utilized to sustain a competitive advantage. Therefore, to comprehensively understand the contribution of KMP to FP, it is essential to investigate the mediating role of innovation (PDI and PCI) and the moderating role of firm size in this relationship. This study presents a conceptual research framework (see Figure 2) that integrates these constructs within the RBV framework, offering a systematic approach to understanding the correlation among KMP, innovation, organizational size, and FP.

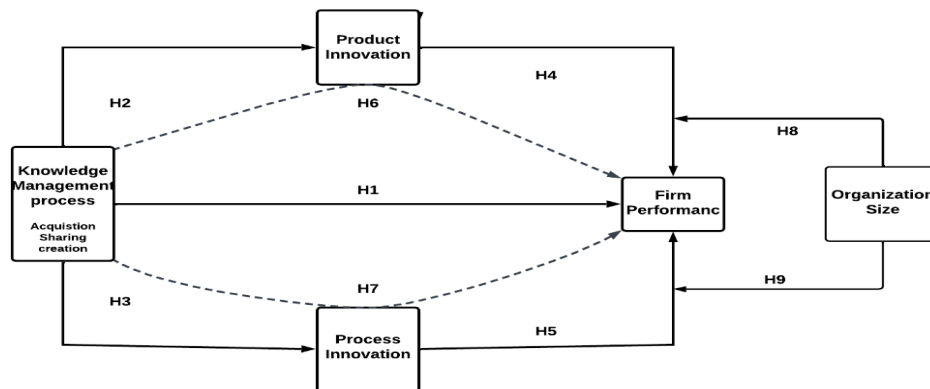


Figure 2: Conceptual Framework (Source: author creation)

Knowledge management process and firm performance

Knowledge is commonly regarded as a strategic organizational resource, and Knowledge Management (KM) is increasingly valued for its role in addressing business issues and facilitating sustainability. Organizations that actively engage in KMP—typically involving knowledge acquisition, sharing, and development—are better equipped to address changing marketplace demands and technological innovation (Migdadi, 2020). These connections are particularly relevant within the developing Ready-Made Garment (RMG) industry, where staying ahead of the curve in trends, manufacturing efficiency, and quality is vital for sustained competitiveness (Mele et al., 2023). Effective KMP are key drivers of Firm Performance (FP), which, in the RMG sector, can be assessed across dimensions such as financial performance, operational efficiency, product quality, and market competitiveness (Zhao et al., 2021). Effective KMP contribute to improved product design, better production output, and enhanced quality control. For example, knowledge acquisition enables RMG firms to stay updated on global fashion trends, technological breakthroughs, and evolving customer preferences (Ahmmed, 2023). Furthermore, sharing

knowledge between departments improves coordination and facilitates informed decision-making, while knowledge creation ensures valuable organizational experience is constantly generated and stored. Companies with effective KMP are consistently found to exert better control over supply chains, reduce operational expenses, and enhance quality (Huang et al., 2024; Zhu et al., 2024). Given the highly competitive and dynamic environment of the RMG industry, knowledge-based strategies are of critical importance to reduce errors, improve quality, and ultimately increase overall efficiency. Despite these recognized benefits, there remains a need for more empirical research to identify the most potent KMP in the specific context of Bangladesh's RMG industry and to explore the mechanisms through which KM enhances performance. A comprehensive study of the direct impact of KMP on FP is vital for the survival, innovativeness, and growth of RMG firms. In light of the above discussion, the following hypothesis is proposed:

H1: KMP has a positive significant impact on FP.

Knowledge management process, product innovation, and process innovation

Effective Knowledge Management Processes (KMP) are instrumental in enhancing an organization's potential for Product Innovation (PDI) by systematically facilitating the free flow of critical information, significantly improving problem-solving capacity, and accelerating product development cycles. For the Ready-Made Garment (RMG) industry, PDI is defined by the introduction of new or fundamentally improved products that successfully generate customer value and reinforce competitive advantage (Saha et al., 2024). The mechanism commences with knowledge acquisition, which is vital for identifying global fashion trends and evolving consumer needs, thereby serving as the core basis for new creative designs and product concepts (Zhang & Liu, 2024). Knowledge sharing among crucial organizational units, such as designers, pattern makers, and production departments, ensures the seamless transmission of ideas and specifications through the product development lifecycle. Moreover, the systematic use and warehousing of knowledge make best practices and past lessons readily accessible, which continuously drives the momentum for constant product improvements (Zhao et al., 2021). This sustained knowledge transfer enables businesses to effectively counter changing market dynamics with innovative textiles, advanced design features, and superior product attributes (Moin et al., 2024). Consequently, firms operating with efficient KM processes can introduce high-quality, specialty apparel with greater ease and compete more effectively on a global scale (Rana & Youn, 2024). Acknowledging that challenges such as a lack of skilled staff and resistance to design changes persist in the RMG sector (Hasan et al., 2020), this study posits that KMP provides the necessary resource base to drive PDI forward. KMP is also crucial in fostering Process Innovation (PCI), which involves the utilization of improved production or delivery processes to achieve enhanced efficiency and greater cost-effectiveness. Efficient KMP facilitate this operational advancement by capturing, sharing, and utilizing valuable operating experience throughout the organization (Abhari & McGuckin, 2023). Operational inefficiencies are precisely identified through systematic knowledge acquisition, and effective sharing promotes the essential inter-departmental collaboration required for process innovation (Ahmed et al., 2024). Empirical evidence suggests that RMG firms with robust KMP are in a superior strategic position to adopt advanced manufacturing technologies, rationalize complex supply chains, and improve quality control across the entire production sequence (Chowdhury et al., 2020).

H2: KMP contributes positively and significantly to PDI.

H3: KMP contributes positively and significantly to PCI.

Product Innovation, process innovation, and firm performance

PDI is defined as the creation and launching of new or substantially improved products that more effectively address dynamic market needs (Raddats et al., 2022). In the highly competitive RMG industry, PDI is fundamental to sustaining and improving Firm Performance (FP). It enables firms to proactively search for new market opportunities, allowing them to effectively extend and diversify their business operations. Through the presentation of differentiated products, RMG companies can successfully establish a strong competitive advantage, which enables them to charge premium prices and foster enhanced brand loyalty among customers (Sahi et al., 2022). As a sector vital to Bangladesh's export earnings and employment, innovation in products is consistently recognized as an important source of competitive advantage and superior FP. Furthermore, product innovation can contribute indirectly by potentially reducing production cost and lead time, allowing firms to offer more competitive prices and meet stringent delivery expectations more effectively. Accordingly, product innovating firms consistently realize a greater market share, higher profitability, and better customer satisfaction ratings (Uddin et al., 2023). For example, the strategic adoption of new textile technology, environmentally friendly materials, and modern design techniques has enabled Bangladeshi RMG firms to meet the sophisticated and evolving preferences of international customers, leading directly to the ability to secure high-value orders and generate greater export volumes. PCI involves the adoption of better or entirely new methods of production or delivery with the overarching goal of enhancing efficiency and productivity. This includes the implementation of contemporary practices such as lean manufacturing and the strategic utilization of digital technology in managing the production flow. Process innovation is critical because it fundamentally helps companies to better manage scarce resources, maintain a standard level of product quality, and reliably achieve established performance goals. Crucially, PCI allows firms to respond swiftly and efficiently to rapidly changing customer needs and market trends, thereby significantly increasing their competitiveness at a global level. In the RMG sector in Bangladesh, where operational efficiency is paramount, PCI is highly regarded as a key determinant of FP (Vinther et al., 2024). While Junaid et al. (2022) observe that its direct contribution may be challenging to measure due to the dynamic and high-speed nature of the industry, the long-term impact of PCI on cost reduction and operational viability is undeniable for ensuring the continued competitiveness and long-term sustainability of the firm. Under these established link, we state the following hypothesis:

H4: PCI contributes positively and significantly to FP.

H5: PDI contributes positively and significantly to FP.

Mediating effect of Product Innovation and Process Innovation

Several studies point to the significant role of effective KMP in RMG company operations (Nabi et al., 2022; Saha et al., 2022). KMP enables companies to gain, share, and apply pertinent knowledge about fashion trends, production processes, and fabric technologies source of PDI. This innovation is a pathway through which KM practices are translated into improved FP, which generally manifests in increased market share, sales growth, and profitability. Product innovation, or the introduction of new or significantly better products or services, increases competitiveness in rapidly evolving markets. Agostinho (2024) found that PDI operates as a mediator between the KMP and FP relationship by creating an innovation culture. In the Bangladeshi RMG sector, this mediating role has drawn increased attention. Nuryanto et al. (2024) argue that RMG firms invest in KMP initiatives to establish an environment of innovation and creativity, which ultimately enhances performance results. According to this, there has to be additional research on how strong this mediating relationship is. Similarly, KM also aids PCI, the implementation of new or improved methods of production to generate higher productivity, reduce waste, and enable better

performance. Tehseen et al. (2024) further state that robust KM systems enable the knowledge base in improving processes. This includes the access to the best practices in lean manufacturing, supply chain management, and quality assurance (Bizuneh & Omer, 2024). Barua (2021) concludes that RMG firms with effective KMP is more likely to create successful PCI. PCI are mechanisms that convert KM into concrete benefits such as increased efficiency and sustainability (Jayabalan & Dorasamy, 2024). PCI is also a significant mediator of KMP and FP, states Moin et al. (2024), as it enables the firm to respond promptly to changes in technology and the market. Despite some barriers, resistance to change, intra-departmental poor communication, and lack of employee training (Khoa & Huynh, 2024; Lo, 2024) the mediation remains necessary. Based on these results, the following hypothesis is set forth:

H6: PDI mediates the relationship between KMP and FP.

H7: PCI mediates the relationship between KMP and FP.

Moderating Effect of Organizational Size

At the RMG industry, firms are generally classified as small, medium, or large with varied characteristics. Small firms are renowned to be agile and responsive to the market but do not have the suitable capacities for innovation expansion (Rahman & Chowdhury, 2020). Medium firms strike a balance between agility and capability to invest moderately into innovation and demonstrate consistent performance development (Kadir et al., 2023). Large firms, due to scale operations, are accorded robust financial and technological assets but may also experience bureaucratic problems that hinder the speed of innovation (Hasan et al., 2020). Size of the organization could be a moderator of the innovation-firm performance relationship. For product innovation, small firms may innovate quicker but not achieve high performance due to poor capabilities. Medium firms are able to extract average resources better, and enormous firms may innovate less frequently but on a large scale. The same moderating effect can be observed in the instance of PCI. Big organizations can implement advanced systems of production and supply chain enhancements, while small organizations, as they are flexible, may not be capable of being accommodating for significant process improvements (Achi et al., 2021). Based on these findings, we hypothesize the following regarding the moderating effect of organizational size on the innovation–performance relationship in Bangladesh's RMG sector.

H8. OS moderates the relationship between PDI and FP.

H9. OS moderates the relationship between PCI and FP.

Research Methodology and Results

Measurement items and questionnaire development

All measurement items used in this study were adapted from established scales in prior research to ensure validity and contextual relevance. The questionnaire was initially developed using items from the works of Naeem et al. (2024), Migdadi (2020), Gao et al. (2022) and Ahmed et al. (2024). The adaptation process involved modifying language and terminology to improve clarity and relevance. The draft questionnaire was reviewed by three academic experts in management and organizational studies and two industry professionals from the RMG sector. Feedback from them allowed minor adjustments to be made to improve wording and remove ambiguities as well as ensure contextual suitability. Following expert validation, a pilot test was conducted with a sample of 30 respondents from various RMG firms. The purpose of the pilot study was to evaluate the reliability, clarity, and consistency of the instrument. After analyzing the pilot data and confirming satisfactory results the final version of the questionnaire was administered to the full sample. The

final instrument utilized a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire included:

- 9 items to measure Knowledge Management Processes
- 5 items for Process Innovation
- 5 items for Product Innovation
- 8 items for Firm Performance

Population and sample

This article investigates the impact of KMP on FP of the RMG industry in Bangladesh through an empirical framework. Data were gathered using a structured questionnaire survey conducted from May to August 2025. The survey was conducted among employees belonging to various hierarchical levels top, middle, and operational of 77 RMG companies based in Dhaka and surrounding industrial areas like Gazipur, Mymensingh, and Narayanganj. These locations were selected due to the presence of high concentration of RMG activities and proximity to big industry organizations including the Bangladesh Garment Manufacturers and Exporters Association (BGMEA) and the Bangladesh Knitwear Manufacturers and Exporters Association (BKMEA). The non-probability convenience sampling technique was utilized, selected due to time constraint and ease of accessibility. 400 questionnaires were sent through electronic (email) and physical mode. Out of these, 273 were correctly filled and collected, providing a response rate of approximately 68.25%. This sample provides excellent insights into workforce opinions at the time. While this methodology permitted data collection from a variety of various respondents, it has potential limitations in terms of generalizability and representativeness. Despite this, the findings are still useful in terms of providing feedback towards explaining the KMP-innovation-firm performance nexus in the Bangladesh RMG sector.

Table 1: Demographic Characteristics (N = 273)

Respondent Profile	Distribution	Frequency	%
Gender	Male	204	74.73
	Female	69	25.27
Age	20–25 years	72	26.37
	26–33 years	124	45.42
	>33 years	77	28.21
Education	Diploma	101	37.00
	Bachelor's	128	46.89
	Master's or Above	44	16.11
Employee Positions	Junior Level	94	34.43
	Mid-Level	110	40.29
	Senior Level	69	25.28

Statistical Analysis

Partial Least Squares Structural Equation Modeling (PLS-SEM) using SmartPLS version 4.1.0.0 was used in the present study to analyze the data. PLS-SEM was applied due to its suitability for complex models involving mediation, moderation, and multigroup analysis (MGA), and for dealing with small-to-medium sample sizes and non-normal distribution of data. The use of PLS-SEM is strongly rooted in all areas such as management, marketing, and human resource studies particularly where the primary concern is predictive modeling and theory building (Hair et al., 2012; Hair & Ringle, 2011). It is particularly handy in the estimation of several structural

relationships simultaneously and in the measurement (outer) model as well as the structural (inner) model determination. Here, outer model validated constructs' reliability and validity, while inner model validated hypothesized relationships between KMP, innovation, and FP. In addition, MGA was employed for the testing of organizational size as a moderating effect by examining structural path differences among small, medium, and large RMG companies.

Results

Measurement Model

The current study analyzed the measurement model approach to assess the reliability. To measure the reliability, we have used Cronbach alpha (CA), composite reliability (CR) and convergent validity through Average Variance Extract (AVE) values. According to Hair & Ringle (2011), CA and CR values should be higher than 0.70, and AVE values should be greater than 0.50 suggested by Henseler & Hubona, (2016). These results are reported in Table 2. For KMP, factor loadings ranged from 0.716 to 0.854, with CA = 0.921, CR = 0.934, and AVE = 0.614, confirming internal consistency and convergent validity. PCI showed loadings between 0.761 and 0.832, with CA = 0.860, CR = 0.899, and AVE = 0.642. PDI exhibited loadings between 0.742 and 0.877, with CA = 0.881, CR = 0.914, and AVE = 0.680. Similarly, FP demonstrated loadings between 0.747 and 0.857, with CA = 0.930, CR = 0.942, and AVE = 0.670. These values meet or exceed the criteria, verifying that the constructs were both reliable and valid. We assessed the Fornell Larcker and heterotrait–monotrait (HTMT) ratio to test the discriminant validity (Fornell & Larcker 1981). The HTMT ratio has recently gained preference over Fornell and Larcker (Henseler & Hubona, 2016). Fornell and Larcker's tests exhibit values greater than the correlations among the variables. The HTMT ratio results are lower than the 0.090 thresholds. Furthermore, we examined the variance inflation factor (VIF) to assess the problem of multicollinearity in the data. Aiken, West, (1991) suggested that the values of VIF must be <10. Outcomes of the statistics are reported in table 3. Estimated values are confirming the validity of all the constructs.

Table 2: Reliability Validity

Construct	Items	Loadings	CA	CR	AVE
Knowledge Management Process	<i>KMP1</i>	0.849	0.921	0.934	0.614
	<i>KMP2</i>	0.761			
	<i>KMP3</i>	0.854			
	<i>KMP4</i>	0.775			
	<i>KMP5</i>	0.725			
	<i>KMP6</i>	0.800			
	<i>KMP7</i>	0.815			
	<i>KMP8</i>	0.716			
	<i>KMP9</i>	0.742			
Process Innovation	<i>PCI1</i>	0.761	0.860	0.899	0.642
	<i>PCI2</i>	0.832			
	<i>PCI3</i>	0.808			
	<i>PCI4</i>	0.783			
	<i>PCI5</i>	0.820			
Product Innovation	<i>PDI1</i>	0.742	0.881	0.914	0.680
	<i>PDI2</i>	0.837			
	<i>PDI3</i>	0.877			
	<i>PDI4</i>	0.853			

	<i>PDI5</i>	0.808			
Firm Performance	<i>FP1</i>	0.835	0.930	0.942	0.670
	<i>FP2</i>	0.856			
	<i>FP3</i>	0.827			
	<i>FP4</i>	0.749			
	<i>FP5</i>	0.840			
	<i>FP6</i>	0.857			
	<i>FP7</i>	0.829			
	<i>FP8</i>	0.747			

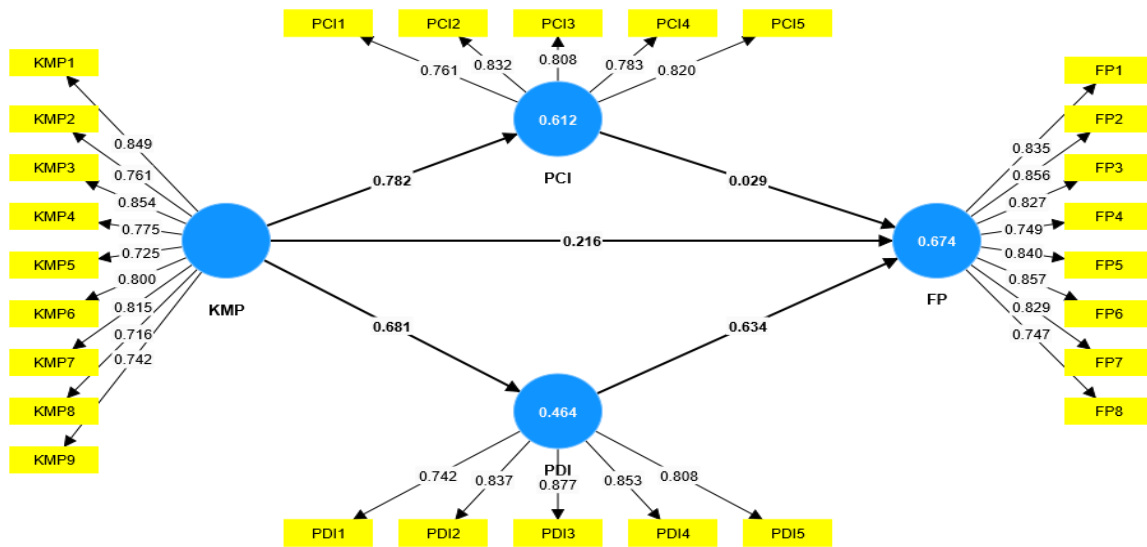


Figure 3: Measurement Model

Table 3: Discriminant validity (latent variable correlation and square root of AVE) and HTMT (*).

Construct	KMP	PCI	PDI	FP
KMP	0.783	0.777*	0.755*	0.722*
PCI	0.782	0.801	0.839*	0.746*
PDI	0.681	0.744	0.825	0.775*
FP	0.671	0.670	0.803	0.937

Structural model

The structural model was designed to clarify the relationships among the latent variables and determine the significance of their effects. To evaluate these relationships, the study employed the bootstrapping technique with 5000 subsamples using PLS-SEM, and the results are presented in Tables 4 and 5. The model was assessed through R^2 values, effect sizes (f^2), and path coefficients (β), with R^2 values of 0.612 for PCI, 0.464 for PDI, and 0.674 for FP. These values indicate moderate to substantial explanatory power, while the Standardized Root Mean Square Residual (SRMR) of 0.077 confirmed an acceptable model fit.

The direct hypotheses (H1–H5) reveal several significant findings. H1, which examined the influence of KMP on FP, was supported with $\beta=0.216$, $t=3.772$, and $p<0.001$, confirming that firms with strong knowledge management systems achieve better performance outcomes. H2,

which explored the link between KMP and PDI, showed a strong positive effect ($\beta=0.681$, $t=20.336$, $p<0.001$), while H3 confirmed a significant relationship between KMP and PCI ($\beta=0.782$, $t=34.655$, $p<0.001$). H4, which assessed the role of PDI in driving FP, was also supported with $\beta=0.634$, $t=10.570$, and $p<0.001$, suggesting that PDI is a critical driver of competitive advantage and organizational performance. In contrast, H5, which tested the direct effect of PCI on FP, was rejected because the path coefficient was not significant ($\beta=0.029$, $t=0.402$, $p=0.344$), implying that PCI alone may not directly lead to performance improvements unless it is strategically aligned with other resources or capabilities. The mediation analysis offered further insights. H6, which proposed that PDI mediates the relationship between KMP and FP, was not supported ($\beta=0.023$, $t=0.400$, $p=0.345$), indicating that PDI does not serve as a significant mediating factor in this relationship. However, H7, which examined the mediating role of PCI, was strongly supported ($\beta=0.432$, $t=9.564$, $p<0.001$). This finding highlights the importance of PCI as an essential mechanism through which effective knowledge management practices translate into enhanced firm performance.

Table 4. Saturated model results

Construct	R2	Adj. R2	VIF	f2	SRMR
PCI	0.612	0.610	2.730	0.043	0.077
PDI	0.464	0.462	2.377		
FP	0.674	0.671	2.279		

Table 5. Structural Model Results

Hypothesis	Relation	β	μ	σ	t_c	p_v	Decision
Direct							
H1	KMP $\rightarrow$ FP	0.216	0.215	0.057	3.772	0.000	Accepted
H2	KMP $\rightarrow$ PDI	0.681	0.683	0.034	20.336	0.000	Accepted
H3	KMP $\rightarrow$ PCI	0.782	0.783	0.023	34.655	0.000	Accepted
H4	PDI $\rightarrow$ FP	0.634	0.635	0.060	10.570	0.000	Accepted
H5	PCI $\rightarrow$ FP	0.029	0.031	0.073	0.402	0.344	Rejected
Mediating							
H6	KMP $\rightarrow$ PDI $\rightarrow$ FP	0.023	0.024	0.057	0.400	0.345	Rejected
	KMP $\rightarrow$ PCI $\rightarrow$ FP	0.432	0.433	0.045	9.564	0.000	Accepted
H7	KMP $\rightarrow$ PCI $\rightarrow$ FP						

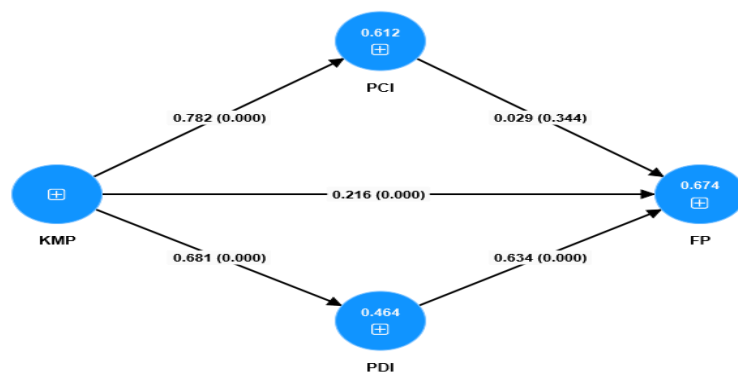


Figure 4: Structural Model

Multi-Group analysis for organizational size

The moderating impact of Organization size is analyzed through multi group analysis (MGA) approach. MGA is used to evaluate the significant difference in the several group of distinct models when the moderator is a categorical variable (Hair et al. 2019)). Since the Organization size is categorical variable, so we divided it into three categories (X_i , $i = 1$ (small), 2(medium), 3(large)), Small ($n = 56, X_1 \leq 150$), Medium ($n = 97, 151 \leq X_2 \leq 250$), and Large ($n = 120, X_3 \geq 251$), here n=No. of firms. The results are reported in Table 6. For H8, the effect of PDI on FP was found to be insignificant for small firms ($\beta = 0.108$, $t = 0.143$) but significant for medium ($\beta = 0.331$, $t = 2.190$) and large firms ($\beta = 0.743$, $t = 2.711$). This suggests that larger firms, due to their resources and technological capabilities, are better positioned to leverage PDI for performance improvement. Similarly, H9, which tested the moderation of OS on the PCI–FP relationship, showed significant effects across all firm sizes: small ($\beta = 0.710$, $t = 2.12$), medium ($\beta = 0.841$, $t = 3.321$), and large ($\beta = 0.992$, $t = 3.442$), with large firms showing the strongest relationship

Table 6: Moderating effect of organizational size.

<i>Hypothesis</i>	<i>Relationship</i>	<i>OS</i>	β	<i>t-value</i>	<i>Decision</i>
H8	$PCI \rightarrow PDI$	X_1	0.108	0.143	Insignificant
		X_2	0.331	2.190	Significant
		X_3	0.743	2.711	Significant
H9	$PDI \rightarrow FP$	X_1	0.710	2.12	Significant
		X_2	0.841	3.321	Significant
		X_3	0.992	3.442	Significant

Discussion

The primary objective of this research was to empirically investigate the relationship between Knowledge Management Processes (KMP) and Firm Performance (FP) in the Bangladeshi Ready-Made Garment (RMG) industry, specifically addressing the mediating roles of innovation capabilities and the moderating role of Organization Size (OS). Drawing on the Resource-Based View (RBV), this study successfully answered three critical research questions, yielding findings with significant theoretical and practical implications. The results confirmed the first hypothesis, demonstrating that KMP positively and significantly contributes to FP. This finding validates the core tenet of the RBV, which asserts that organizational knowledge, when properly managed, serves as a strategic, valuable, and inimitable resource that enables sustainable competitive advantage. Our findings concur with previous research (Mighdadi 2022), emphasizing that the rigorous practice of knowledge acquisition, sharing, and utilization is vital for both business efficacy and the financial prosperity of RMG firms. KMP, in this sector, operates not merely as a set of technical practices but as a fundamental driver of organizational culture that fosters continuous learning, facilitates informed decision-making, and enhances employee involvement, all of which are essential for competitiveness in a highly globalized environment. The second set of questions addressed the differential mediating roles of Product Innovation (PDI) and Process Innovation (PCI). The analysis revealed that PDI plays a strong role in directly influencing FP (H4 confirmed), which is consistent with existing literature (Sahi et al., 2022) highlighting the importance of new product development and quality improvement for market performance. In a crucial divergence from expectations, however, PDI did not significantly mediate the relationship between KMP and FP (H6 was rejected). This implies that while KMP may successfully generate

innovative design knowledge, the ultimate translation of this product-centric knowledge into performance outcomes is highly contingent upon external enablers, such as significant investment in R&D activities, large-scale technology upgradations, or robust customer-driven product development frameworks—resources often constrained in the cost-focused Bangladeshi RMG sector. Conversely, PCI emerged as a significant and potent mediator for the KMP-FP relationship (H7 was confirmed). This finding is especially salient for the RMG sector, where operational efficiency, cost reduction, and superior production processes are paramount determinants of success. The result strongly aligns with previous studies (Moin et al., 2024; Barua, 2021), powerfully reaffirming that successful KMP practices are the essential foundation for achieving continuous improvement and operational excellence via process innovation. This empirical result strongly suggests that the highest return on KMP investment in this context is its ability to refine how products are manufactured, rather than generating entirely new products. The third research question concerning the moderating role of organizational size was also investigated. The results from the Multi-Group Analysis (MGA) consistently revealed that large and medium-sized firms benefit more significantly from both PDI and PCI than small firms. This disparity stems from the fact that small firms frequently lack the necessary financial capital, technological infrastructure, and specialized human resources required to effectively leverage sophisticated KMP and scale innovation for substantial, long-term performance improvement. This finding is entirely consistent with the reports of Farooq et al., (2021), who note that firms with greater resource capacity are better positioned to adopt and fully implement innovative practices on a grand scale. While small firms benefit from agility and adaptability, without the backing of strategic resources, these qualities are insufficient to consistently translate KMP and innovation efforts into sustained performance enhancement compared to their larger, better-resourced counterparts.

Implications

Theoretical Implications

First, this research significantly extends the Resource-Based View (RBV) by establishing the centrality of Knowledge Management Processes (KMP) as a dynamic and intangible resource that generates enduring competitive advantage when strategically paired with innovation capabilities. Previous studies (Bashir et al., 2024) broadly listed KMP as key to FP, but the current study provides robust empirical validation within the specific context of the highly competitive and labor-intensive RMG industry in Bangladesh. By verifying KMP's strong direct impact on Firm Performance (FP), the study substantiates the theoretical argument that knowledge is an essential driver of long-term organizational success in emerging economies.

Second, the research makes a critical contribution to the existing body of knowledge on innovation as a mediating process by empirically distinguishing the value of innovation capabilities. While prior research often considered PDI and PCI as generalized constructs (Sahi et al., 2022), the present study clearly differentiates their roles within the KMP and FP relationship in a manufacturing context. The findings reveal that Process Innovation (PCI) plays a significant mediating role, whereas Product Innovation (PDI) does not present a significant mediating impact on the KMP-FP link. This emphasizes that for the RMG sector, operational efficiency, cost reduction, and continuous process improvements (PCI) are the key theoretical link through which KMP is successfully converted into superior performance outcomes, providing a nuanced perspective that is contrary to the generalized assumption that product-related changes dominate.

Third, defining Organizational Size (OS) as a moderator allows for the integration of a critical contextual factor often underrepresented in KMP research. The findings demonstrate that medium and large firms gain substantially greater performance benefits from KMP-driven innovation compared to small firms. Observing this moderating effect adds rich theoretical understanding by

empirically confirming that different firm-level resource endowments significantly shape the effectiveness of knowledge-based innovation strategies (Farooq et al., 2021). This enhances the contextual depth of the RBV by demonstrating that the return on KMP investment is highly contingent upon organizational scale.

Practical Implication

Practically, the study powerfully reaffirms that establishing and empowering effective Knowledge Management Processes (KMP) is not a mere administrative or technical function but a fundamental strategic necessity. RMG companies can substantially improve both operational and financial performance by actively investing in structured systems and practices that enhance organizational learning, knowledge transfer, and the strategic use of internal expertise. For instance, creating comprehensive electronic knowledge repositories, implementing targeted cross-functional training programs, and fostering robust inter-departmental communication are essential actions to successfully operationalize the firm's knowledge system.

Managers should embrace a dual strategy that leverages both process and product innovation for competitive advantage. The findings confirm that Process Innovation (PCI) is the most direct and linear route to performance improvement. Therefore, continuous process improvement, such as adopting lean manufacturing techniques, automating production processes, and enhancing quality control systems, must be the top operational priority. Simultaneously, Product Innovation (PDI) remains critical for market differentiation. Managers must invest strategically in R&D, creative design teams, and sustainable product development to swiftly respond to changing consumer preferences, thereby improving brand value, enhancing profitability, and maximizing export potential.

The findings provide valuable implications regarding organizational scale and resource strategy. Medium and large firms, which benefit most from innovation, should utilize their greater access to financial and technological resources to amplify the scale and speed of both their process and product innovations. Small firms, constrained by limited resources, must pursue collaborative strategies—such as forming partnerships with larger firms, interacting with industry clusters, or utilizing government-sponsored innovation schemes—to overcome resource handicaps and translate agile innovation efforts into scalable performance gains. Policy-wise, government organizations and industry groups (like BGMEA and BKMEA) should act as major facilitators by establishing knowledge-sharing networks, promoting technical skill development, and providing support for digital transformation to allow firms to utilize their knowledge resources more effectively.

Additionally, the research provides clear signals to foreign buyers and global supply chain partners. The findings point to the strategic importance of transacting with RMG firms that demonstrate a continuous, verified investment in both KMP and innovation capabilities. This practice will naturally lead to the development of long-term supplier relationships based on high standards of quality, reliability, and manufacturing flexibility, which ultimately de-risks the global supply chain.

Limitations & Future directions

While this study offers interesting and valuable insights into the empirical linkage between Knowledge Management Processes (KMP), innovation, and Firm Performance (FP) in Bangladesh's RMG sector, it is subject to several limitations that inform a clear agenda for future research. Methodologically, the findings are limited by their geographical and industry-specific focus on core industrial areas (e.g., Dhaka, Gazipur), meaning the results may not reflect other

industries or countries with different structural and operational dynamics, suggesting a need to apply the model to other contexts to examine generalizability. Furthermore, the reliance on a non-probability convenience sampling method, despite achieving an acceptable response rate (68.25%), could potentially limit the overall representativeness of the data, warranting the use of larger, probability-based samples derived from methods such as stratified random sampling in subsequent studies. Additionally, the cross-sectional design inherently restricts the ability to fully uncover the dynamic process of KMP and innovation; therefore, longitudinal research would be capable of better testing causal relationships and identifying the sustained impact of these processes on performance over time. Moving beyond the current model, future research should also attempt to incorporate additional, critical dimensions, as other variables such as leadership style, organizational culture, or digitalization are likely to play important roles in linking KMP with FP. Similarly, combining the current analysis with firm of ownership is warranted, as resource availability and strategic focus vary across different ownership types. Lastly, with Artificial Intelligence (AI) and advanced digital technologies evolving at a frenzied rate, future work must specifically examine how AI-driven tools and advanced data systems empower KMP, drive innovation, and enhance FP across small, medium, and large firms, thereby building upon this study's strong foundational model. Despite these limitations, the findings of this study form a robust basis for continued empirical investigation.

Conclusion

This study explored the relationship between Knowledge Management Processes (KMP) and Firm Performance (FP) within the Ready-Made Garment (RMG) sector of Bangladesh, with specific emphasis on the mediating effects of Product Innovation (PDI) and Process Innovation (PCI), and the moderating effect of Organizational Size (OS). Guided by the Resource-Based View (RBV), the research sought to determine how efficiently managed knowledge resources produce enhanced performance through innovation-based strategies. Utilizing data collected from 273 respondents across 77 RMG firms, the analysis revealed several robust outcomes. Results confirm the existence of a strong and significant positive direct relationship between KMP and FP, reiterating that effective knowledge acquisition, creation, and sharing practices improve decision-making, operational efficiency, and financial outcomes. Crucially, among the innovation constructs, Process Innovation (PCI) emerged as the strong and significant mediator in the KMP-FP relationship, underscoring that operational excellence, efficiency, and cost reduction are the primary channels for translating knowledge into performance in this sector. Conversely, Product Innovation (PDI) was found to have a weak or non-significant mediating effect, suggesting that market-facing innovation alone may not reliably deliver competitive advantage unless backed by strategic changes. The moderation analysis also revealed that medium and large firms are better equipped to benefit from KMP-driven innovation due to greater access to technological resources and formal knowledge systems, whereas small firms are restricted by resource constraints in converting innovation to scalable performance outcomes. These results highlight the strategic potential of integrating KMP with process-based innovation strategies to fundamentally strengthen operational competitiveness in global markets. The study adds substantial value to theory by empirically testing the RBV in the RMG context and demonstrating that knowledge resources are dominantly translated into superior performance results through PCI.

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