Hungarian University of Agriculture and Life Sciences

"Impact of Supply Chain Capabilities and Digitization on the Supply Chain Performance of Bangladesh's Apparel Industry"

Doctoral (Ph.D.) Thesis

by

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I. INTRODUCTION

1.1 Research Background

Over the past two decades, supply chain management (SCM) has undergone a significant transformation driven by globalization, digitalization, and rising customer expectations. Modern supply chains are no longer linear structures that connect suppliers to customers; they are complex, adaptive networks that must constantly adjust to environmental volatility, technological disruptions, and shifting market demands (CRAIGHEAD ET AL., 2020). In this context, supply chain capabilities — defined as an organization's ability to deploy, coordinate, and reconfigure resources and competencies to achieve superior performance — have emerged as critical drivers of competitive advantage (GLIGOR & HOLCOMB, 2012).

Among these capabilities, supply chain agility, flexibility, innovation, and digitization have been repeatedly highlighted in both academic literature and industry practice as vital enablers of resilience and performance (QUEIROZ ET AL., 2019). *Agility* refers to the ability to respond rapidly to market and environmental changes (GLIGOR & HOLCOMB, 2012), *flexibility* to the capacity for adjusting operations and processes to meet varied requirements (CHEN, 2019), *innovation* to the adoption of new products, processes, or business models (BA AWAIN ET AL., 2025), and *digitization* to the integration of digital technologies into supply chain processes (BÜYÜKÖZKAN & GÖÇER, 2018).

However, the presence of these capabilities does not automatically translate into improved Supply Chain Performance (SCP). There are often intermediate mechanisms, such as Risk Management Capacity (RMC) and Digital Absorptive Capacity (DAC), that determine whether capabilities are effectively converted into performance outcomes (TEECE, 2007). RMC involves the proactive identification, assessment, and mitigation of risks across the supply chain (FAN & STEVENSON, 2018), ensuring that innovation, agility, and flexibility do not inadvertently increase exposure to vulnerabilities. On the other hand, DAC refers to an organization's ability to recognize, assimilate, and apply digital knowledge, thereby enabling the effective utilization of digital tools to create operational and strategic value.

In recent years, global supply chains have been disrupted by unprecedented events, including the COVID-19 pandemic, geopolitical conflicts, raw material shortages, and transportation bottlenecks (IVANOV & DOLGUI, 2020). These disruptions have reinforced the importance of capability-based approaches to supply chain management, in which firms do not simply react to problems but actively develop the capacities to sense, adapt, and transform in response to changing condition. This aligns closely with the Dynamic Capabilities Theory (TEECE ET

AL., 1997), which posits that long-term performance in turbulent environments depends on an organization's ability to integrate, build, and reconfigure internal and external competencies.

1.2 Research Problem

In today's highly interconnected and turbulent global economy, supply chains have become more than operational backbones; they are strategic enablers that determine competitive survival (IVANOV & DOLGUI, 2020). Increased market volatility, shorter product life cycles, geopolitical tensions, and disruptions stemming from factors such as pandemics have made traditional, linear supply chain structures increasingly insufficient (BURIN ET AL., 2020). Modern supply chains must be adaptive, resilient, and innovation-driven to meet rapidly changing customer expectations and withstand uncertainty. This has propelled concepts such as supply chain agility, flexibility, innovation, and digitization into the forefront of academic discourse and managerial practice (BÜYÜKÖZKAN & GÖÇER, 2018). These capabilities enable firms to respond quickly to change, reconfigure operations efficiently, and leverage technology to inform decision-making, factors that are now central to sustaining performance in competitive markets (BA AWAIN ET AL., 2025).

Nowhere is the demand for such capabilities more critical than in the global apparel industry. This sector is characterized by a high variety of products, intense price competition, rapidly shifting consumer trends, and highly fragmented global production networks (OLIVEIRA-DIAS ET AL., 2022). Within this space, the Bangladesh apparel industry occupies a globally significant position. As the world's second-largest apparel exporter after China, it generates over 80% of the nation's export earnings and accounts for more than 11% of GDP (JAHED ET AL., 2022). The sector earned USD 42.61 billion in 2021–2022, underscoring its status as the country's economic lifeblood (JAHED ET AL., 2022). Its competitiveness has even been indirectly bolstered by external factors, such as the US–China trade war, which has led global buyers to diversify their sourcing away from China (SUSITHA ET AL., 2025).

However, the RMG sector's global standing is under persistent threat from regional competitors such as Vietnam, Sri Lanka, India, and China, which are outperforming Bangladesh in both lead times and product diversification. Buyers increasingly demand low-cost, high-quality, and highly customized products with ever-shorter delivery times. However, Bangladeshi manufacturers often face higher operational costs, dependence on imported raw materials, and infrastructural inefficiencies that constrain responsiveness. In such an environment, enhancing supply chain agility and flexibility is not optional; it is essential to meet buyer expectations, mitigate risks, and retain market share (CHEN, 2019).

While agility and flexibility are vital, innovation is equally critical for sustaining competitiveness in the global apparel value chain. Supply chain innovation, whether in processes, technologies, or collaboration mechanisms, enables firms to break free from competing solely on cost and create differentiated, value-added offerings. However, innovation adoption in Bangladesh's apparel manufacturing sector remains inconsistent, with many firms reluctant or unable to invest in advanced methods due to financial constraints or lack of expertise. Digitization of the supply chain has emerged as the central enabler that integrates these capabilities. Digital technologies enable real-time visibility, predictive analytics, and seamless information sharing among stakeholders, thereby enabling faster, more informed decision-making (WANG ET AL., 2024). Research shows that digital readiness improves operational integration and strengthens supply chain agility (OLIVEIRA-DIAS ET AL., 2022). Nevertheless, despite the clear potential, many Bangladeshi RMG firms continue to rely on fragmented legacy systems, limiting the transformative benefits of digital tools (BURIN ET AL., 2020).

The research model underpinning this study addresses the critical observation that possessing capabilities such as agility, flexibility, innovation, and digitization does not automatically guarantee superior supply chain performance. Instead, these capabilities must be effectively converted into tangible outcomes through intermediary capacities, specifically, risk management capacity and digital absorptive capacity. Risk management capacity is the ability to anticipate, absorb, and recover from disruptions while minimizing operational and financial impacts. In the volatile global apparel supply chain, the importance of such capacity is magnified by exposure to geopolitical shocks, supply delays, and demand fluctuations. Digital absorptive capacity, on the other hand, reflects a firm's ability to identify valuable external digital knowledge, assimilate it into existing processes, and apply it to create competitive advantage (BURIN ET AL., 2020). This capacity determines whether digital investments translate into real operational improvements.

Existing literature has discussed agility, flexibility, innovation, and digitization individually in terms of performance (BÜYÜKÖZKAN & GÖÇER, 2018). It has also separately highlighted the benefits of risk management and absorptive capacity (OLIVEIRA-DIAS ET AL., 2022). However, few studies integrate these components into a single empirical model that explains how capabilities translate into performance through these two mediating capacities, particularly in the apparel manufacturing context of a developing economy. The Bangladeshi Apparel Manufacturing industry presents a unique empirical setting to test this model for several reasons. First, the sector's dependence on global buyers and imported inputs creates

heightened vulnerability to supply chain disruptions, making risk management capacity vital (ALI ET AL., 2023). Second, limited digital infrastructure and skills mean that digital absorptive capacity varies significantly across firms, influencing the extent to which digitization produces benefits. Third, the sector's competitive environment, characterized by intense cost pressure and rapidly changing buyer requirements, demands a holistic approach to capability development rather than isolated improvements. The absence of integrated empirical research on these interrelationships creates a critical knowledge gap. Without understanding how agility, flexibility, innovation, and digitization feed into risk management and digital absorptive capacity, managers lack evidence-based guidance on where to prioritize investments. This gap also limits policymakers' ability to design supportive interventions, such as targeted technology adoption programs or capability-building initiatives, that could improve the sector's global competitiveness.

1.3 Research Significance

This study is expected to contribute to theory by integrating the Resource-Based View (RBV) and Dynamic Capability Theory (DCT) into the context of supply chain management. From the RBV perspective, the research anticipates demonstrating how supply chain capabilities — such as agility, flexibility, innovation, and digitization can serve as valuable, rare, inimitable, and non-substitutable resources that enhance competitiveness. At the same time, drawing on DCT, the study is expected to highlight the role of dynamic capabilities, particularly risk management capacity and digital absorptive capacity, in enabling organizations to reconfigure and adapt these resources in response to environmental turbulence. By linking supply chain capabilities with RBV and DCT, this research aims to extend the theoretical understanding of how organizations build and sustain competitive advantage in dynamic markets. Moreover, the study is expected to clarify how different capabilities complement each other, rather than acting in isolation, to strengthen resilience and adaptability in supply chains.

Second, this study is expected to make several methodological contributions. First, by employing Partial Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS, the research aims to provide a rigorous approach for assessing direct and indirect effects among key supply chain constructs. This methodological choice is particularly suitable for complex models that involve mediating variables, such as risk management and digital absorptive capacity. Second, the study is expected to demonstrate the value of testing multi-mediation pathways, offering a more nuanced understanding of how supply chain capabilities influence performance. Third, the research intends to contribute by applying validated measurement

scales for constructs such as agility, flexibility, innovation, and digitization, ensuring reliability and validity in future empirical work. Ultimately, this study aims to promote methodological diversity in supply chain research by highlighting the potential for alternative analytical approaches (e.g., longitudinal designs, non-linear modeling, or qualitative methods) that can complement quantitative findings and offer richer insights into the dynamics of supply chain performance.

Third**,** from a practical perspective, this study is expected to provide actionable insights for supply chain practitioners, managers, and industry stakeholders. The research aims to offer guidance on how organizations can enhance performance in dynamic and uncertain environments by examining the roles of agility, flexibility, innovation, digitization, risk management, and digital absorptive capacity. The study is expected to show how strengthening agility, and flexibility can help firms adapt to disruptions more effectively. At the same time, innovation and digitization are anticipated to support the development of advanced technological and knowledge capabilities. Furthermore, the research is expected to highlight the practical importance of building robust risk management frameworks and digital absorptive capacity, enabling firms to translate supply chain capabilities into improved resilience and competitiveness. Overall, this study intends to provide supply chain leaders with a clearer understanding of how to align operational capabilities with strategic resources to achieve sustainable performance advantages.

II. OBJECTIVES OF THE STUDY

This chapter presents the research objectives, research questions, hypothesis development, proposed framework, and dissertation structure. The study focuses on the Bangladeshi apparel manufacturing industry, examining how supply chain capabilities — such as agility, flexibility, innovation, and digitization — directly and indirectly influence performance through risk management capacity and digital absorptive capacity.

The main objectives are to explore these relationships, integrate the two mediators into capability–performance research, and offer practical insights for strengthening resilience and competitiveness in the RMG sector. The chapter also introduces the guiding research questions, outlines the development of the hypotheses, presents the proposed framework, and provides an overview of the dissertation structure.

2.1 Research Objectives

1. Determine the extent to which supply chain capabilities (agility, flexibility, innovation, digitization) influence risk management and digital absorptive capacity.
2. Assess how these intermediary capacities, in turn, affect overall supply chain performance.
3. Provide theoretical contributions by integrating two underexplored mediators, risk management capacity and digital absorptive capacity, into capability–performance research.
4. Offer practical recommendations for managers and policymakers seeking to strengthen the resilience, adaptability, and competitiveness of the RMG supply chain.

2.2 Research Questions

1. How do supply chain agility, flexibility, innovation, and digitization influence supply chain performance in the Bangladeshi apparel manufacturing industry?
2. To what extent do risk management capacity and digital absorptive capacity mediate the relationship between supply chain capabilities and supply chain performance?
3. How can firms in the apparel manufacturing sector strategically develop and align supply chain capabilities to enhance resilience and performance in a competitive global market?

2.3 Research Hypothesis

Hypothesis 1a: Risk management capacity is positively influenced by supply chain agility.

Hypothesis 1b: Risk management capacity is positively influenced by supply chain flexibility.

Hypothesis 1c: Risk management capacity is positively influenced by supply chain innovation

Hypothesis 2a: Digital absorptive capacity is positively influenced by supply chain agility.

Hypothesis 2b: Digital absorptive capacity is positively influenced by supply chain innovation.

Hypothesis 2c: Digital absorptive capacity is positively influenced by supply chain digitization.

Hypothesis 3a: Supply chain performance is positively influenced by supply chain agility.

Hypothesis 3b: supply chain performance is positively influenced by supply chain digitization.

Hypothesis 4a: Risk management capacity mediates the relationship between supply chain performance and supply chain agility.

Hypothesis 4b: Risk management capacity mediates the relationship between supply chain performance and supply chain flexibility.

Hypothesis 4c: Risk management capacity mediates the relationship between supply chain performance and supply chain innovation.

Hypothesis 5a: Digital absorptive capacity mediates the relationship between supply chain performance and supply chain agility.

Hypothesis 5b: Digital absorptive capacity mediates the relationship between supply chain performance and supply chain innovation.

Hypothesis 5c: Digital absorptive capacity mediates the relationship between supply chain performance and supply chain digitization.

2.4 Research Model

Based on prior literature in supply chain management and information systems, this conceptual framework examines how different supply chain capabilities enhance overall supply chain performance through the mediating roles of risk management capacity and digital absorptive capacity. Specifically, supply chain agility, flexibility, innovation, and digitization are identified as key antecedents that strengthen a firm's ability to manage risks and adopt digital technologies. Previous studies have consistently shown that agility, flexibility, and innovation enhance risk management capacity, enabling firms to respond effectively to uncertainties (CHEN, 2019). Moreover, agility and flexibility are interrelated and jointly enhance responsiveness in volatile environments (UMAM & SOMMANAWAT, 2019). Similarly, innovation and digitization foster digital absorptive capacity, which is critical for leveraging new technologies and enhancing supply chain responsiveness. Collectively, these supply chain capabilities—through improved risk management and digital absorptive capacities—drive superior supply chain performance by enabling speed, adaptability, cost efficiency, and competitive advantage in dynamic markets.

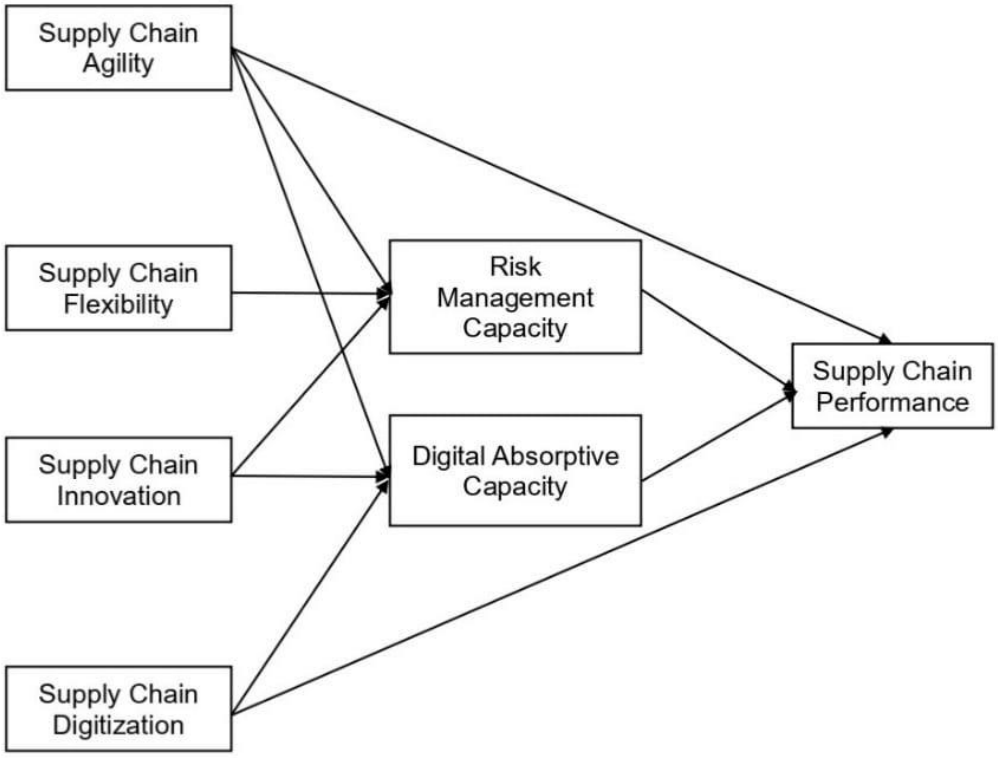

Figure 1: Proposed Conceptual Framework

Sources: Author's own construction

III. METHODOLOGY

3.1 Questionnaire Development

A questionnaire is a set of questions used in research, serving as a structured tool for collecting systematic data from respondents. An effective questionnaire motivates respondents to provide genuine and accurate information, thus reducing response errors. A self-administered questionnaire was adopted as the quantitative data collection method for this study to test the relationship between the constructs. In this study, a questionnaire was developed to collect data from executives and managers in the supply chain. The measurement items used in this study were drawn from the existing literature on information technology and supply chain management. However, minor changes were made to adapt them to the specific context of this study and to increase transparency for respondents. This method not only enabled a thorough examination of the construct but also increased the reliability and validity of the collected data. The questionnaire consists of two sections. The primary section collects general demographic information about the respondent and their organization, including business type, scope, total number of employees, and period of operation. The latter section contains independent and

dependent constructs. Data were collected using a Likert scale ranging from 1 to 5, with one indicating 'strongly disagree' and five indicating 'strongly agree'. The survey instrument was administered in English, as translation into Bengali (the Local Language) presented challenges due to the technical nature of the terminology. Since the respondents of this study had a high level of education, English was chosen for the questionnaire to ensure that everyone could understand it well.

It is crucial to test the questionnaire before administering it to ensure the validity and reliability of the data collected. The pre-test of the question paper will determine whether the respondent understands the question paper or not and will also identify any unclear questions. The purpose of the pre-testing questionnaire is to gather feedback to inform the development of the final survey questionnaire. In this phase, the initial questionnaire was sent to five supply chain managers from reputable garment manufacturing companies in Bangladesh, selected to review it objectively. Furthermore, the items of this questionnaire were reviewed by three academic scholars specializing in supply chain research in a similar direction to verify their consistency and validity. After receiving qualitative feedback from the respondents, the questionnaire was adjusted to make it more straightforward, worded consistently, and better suited to the context. After finalizing the pretested questionnaire, a pilot study was conducted to assess its applicability before collecting data on a larger scale. A pilot study helps researchers refine their methods and procedures before implementing them on a larger scale. These include experimental survey instruments, data collection methods, and analytical techniques to ensure appropriateness and effectiveness. The pilot test aims to identify and address potential problems. Finally, to validate the instrument and confirm the respondents' perceptions, a pilot test was conducted. Thirty-five questionnaires were distributed to randomly selected respondents from the supply chain department of the ready-made garment manufacturing industry to participate in the pilot test. The results of the pilot study showed that some items had low reliability, which was slightly less than 0.70 (Cronbach's alpha). The measurement items were slightly modified based on the pilot test results to ensure validity and reliability. This final questionnaire was used to collect large-scale data for this study.

3.2 Sample Selection and Data Collection

Sample selection is an important research task, especially in a quantitative survey study, as it directly influences the validity, generalizability, and reliability of the study's findings. The sample was selected using a random sampling method, focusing on top- and mid-level supply chain managers in the apparel manufacturing industry across different cities in Bangladesh.

Bangladesh holds a prominent position as a global apparel manufacturer and supplier, contributing significantly to the global apparel supply chain. More than 80% of Bangladesh's export earnings come from this sector, and over 150 countries import apparel products from the country. Bangladesh's ready-made garment industry is an ideal setting for data collection on supply chain performance due to its global prominence, diverse supply chain structure, adoption of digitalization, relevance to emerging markets, access to industry expertise, and its broad reflection on supply chain challenges. We randomly selected respondents through the Bangladesh Garments Manufacturers and Exporters Association (BGMEA). There are 3,939 general members listed in the BGMEA, most companies are located in the two largest cities in Bangladesh, namely Dhaka, the capital, and Chittagong, the second-largest city. Most of the company's head offices are in Dhaka. However, sample selection was a crucial factor in obtaining quality data. Respondents should have adequate knowledge of the survey context and the focus area. Therefore, this study targeted a highly professional individual in the focus area, such as a director, supply chain manager, merchandiser, or executive in sales and supply chain, procurement, etc.

A personally administered survey format was employed, enabling the researcher to distribute questionnaires directly to respondents. Initially, the aim was to collect data from 800 respondents. However, due to communication gaps with the top-level management, our target sample size was adjusted. Ultimately, questionnaires were distributed to approximately 650 potential respondents over 5 months. Data collection was conducted via a Google Forms survey distributed via email and personal messages on Facebook Messenger and WhatsApp. According to ALI ET AL. (2023), online, email, and telephone surveys are among the most effective methods of data collection, with an average response rate of 54%. The researcher received assistance from a team consisting of two final-year undergraduate students and one postgraduate student. All team members were well-trained in data collection techniques. With their background in research methods, they made significant contributions to survey distribution and data collection. To encourage participation, respondents were informed that the study's purpose was purely academic, and strict measures were in place to protect their confidentiality and anonymity. Detailed guidelines were also provided, outlining the process for completing the questionnaire accurately.

To further improve participation, follow-up reminders were sent to respondents via email and phone calls if they had not completed the questionnaire within 10 days. As a result of these initiatives, 381 responses were collected during the data collection window, achieving a

response rate of 58%. After excluding incomplete, irrelevant, and missing data, a final dataset of 368 valid responses was retained for analysis.

3.3 Data Analysis

Partial Least Squares (PLS) Procedures are statistical methods used primarily for structural equation modeling (SEM) to predict and explain variance in dependent variables. PLS is a variance-based SEM technique, handy for complex models with multiple constructs, indicators, and pathways, even in situations with smaller sample sizes and non-normal data distributions (HAIR ET AL., 2019). Partial Least Squares Structural Equation Modeling (PLS-SEM) was applied in this study because it is well-suited for analysing complex models with multiple constructs and relationships, particularly given the exploratory nature of this research and the focus on theory development. PLS-SEM is also suitable for smaller samples and non-parametric data (HAIR ET AL., 2019). The PLS-SEM assessment followed a two-stage approach: (1) evaluation of the measurement model and (2) evaluation of the structural model. In the first stage, the focus was on examining the relationships between the observed variables and their respective constructs to ensure that the observed items accurately represented the underlying constructs. The second stage concentrated on analyzing the relationships among the constructs within the path model to validate the hypothesized connections.

3.3.1 Measurement Model

A measurement model is a conceptual framework typically used to define the relationships between measurement indicators and the latent construct. This correlation assesses the latent variable corresponding to each item to ensure reliability and validity before evaluating the structural model. There are two types of assessment used in measurement models: reflective and formative.

A reflective measurement model assumes that latent constructs cause observed indicators. In this model, indicators express underlying constructs and are considered interrelated because they reflect the same concept. Evaluation of reflective measurement models focuses on reliability and validity, including internal consistency reliability (e.g., Cronbach's alpha, Composite Reliability), convergent validity (e.g., Average Variance Extracted), and discriminant validity (e.g., HTMT ratio, Fornell-Larcker Criterion). Indicator reliability is also assessed, where item loadings above 0.7 are deemed acceptable. These evaluation criteria ensure that the indicators, both collectively and individually, accurately measure the construct.

In a construct measurement model, observed indicators cause or define latent constructs. Unlike the reflective model, the indicators are not interrelated because each represents a distinct dimension or aspect of the contract. In a formative measurement, latent contracts don't have to present a single consistent theme. These indicators are combined to define the construct as a whole. For example, in this model, supply chain performance can be measured using indicators such as supply chain capability and technological innovation, including flexibility, agility, risk management, and innovation. These indicators collectively form the construct and removing one may alter its meaning. In this model, correlations among indicators are not required, as each contributes uniquely to the construct. Evaluation of formative measurement models includes assessing indicator weights and their significance, checking for multicollinearity using Variance Inflation Factor (VIF), and conducting redundancy analysis to ensure external validity. These steps confirm that the indicators appropriately represent the latent construct while avoiding redundancy or overlap.

3.3.2 Structural Model

The structural model represents the relationships between latent variables. More specifically, it examines the degree to which the exogenous construct influences the endogenous construct. In PLS-SEM (Partial Least Squares Structural Equation Modeling), the structural model used path coefficients, t-statistics, standard errors, and R2 to examine the relationships of latent constructs. Path coefficients, which indicate the strength and significance of relationships, are used along with key metrics such as $\mathbf{R^2}$ to measure explanatory power, $\mathbf{f^2}$ to assess the impact of predictor variables, and $\mathbf{Q^2}$ to determine the model's predictive accuracy.

IV. RESULTS AND DISCUSSION

4.1 Participants' Demographics Summary

The study attracted a total of 367 participants, of whom 9.26% were female and 90.74% were male (see Figure 3). Among the firm types, most of the participants' firms were apparel manufacturers (66.21%), followed by textile manufacturers (27.79%) and, lastly, accessories manufacturers (5.99%). About 45.78% of the study participants were executives, 45.23% were supply chain or merchandise managers, and the remaining 8.99% were chief executive officers or managing directors.

4.2 Summary Statistics of Responses to Measurement Items

A total of 30 Likert-scale items were used to collect data from the study participants, and Table 2 below presents the summary statistics, including the mean, median, and standard deviation. The objective of providing summary statistics for this data was to understand patterns, including central tendency, dispersion, and distributional characteristics for each item. As mentioned before, there were seven constructs covered by the 30 items contained in the data i.e. Supply Chain Flexibility (SCF1-SCF4), Supply Chain Innovation (SCI1-SCI5), Supply Chain Agility (SCA1-SCA4), Digital Absorptive Capacity (DAC1-DAC5), Supply Chain Performance (SCP1-SCP4), Supply Chain Digitization (SCD1-SCD4), and Risk Management Capacity (RMC1-RMC4). The construct and measurement items were developed through an intensive literature review involving studies on supply chain performance; more details about this development are provided in the methodology section.

4.3 Bootstrapping Procedure

4.3.1 Structural Path Coefficients for Direct Paths

The structural path coefficients represent the standardized regression weights, indicating the strength and direction of hypothesized relationships. Results from PLS-SEM (Table 2; Figures 2 and 3) show that most direct paths were statistically significant ($p < 0.05$), except H3a (SCA → SCP, $p = 0.070$) and H3b8 (SCD → SCP, $p = 0.053$). Table 2 also presents bias-corrected confidence intervals for these coefficients.

H1a (SCA → RMC) was significant and positive ($\beta = 0.144$, $p = 0.021$), indicating that supply chain agility enhances risk management capacity. H1b (SCF → RMC) was highly significant ($\beta = 0.738$, $p < 0.001$), indicating that flexible supply chains improve risk management. H1c (SCI → RMC) was significant ($\beta = 0.221$, $p < 0.001$), showing innovation enhances risk management. H2a (SCA → DAC) was positive and significant ($\beta = 0.121$, $p < 0.001$), confirming that agility improves digital absorptive capacity. H2b (SCI → DAC) was also positive and significant ($\beta = 0.437$, $p < 0.001$), confirming that supply chain innovation strengthens digital absorptive capacity. Similarly, H2c (SCD → DAC) was significant ($\beta = 0.325$, $p < 0.001$), suggesting that digitalized supply chains enhance a firm's ability to utilize digital knowledge. H3a (SCA → SCP) was not significant ($\beta = -0.205$, $p = 0.070$), indicating no clear direct effect of agility on performance. H3b (SCD → SCP) was positive but not significant ($\beta = 0.120$, $p = 0.053$), suggesting that the impact of digitalization on performance may depend on other factors and warrants further investigation.

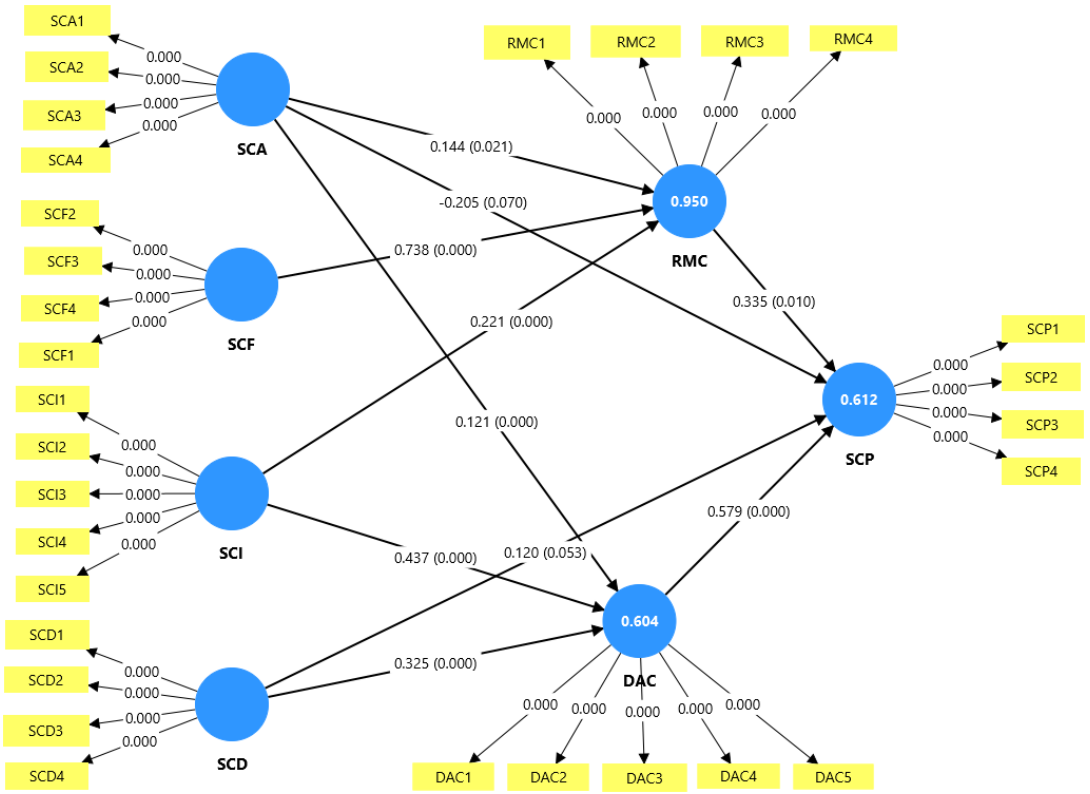

Figure 2. PLS-SEM Bootstrapped results showing path coefficients and p-values (Table-2 and 3)

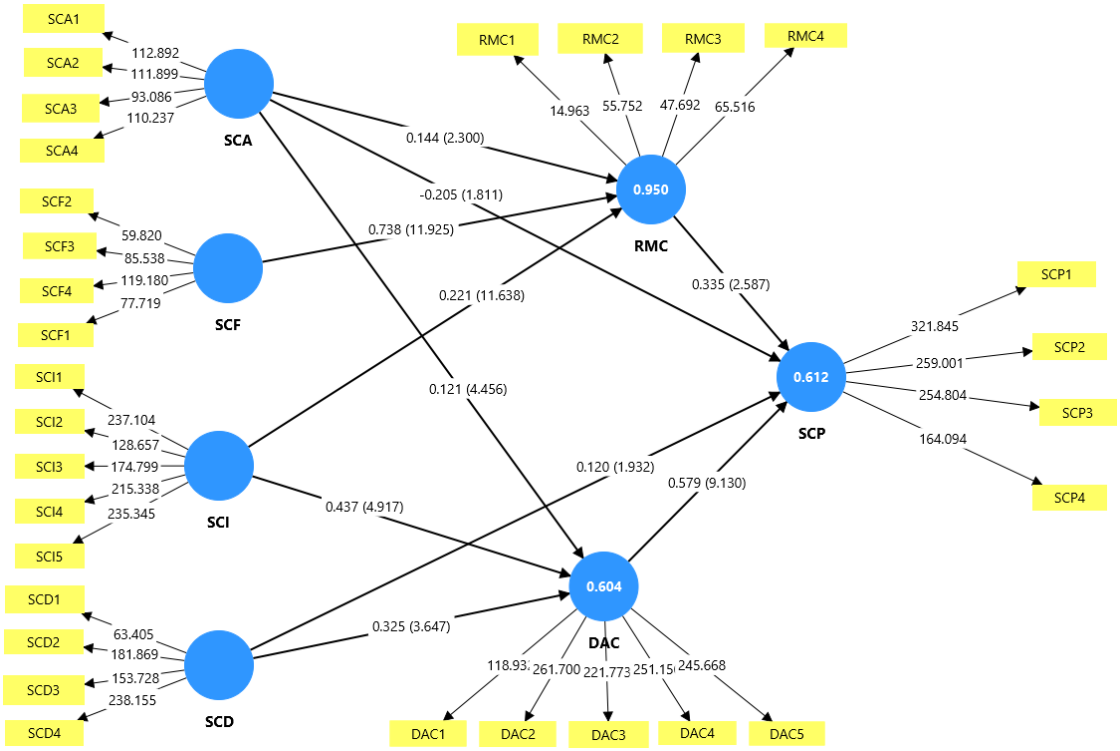

Figure 3. PLS-SEM Bootstrapped results showing path coefficients and t-statistic values (Table-2 and 3)

Table 2. Path Coefficients for the Structural Relationship

Hypothesis	Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV	Bias	2.5%	97.5%	T statistics (|O/STDEV|)	P values	Result
H1a	SCA -> RMC	0.144	0.142	0.063	-0.002	0.029	0.275	2.300	0.021	Supported
H1b	SCF -> RMC	0.738	0.740	0.062	0.001	0.608	0.854	11.925	0.000	Supported
H1c	SCI -> RMC	0.221	0.221	0.019	0.000	0.184	0.257	11.638	0.000	Supported
H2a	SCA -> DAC	0.121	0.120	0.027	-0.001	0.071	0.177	4.456	0.000	Supported
H2b	SCI -> DAC	0.437	0.438	0.089	0.001	0.264	0.612	4.917	0.000	Supported
H2c	SCD -> DAC	0.325	0.324	0.089	-0.001	0.149	0.497	3.647	0.000	Supported
H3a	SCA -> SCP	-0.205	-0.204	0.113	0.001	-0.428	0.012	1.811	0.070	Not Supported
H3b	SCD -> SCP	0.120	0.119	0.062	-0.001	0.004	0.248	1.932	0.053	Not Supported

Sources: Author's own works based on SmartPLS version 3

4.3.2 Mediation Analysis

The mediation analysis (H4a9–H5c) explored how risk management capacity (RMC) and digital absorptive capacity (DAC) mediate the impact of supply chain capabilities on performance. H4a (SCA → RMC → SCP) was positive but not statistically significant ($\beta = 0.048$, $p = 0.092$), indicating that RMC does not significantly mediate the effect of supply chain agility on performance. Conversely, H5a (SCA → DAC → SCP) was significant ($\beta = 0.070$, $p < 0.001$), showing that DAC effectively mediates the influence of supply chain agility on performance. H4b confirmed that RMC significantly mediates SCF → SCP ($\beta = 0.248$, $p = 0.013$), suggesting that flexible supply chains enhance performance through improved risk management. For supply chain innovation, both RMC (H4c: $\beta = 0.074$, $p = 0.012$) and DAC (H5b: $\beta = 0.253$, $p < 0.001$) were significant mediators, indicating that innovation strengthens risk management and digital knowledge absorption, which, in turn, boost supply chain performance. Lastly, H5c investigated the mediating role of Digital Absorptive Capacity (DAC) in the effect of Supply Chain Digitalization (SCD) on Supply Chain Performance (SCP). The H5c test yielded a significant indirect effect ($\beta = 0.188$, $SD = 0.053$, $t = 3.519$, $p < 0.001$). This affirms the notion that strong digital absorptive capacity provides a solid foundation and an enhancer for the digitalization of supply chain processes, thereby positively impacting the overall performance of the firm's supply chain. Therefore, the organization needs

to develop a robust, dynamic digital capacity to translate IT investments into performance gains across the supply chain.

Table 3. Path Coefficients for the Specific Indirect Paths (Mediated Analysis)

Hypothesis	Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	Bias	2.5%	97.5%	T statistics (|O/STDEV|)	P values	Result
H4a	SCA -> RMC -> SCP	0.048	0.047	0.029	-0.001	0.009	0.133	1.686	0.092	Not Supported
H4b	SCF -> RMC -> SCP	0.248	0.248	0.099	0.000	0.040	0.111	2.496	0.013	Supported
H4c	SCI -> RMC -> SCP	0.074	0.074	0.029	-0.001	0.089	0.302	2.517	0.012	Supported
H5a	SCA -> DAC -> SCP	0.070	0.070	0.018	0.000	0.063	0.453	3.895	0.000	Supported
H5b	SCI -> DAC -> SCP	0.253	0.255	0.062	0.000	0.018	0.134	4.077	0.000	Supported
H5c	SCD -> DAC -> SCP	0.188	0.187	0.053	0.002	0.140	0.382	3.519	0.000	Supported

Sources: Author's own works based on SmartPLS version 3

4.4 Model's Predictive Power

The model's predictive power was assessed using the R-Square (R^2) metric, i.e., the coefficient of determination. The coefficient of determination is a measure of how well the dependent constructs (endogenous variables) are explained by their corresponding independent constructs (exogenous variables). Table presents the values for the R-Square as a coefficient of determination for the three endogenous constructs i.e. supply chain performance, risk management capacity, and digital absorptive capacity. DAC registers an R-squared value of 0.604 and a CI [0.515, 0.700], indicating that about 60.4% of the variance in the DAC can be explained by the predictor constructs, such as Supply Chain Agility (SCA), Supply Chain Innovation (SCI), and Supply Chain Digitization (SCD). Risk management capacity (RMC) had an R-squared value of 0.950 CI [0.936, 0.962], which means that 95.0% of the variance in risk management capacity could be explained by the exogenous constructs such as the Supply Chain Flexibility (SCF), Supply Chain Agility (SCA), and Supply Chain Innovation (SCI). Lastly, the supply chain performance registered an R-squared value of 0.612 Ci [0.532, 0.698], which means that the predictor constructs for SCP could explain 61.2% of its variance. All

these results suggest that the models' predictive power can be trusted since they provide a reasonably good explanation for the outcome constructs.

Table 4. R-Square Values to assess the predictive power of the hypothesized structural models

Construct	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	2.5%	97.5%	T statistics (|O/STDEV|)	P values
DAC	0.604	0.608	0.048	0.515	0.700	12.638	0.000
RMC	0.950	0.950	0.007	0.936	0.962	143.386	0.000
SCP	0.612	0.617	0.043	0.532	0.698	14.402	0.000

4.5 Discussion of the Findings

The empirical results are discussed in two sections: direct relationships (Hypotheses 1a–3b) and mediated relationships (Hypotheses 4a–5c). This structure highlights how key supply chain factors—agility, flexibility, innovation, and digitization—affect supply chain performance, risk management capacity, and digital absorptive capacity. It also allows for examination of mediation patterns, showing how risk management and digital absorptive capacity serve as critical links in converting these supply chain capabilities into competitive advantages, ultimately enhancing overall firm supply chain performance.

In Hypothesis 1a, the findings from the previous results chapter supported the hypothesis that supply chain agility (SCA) has a positive direct effect on risk management capacity (RMC). This finding reinforces the theoretical view that agile supply chain processes can help firms and organizations to mitigate potential risks with great efficiency (NAZEMPOUR ET AL., 2020; NDAYISENGA ET AL., 2025; UM, 2017; WANG & WANG, 2024). Key dimensions and aspects of supply chain agility that make it a solid enabler of risk management capacity include responsiveness, flexibility, accessibility, and adaptability (ALDHAHERI & AHMAD, 2023; NAZEMPOUR ET AL., 2020; UM, 2017); and these properties of agile supply chain systems ensure the organization(s) can dynamically react to volatile environment (WANG ET AL., 2024).

Hypothesis 1b, which stated that supply chain flexibility has a positive direct effect on the firm's risk management capacity, generated statistically significant results that supported the hypothesis. This suggests that firms with high supply chain flexibility are better equipped to manage potential disruptions to their supply chain and business processes. This finding is consistent with past literature. For instance, PIPRANI ET AL. (2022) emphasized the role of

supply chain flexibility in enhancing resilience within supply chain processes, especially when the flexibility is crafted to be multidimensional across supply chain systems. CHEN, (2019) supported this idea by proposing that a strategic, flexible framework for addressing supply chain uncertainties can enhance the organization's risk management capacity, particularly in supply chains. Additionally, NDAYISENGA ET AL. (2025) highlighted the need for a more flexible supply chain framework within organizations to address the escalating challenges posed by rapid technological changes and emerging markets, which may lead to digital threats and regulatory pressures.

Hypothesis 1c was found to be significant, and it implied that supply chain innovation had a positive impact on a firm's risk management capacity. This result suggests that firms that prioritize supply chain innovation are more likely to identify and efficiently mitigate potential risks or disruptions to their supply chain processes and business processes. However, a connection to past research can be drawn implicitly. For instance, ZHANG ET AL. (2025) found that a data-driven supply chain would positively impact both organizational performance and the organization's risk management capability through fast, informed decision-making. Another connection that past studies have made, which this study will use as a foundation to affirm its findings on hypothesis 1c, is that digital absorptive capacity has a net positive impact on an organization's risk management capacity by being able to understand potential vulnerabilities within the supply chain systems and processes (DEWANTI & SANTOSA, 2025).

The empirical results for Hypothesis 2a were statistically significant, indicating that supply chain agility positively affects digital absorptive capacity ($\beta = 0.121$, SD = 0.027, $t = 4.456$, $p < 0.001$). This means that organizations with robust agile supply chain systems would be better equipped to acquire and leverage the knowledge they gain. This finding aligns with numerous prior studies examining the relationship between supply chain agility and organizations' digital absorptive capacity. For example, ALJAWAZNEH (2024) revealed that there was a statistically significant positive impact of supply chain agility on supply chain digitization, which means that agile systems necessitate, also highlighted by QURESHI ET AL. (2023) who revealed that IT solutions are needed for agile supply chain systems, or drive the adoption of digital solutions within organizations.

Hypothesis 2b found that supply chain innovation (SCI) positively and significantly impacts digital absorptive capacity (DAC) ($\beta = 0.437$, SD = 0.089, $t = 4.917$, $p < 0.001$). This indicates that fostering an innovative culture within supply chain processes strengthens a firm's ability to acquire and leverage digital knowledge. Past studies support this relationship, highlighting

that engaging in diverse innovative projects cultivates routines for effective knowledge absorption while digital platforms enhance access to and utilization of knowledge, boosting innovation performance (CHEN & KIM, 2023; KASTELLI ET AL., 2024). Thus, SCI is key to enhancing DAC and overall organizational innovation.

In Hypothesis 2c, supply chain digitization was found to have a positive and significant direct effect on an organization's digital absorptive capacity. This suggested that high levels of supply chain digitization would positively influence the firm's ability to collect, utilize, and absorb digital knowledge. Through the synthesis of these findings alongside past studies on supply chain digitization and digital absorptive capacity, the findings resonated with earlier studies on the same subject (JANG & LEE, 2025). Particularly, JANG & LEE, (2025) testified that strong digital entrepreneurial orientation within SME settings fosters technological absorptive capacity, which, in turn, would propel digital innovation and ultimately be a positive for the organization's performance. Further, TALLARICO ET AL. (2024) corroborated this perspective by showing that equipping firms with digital tools was key and literally indispensable for both potential and realized absorptive activities.

Hypothesis 3a proposed a positive direct effect of supply chain agility (SCA) on supply chain performance (SCP), but the analysis revealed a negative, though statistically insignificant, path coefficient. This contrasts with earlier studies (MUKHSIN ET AL., 2022) which reported a positive relationship between SCA and performance—for example, NAZEMPOUR ET AL. (2020) found that agility enhanced performance in Iranian SMEs through dimensions such as alertness, decisiveness, flexibility, accessibility, and swiftness. The current finding, therefore, calls for deeper investigation rather than a definitive conclusion. Prior research indicates that SCA's impact may be mediated by constructs such as supply chain responsiveness (EMON, 2025) or supply chain digitization (ALJAWAZNEH, 2024) and may also be moderated by factors like supply chain environmental risks. The Bangladeshi apparel sector presents unique constraints—tight cost pressures, limited infrastructure, and buyer-driven specifications—that can restrict the benefits of agility (JAHED ET AL., 2022). In such conditions, agility alone may not enhance SCP unless complemented by supplier integration, technology adoption, or workforce training. Consequently, the absence of a direct effect in this study likely reflects contextual and capability gaps, highlighting the need to explore indirect or moderated pathways in future research.

Hypothesis 3b examined the direct effect of supply chain digitization (SCD) on supply chain performance (SCP) and produced a positive but statistically non-significant result ($\beta = 0.120$,

SD = 0.062, t = 1.932, p = 0.053), indicating insufficient evidence for a direct effect in this sample. Prior studies (HOVE-SIBANDA & POOE, 2018) show that SCD can enhance SCP but often under specific conditions or indirectly through improved integration and efficiency, suggesting its benefits are not uniform across contexts. Consistent with this view, Hypothesis 5c in the current study confirmed that digital absorptive capacity mediates the SCD–SCP relationship, implying that digitization alone may be insufficient to drive performance gains without complementary capabilities. The Bangladeshi apparel sector faces additional constraints, including limited technological infrastructure, dependence on imported raw materials, and strict buyer requirements, which can dampen the immediate impact of digitization. As a result, the non-significant finding likely reflects contextual limitations rather than contradicting previous research. In practice, firms should combine digital tools with enabling capabilities—such as absorptive capacity, process integration, and collaborative systems—to fully realise the potential benefits of supply chain digitization.

Hypothesis 4a proposed that risk management capacity (RMC) mediates the link between supply chain agility (SCA) and supply chain performance (SCP). Although the result showed a positive path, it was statistically insignificant, suggesting that RMC alone may not be sufficient to translate SCA into performance gains. This aligns with studies that note that agile supply chains inherently face risks that require efficient mitigation (GANGULY ET AL., 2019; TARIGAN ET AL., 2021). The lack of significance suggests that future research should re-examine how RMC is measured and explore additional co-mediators such as supply chain digitization (CHEN & KIM, 2023) or effective leadership that may enhance SCA's impact on SCP. Such an approach would provide a clearer understanding of how to leverage agility for superior supply chain performance.

Hypothesis 4b revealed that risk management capacity (RMC) significantly moderates the relationship between supply chain flexibility (SCF) and supply chain performance (SCP). This indicates that strengthening RMC within flexible supply chain frameworks enables organizations to adjust rapidly to market or customer changes while maintaining high performance and customer satisfaction. Although direct studies on the SCF→RMC→SCP path are scarce, related research highlights that agility and flexibility enhance firms' ability to manage risk effectively (WANG ET AL., 2024) and that strong RMC contributes positively to organizational and supply chain performance (MANHART ET AL., 2020; MUKHSIN ET AL., 2022).

Hypothesis 4c confirmed that supply chain innovation (SCI) improves supply chain performance (SCP) through the mediating role of risk management capacity (RMC) ($\beta = 0.074$, $p = 0.012$). Firms that innovate their supply chain processes strengthen their ability to manage risks and operational disruptions, thereby enhancing performance. This aligns with prior research showing that innovation boosts agility and resilience, thereby reinforcing RMC (MUKHSIN ET AL., 2022). The finding adds theoretical value by clarifying how RMC translates innovation into SCP and offers practical guidance for managers to pair innovation with robust risk management.

Hypothesis 5a showed that digital absorptive capacity (DAC) significantly mediates the relationship between supply chain agility (SCA) and supply chain performance (SCP) ($\beta = 0.070$, $SD = 0.018$, $t = 3.895$, $p < 0.001$). Firms that leverage agility to enhance DAC achieve superior SCP. This aligns with studies highlighting SCA's contribution to competitive advantage (NAZEMPOUR ET AL., 2020; QURESHI ET AL., 2023) and DAC's role as a driver of performance. Theoretically, this underscores the importance of DAC in translating agile supply chains into performance. Practically, managers should invest in DAC but continually assess its integration to avoid counterproductive effects (DEWANTI & SANTOSA, 2025).

Hypothesis 5b confirmed that digital absorptive capacity (DAC) significantly mediates the relationship between supply chain innovation (SCI) and supply chain performance (SCP) ($\beta = 0.253$, $p < 0.001$). Firms with strong DAC are better able to translate innovative efforts into improved SCP by absorbing and leveraging digital knowledge. This aligns with research highlighting DAC as essential for converting innovation into competitive advantage (CHEN, 2019; MUAFI & SULISTIO, 2022). Theoretically, the finding underscores the centrality of DAC in supply chain management. Practically, it calls for firms to invest in DAC to strengthen knowledge management and enhance innovation-driven supply chain performance.

Hypothesis 5c showed that digital absorptive capacity (DAC) significantly mediates the relationship between supply chain digitization (SCD) and supply chain performance (SCP) ($\beta = 0.188$, $p < 0.001$). While the direct SCD–SCP link was insignificant, the mediation result indicates that digitization enhances performance primarily by strengthening DAC. This aligns with studies noting that digitization provides infrastructure for the absorption of digital knowledge (JANG & LEE, 2025) and that DAC itself drives competitive advantage and SCP. In practice, firms should invest not only in digital tools but also in building DAC to translate digitization into improved supply chain and business performance.

V. CONCLUSIONS AND RECOMMENDATIONS

This chapter presents conclusions, research implications, Limitations, and further research directions

5.1 Conclusion

The most intriguing insight from the research findings and discussion in the previous chapters was that no single construct had a significant influence on supply chain performance. With supply chain performance being the ultimate variable or construct of interest, this current research tested the direct effect of two constructs, namely supply chain digitization and supply chain agility, on supply chain performance. Both effects were deemed statistically insignificant, which necessitated a follow-up mediation analysis. This suggests that although past studies have linked supply chain performance to supply chain agility and digitization, other factors may help translate these into enhanced supply chain performance.

This research also assessed the direct effects of three constructs —supply chain innovation, flexibility, and agility —on the organization's risk management capacity. All three had significant direct impacts on the risk management capacity of the organization, implying that if the organization needs a robust, efficient, and effective risk management capacity, then it has to redesign its supply chain systems and processes to be more agile and flexible, and also to invest in its supply chain innovation. Specifically, this current research presented in its discussion of the direct effect of supply chain innovation on supply chain performance that supply chain innovation was a critical driver for the effective and efficient risk management capacity of an organization because, through innovation, the organization can leverage various technological tools that arise from such innovation to mitigate risks and manage its potential or exhibited risks efficiently. Additionally, supply chain innovation has brought data-driven technologies, which organizations can leverage first to improve their digital adaptability, thereby helping them consume digital knowledge and be better prepared to mitigate potential risks and disruptions to their supply chain operations. This aligns perfectly with past studies that support the notion that digital absorptive capacity improves an organization’s risk management capacity (DEWANTI & SANTOSA, 2025; WANG ET AL., 2024). Such innovation also provides a foundation for integrating emerging technologies like artificial intelligence and blockchain technologies, making supply chain systems more resilient to risks, disruptions, and even malicious attacks. Besides the supply chain innovation, flexibility within the supply chain was identified as a crucial ingredient to a robust and efficient risk management capacity. The finding itself was statistically significant, and the subsequent discussion

highlighted the reasons why a flexible supply chain system would enhance the organization's risk management capacity. Flexibility, likened to agility, was suggested to help the organizations operate amid rapid changes and disruptions to their business and supply chain operations. Just as supply chain flexibility was identified as key to risk management capacity within supply chain systems, an organization's supply chain agility had a statistically significant direct effect on its risk management capacity. Agile supply chain systems enable organizations to recover from significant disruptions quickly and continue serving customers by meeting their orders within set deadlines. This means that when organizations prioritize a high degree of agility in their supply chain processes, they can quickly mitigate risks and disruptions, which is a clear indicator of robust risk management capacity.

The Digital Absorptive Capacity (DAC) of the organization was also a construct of interest, and the current research sought to explore the key constructs that directly impacted it. These key constructs were found to have a statistically significant direct effect on the digital absorptive capacity, namely, supply chain agility, digitization, and innovation. The first important relationship, i.e., between supply chain agility and digital absorptive capacity, may appear to have been explored in reverse order, as past research suggests that with a robust digital absorptive capacity, an organization would be able to respond rapidly to supply chain risks and disruptions, implying that a higher digital absorptive capacity improves the agility of the supply chain systems. However, this research adds a novel perspective, suggesting that an agile supply chain can also enhance the organization's digital absorptive capacity; it need not be one-way. This is possible because, with agility, the organization can quickly learn from its experiences with risks and disruptions, adding that knowledge digitally to its database to guide it in the future, thereby boosting its digital absorptive capacity. Without a doubt, supply chain digitization and innovation were key to the organization's digital absorptive capacity, and this research found that they had a statistically significant direct effect on it. These two constructs ensure the organization has robust analytical and information processing capabilities, e.g., through technologies such as cloud computing, which ultimately boost the capacity of supply chain systems to absorb and leverage digital knowledge (WANG ET AL., 2024). Therefore, for an organization looking to improve its digital absorptive capacity, it must prioritize agility in its supply chain systems and invest sufficiently in supply chain innovation and digitization.

The current research also explored mediated relationships for the constructs believed to have significant impacts on the supply chain performance. The aim was to develop a nuanced understanding of the interplay among the various supply chain constructs and how they contribute to supply chain performance. A total of six mediated relationships were explored, of

which three had risk management capacity as the mediating construct, and the remaining three had digital absorptive capacity. While five of the six hypothesized mediated relationships were statistically significant, one was not, specifically the relationship between supply chain agility and corresponding supply chain performance, mediated by the organization's risk management capacity. This calls for further investigation to develop a nuanced understanding of the relationships among supply chain agility, supply chain performance, and the interplay with various supply chain constructs. Such understanding would be key in helping organizations balance the agility within their supply chain systems to improve their performance within the supply chain systems and ultimately within the overall organizational performance.

Risk management capacity significantly influenced the relationship between supply chain flexibility and supply chain performance. This implies that, with robust, effective risk management, the organization can harness the power of its flexible supply chain systems to achieve optimal performance. This is crucial because flexibility within the supply chain process may, in itself, introduce risks that could jeopardize supply chain performance; therefore, robust and effective risk management would help keep operations on track while maintaining flexibility. This is key, since unmanaged flexibility may get out of hand, becoming a liability to the organization’s overall performance, particularly its supply chain performance. Further, risk management capacity was also found to significantly mediate the relationship between supply chain innovation and supply chain performance. Specifically, the mediating role of risk management capacity between supply chain innovation and performance is evident through a risk management system enhanced by technology, which in turn bolsters supply chain performance. Furthermore, risk management systems can be further enhanced through emerging technologies such as artificial intelligence and data-centric cloud computing. Additionally, mediation can be achieved through innovative risk management techniques, which help the firm attain a competitive advantage and improve its supply chain performance. Therefore, supply chain innovation channelled through risk management systems would ultimately enable the firm to realize enhanced supply chain performance.

Another mediating construct explored was an organization's digital absorptive capacity. Collectively, the current research explored three relationships with the DAC as the core mediator. One of the relationships involved the indirect effect of supply chain agility on supply chain performance. The study's findings indicated that the organization's digital absorptive capacity significantly mediated the impact of supply chain agility on supply chain performance. This was not a surprising finding since, prior to analyzing the mediated relationship, this very study found that supply chain agility had a significant positive direct impact on the firm’s

digital absorptive capacity. However, this study provides a new understanding: the interplay between agility and digital absorptive capacity ensures improved supply chain performance, whereas initially, supply chain agility alone does not guarantee it. This is also the same for supply chain digitization, which on its own could not achieve a statistically significant direct effect on the supply chain performance, but when mediated by the digital absorptive capacity, did yield a significant positive effect on the supply chain performance. Similarly, digital absorptive capacity was found to mediate the impact of supply chain innovation on supply chain performance. Therefore, harnessing supply chain agility, innovation, and digitization to achieve better supply chain performance would need the organization to set up and improve its digital absorptive capacity.

In summary, the study's findings and the post-analysis synthesis of the literature presented in the preceding chapters have shown the importance of various supply chain constructs in achieving better supply chain performance. Even better the findings and discussion presented provide a nuanced understanding of how the different supply chain constructs impact each other and how that interplay ultimately impacts the supply chain performance. Specifically, risk management and digital absorptive capacities are the central constructs within the supply chain ecosystems that can harness supply chain agility, flexibility, innovation, and digitization into improved supply chain performance. Therefore, while organizations are called to have agile and flexible supply chain systems and also to prioritize supply chain innovation and digitization, these might not translate to supply chain performance without robust and effective risk management and digital absorptive capabilities. As such, any organization aiming to enhance its supply chain performance should prioritize effective risk management and digital absorptive capacities at the core of its supply chain ecosystem. These capacities can be significantly improved through technology and innovation, underscoring the ongoing interplay between innovation and digitization within supply chain systems.

5.2 Research Implications

5.2.1 Theoretical Implications

This study offers substantial theoretical implications for advancing the understanding of resilient supply chain systems, specifically by highlighting how constructs such as innovation, agility, flexibility, and digitization interact to influence risk management capacity, digital absorptive capacity, and ultimately organizational performance. First, the finding that supply chain innovation, flexibility, and agility directly enhance risk management capacity reinforces the supply chain risk management (SCRM) literature, supporting the view that agility and

flexibility enable firms to adapt to volatile environments while innovation, particularly data-driven, strengthens proactive decision-making (JÜTTNER, 2003; NAZEMPOUR ET AL., 2020). This aligns with theoretical arguments that resilience is not accidental but built on dynamic constructs that safeguard continuity under disruption. Second, the study demonstrates that agility, innovation, and digitization significantly improve digital absorptive capacity, which is defined as an organization's ability to acquire, assimilate, and exploit digital knowledge for competitive advantage. Theoretically, this extends the resource-based view (RBV) by establishing digital absorptive capacity as a strategic resource, while simultaneously reinforcing the dynamic capabilities view (DCV), since these constructs enable adaptation to rapid technological and environmental shifts. Thus, absorptive capacity emerges as both a resource and a dynamic capability that bridges supply chain practices with competitiveness. Third, the study highlights the mediating role of risk management capacity, showing that the benefits of flexibility and innovation on performance are contingent upon the existence of robust risk frameworks. This contribution is significant for SCRM theory because it moves beyond treating risk management as a defensive mechanism, instead positioning it as a dynamic capability that enables innovation and flexibility to translate into measurable performance outcomes. Fourth, the mediating role of digital absorptive capacity reinforces the knowledge-based view (KBV), which considers knowledge acquisition and exploitation central to performance. The results reveal that investments in agility, innovation, and digitization do not automatically improve outcomes unless organizations possess the capacity to integrate and leverage new digital knowledge effectively, thereby positioning absorptive capacity as a theoretical linchpin for converting resources into performance. Fifth, the study's insignificant findings also generate important theoretical insights by challenging assumptions of direct positive relationships between agility, digitization, and supply chain performance. Contrary to widely held beliefs (UM, 2017), this study demonstrates that such effects may not materialize without mediating mechanisms like risk management and absorptive capacity, signaling the need for future studies to adopt mediation or interaction models rather than simplistic direct-effect frameworks. Moreover, the finding that risk management does not mediate the agility–performance relationship challenges the prevailing assumption that risk management universally enhances outcomes, instead suggesting that the interplay among constructs may be more complex and context-dependent than previously theorized. Finally, these results underscore the importance of context, as relationships between constructs and performance may differ across industries, geographies, and organizational structures (SRIVASTAVA & ROGERS, 2022), indicating that future theoretical models should incorporate contingency

perspectives rather than universal claims. Collectively, these contributions enrich multiple theoretical streams by confirming the role of supply chain constructs as enablers of risk management and absorptive capacity, extending RBV and DCV by identifying these capacities as critical organizational mechanisms, advancing KBV by framing absorptive capacity as a mediator, and, significantly, disrupting conventional assumptions with evidence of insignificant direct effects. Overall, the study reframes supply chain resilience and performance as outcomes not of individual constructs in isolation but of their interaction through mediating mechanisms, offering a comprehensive theoretical foundation for scholars seeking to model the dynamic nature of modern supply chain ecosystems.

5.2.2 Practical Implications

The results and findings from this current study revealed significant direct and indirect effects of supply chain innovation, flexibility, agility, digitization, digital absorptive capacity, and risk management capacity on an organization's supply chain performance. These findings left significant practical implications for supply chain practitioners, leaders, and various industry stakeholders, including the need to invest in agile and flexible supply chain systems, embrace digitization and innovation within supply chains, integrate effective risk management, and enhance the organization's digital absorptive capacity.

First, there were significant and positive direct effects of supply chain innovation, flexibility, and agility on the risk management capacity of the organization, which very much aligned with existing literature which has emphasized the importance of agile and flexible supply chain systems or processes when it comes to effective mitigation of disruptions or risks on supply chain operations or processes (UM, 2017). Specifically, a flexible and agile supply chain system would enable the organization to adapt to unexpected disruptions e.g. by adjusting production plans or even switching suppliers where and when required (NAZEMPOUR ET AL., 2020; UM, 2017). Other dimensions of supply chain agility like alertness, decisiveness, flexibility, accessibility, and swiftness are key to better risk mitigation, which is in turn amplified through better supply chain performance, as such the organization(s) need to enhance their agility along these dimensions to bolster their ability to manage and effectively mitigate the potential risks and disruptions that they may face (NAZEMPOUR ET AL., 2020). Second, the current study found significant and positive direct impacts of supply chain agility, digitization, and innovation on the organization's digital absorptive capacity. With the digital absorptive capacity being a key driver to an organization's risk management, maintaining a competitive edge, and ultimately its performance, what these findings mean is that by

enhancing the organization's supply chain agility, digitization, and innovation, the company would not only improve its digital absorptive capacity but would also enhance its risk management capacity and ultimately its overall supply chain performance (ALJAWAZNEH, 2024; ZHANG ET AL., 2025). Therefore, where organizations invest in agile supply chain systems and digital technologies that are useful to their supply chain processes, they are better positioned to quickly identify practical external knowledge, absorb it, and use it as a competitive advantage that would strengthen their supply chain performance, ultimately. Practically, firms need to foster a culture of digital competence guided through innovation to be able to enhance their digital absorptive capacities, which would aid in their continuous learning and ultimately their overall supply chain and operational performances.

Additionally, the findings indicated the significant mediating effects of risk management capacity and digital absorptive capacity on the impact of supply chain agility, flexibility, innovation, and digitization on supply chain performance. Taking for instance the finding that the risk management capacity of an organization would mediate the impact of its supply chain innovation and flexibility on the overall supply chain performance, this is suggestive that risk management within an organization is crucial to realize better supply chain performance ultimately, and specifically suggest that simply implementing innovative or flexible supply chain practices would not be sufficient to materialize that investment or implementation to a better overall supply chain performance. As such, integrating robust and effective risk management strategies within innovative and flexible supply chain systems would enhance the effectiveness of these systems, thereby yielding the firm robust supply chain performance. Similarly, the digital absorptive capacity of an organization was found to be a significant mediator for the impact of supply chain agility, innovation, and digitization. This suggests that investments in agile, innovative, and digitized supply chain systems would not be enough to bolster supply chain performance. However, when the organization implements a robust digital absorptive capacity within their supply chain and operational systems, then it can significantly and positively translate the investments in innovation, digitization, and agile supply chain systems into tangible supply chain performance. In practice, organizations need to understand the importance of digital absorptive capacity, which is simply their ability to identify and leverage digital knowledge to bolster their supply chain operations (Dewanti & Santosa, 2025). This understanding would gear up for an intentional investment and implementation of policies within the organization channelled at creating or enhancing the existing digital absorptive capacity.

5.2.3 Methodological Implications

The current research employed Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS to explore the direct and indirect effects of different supply chain constructs on supply chain performance. The indirect effects were analyzed using mediation analysis, with the key mediators being the organization's risk management and digital absorptive capacities. The findings yielded methodological implications for future studies exploring the relationships among supply chain agility, innovation, flexibility, digitization, risk management capacity, digital absorptive capacity, and supply chain performance. First, for the insignificant results, despite existing literature affirming significant relationships, there is a need to refine models exploring supply chain performance and its influencing constructs, such as supply chain agility, digitization, and risk management capacity. The models can be refined by exploring alternative mediators and moderators —for example, to help translate supply chain agility, innovation, digitization, and flexibility into tangible improvements in supply chain performance. Additionally, considering a model that integrates multiple mediators or moderators, as the insignificant results could also be due to an incomplete set of factors (EMON, 2025). Furthermore, constructs like supply chain digitization, which were assumed by this current research to have a base influence on supply chain performance, could also be explored as mediators for the relationship between other constructs and the supply chain performance as digitization has been shown to significantly mediate the impact of supply chain agility on the supply chain or operational performance (ALJAWAZNEH, 2024). Additionally, studies could consider non-parametric and non-linear relationships and explore them using methods such as Bayesian analysis and other non-linear approaches.

The insignificant relationships call for a more nuanced understanding of the constructs under study, and what better method than a qualitative approach, which may reveal key sub-constructs and help explain why the relationship between or among select supply chain constructs was valid or invalid. The in-depth investigation allowed within a qualitative study framework achieves the objective of nuanced understanding by helping delve into the complexities of supply chain constructs of interest. Take, for example, the notion that risk management is not a significant mediator for the impact that agility has on supply chain performance. A qualitative approach would help unpack the specific strategies, decision-making processes, and even the organizational risk management culture to understand better how and why an organization's risk management capacity may fail to materialize when translating agile supply chain systems into significant supply chain performance. Additionally, a case study approach would be

valuable for getting the geographical context with respect to the nuance that comes with different locations.

Another methodological implication is to adopt a longitudinal approach to explore the relationship among the supply chain constructs studied in this research. The past research is cross-sectional, mainly studies, including this current study, which only provides a snapshot of the relationship between these constructs at a single point in time, thereby failing to capture and explore the evolving nature of supply chain dynamics (IVANOV & DOLGUI, 2020). By considering longitudinal analysis, future studies can understand the dynamic interplay between supply chain agility or digitization and supply chain performance, and how through time the key constructs i.e. agility and digitization on their own can no longer guarantee significant improvement on supply chain performance, and so is the case of risk management capacity where emerging technologies that influence risk management like artificial intelligence, blockchain, and other data-driven technologies might have rendered past relationships insignificant.

Lastly, a critical methodological implication of this current research is how the key constructs were conceptualized and measured. One key issue in construct development and conceptualization is the development of measurement items, which requires proper scales to capture the indicators representing the construct adequately, and that the construct be relatively well represented by including all items or indicators. Thus, the findings from this study, especially the insignificant results, call for a re-evaluation of the development of the key measurement items for the selected supply chain constructs. Such re-evaluation would ensure robust, valid measurement items for supply chain agility, digitization, risk management capacity, and the corresponding supply chain performance, thereby ensuring that the indicators accurately and reliably reflect the underlying theoretical concepts that underpin the constructs being explored.

VI. NEW SCIENTIFIC RESULTS

This chapter presents the new scientific results and contributions of this thesis. Based on the research questions, objectives, and hypotheses, this study makes novel contributions to the fields of supply chain management, dynamic capabilities, and resource-based theory. The results not only enrich the theoretical understanding of supply chain performance but also

provide practical guidelines for managers in emerging market contexts, particularly in the apparel manufacturing countries.

1. This study offers a novel theoretical contribution by combining the Dynamic Capabilities Theory (DCT) and the Resource-Based View (RBV) to explain supply chain performance (SCP) in the Bangladeshi apparel industry. While RBV emphasizes the possession of valuable, rare, and inimitable resources such as digital technologies and knowledge assets, DCT highlights the firm's ability to reconfigure these resources into strategic capabilities like agility, flexibility, innovation, and digitization. The findings reveal that these capabilities alone are insufficient to generate performance gains unless they are supported through two critical mediating mechanisms: Risk Management Capacity (RMC) and Digital Absorptive Capacity (DAC). RMC enables firms to deploy strategic resources to mitigate volatility and uncertainty, while DAC allows firms to absorb, transform, and exploit digital knowledge effectively. By demonstrating how strategic resources (RBV) and dynamic capabilities (DCT) jointly influence SCP through RMC and DAC, the study advances a more comprehensive framework for supply chain performance.
2. This study makes a unique contribution by developing and empirically validating an integrated model that links supply chain capabilities (agility, flexibility, innovation, and digitization) with performance outcomes through the mediating roles of Risk Management Capacity and Digital Absorptive Capacity. To the best of my knowledge, this is the first attempt to apply such a framework in the Bangladeshi apparel supply chain, a globally significant yet highly volatile industry. This contribution is especially novel because prior research in the apparel sector has primarily focused on cost efficiency, compliance, or supply chain practices. In contrast, this study presents a comprehensive framework that addresses the distinct challenges of emerging market supply chains, providing actionable insights to enhance competitive advantage and performance.
3. This study develops and validates an extended PLS-SEM–based analytical framework that integrates multiple mediating and moderating mechanisms to explain how supply chain capabilities, risk management capacity, and digital absorptive capacity jointly influence supply chain performance in the Bangladesh apparel industry. Unlike conventional PLS-SEM applications, the proposed framework incorporates higher-order constructs and multi-mediation to capture the complex interdependencies specific

to emerging-market supply chains. The empirical validation demonstrates the methodological robustness and contextual adaptability of the extended PLS-SEM approach, providing a replicable analytical model for future supply chain research in similar industry and developing-country contexts.

4. One of the most significant contributions of this study is the establishment of Digital Absorptive Capacity (DAC) as a fundamental construct in explaining supply chain performance. The empirical findings reveal that supply chain agility and digitization, although widely regarded as critical capabilities, do not exert a significant direct influence on supply chain performance in the Bangladeshi apparel industry. Instead, their influence becomes evident only when mediated by DAC. This demonstrates that the ability of firms' digital knowledge is essential for translating strategic digital and agile initiatives into tangible performance outcomes. To the best of current knowledge, previous supply chain studies have rarely, if at all, positioned DAC as a core construct in capability and performance frameworks. By introducing DAC as a key mediating variable, this study extends both the Dynamic Capabilities Theory and the Resource-Based View into the digital domain. This contribution not only enriches theoretical understanding but also provides a practical framework for firms in volatile emerging markets to influence digital knowledge absorption as a pathway to resilience and competitiveness.
5. Previous studies have shown that supply chain agility is a key strategic capability for improving performance and gaining a competitive advantage. However, in highly volatile markets such as the diverse apparel supply chain, agility alone does not directly enhance performance. This study found that Risk Management Capacity plays a crucial mediating role, enabling firms to translate agility into stronger supply chain performance under uncertain conditions. This finding highlights the importance of developing robust risk management practices to utilize the benefits of supply chain agility fully.

VII. SUMMARY

Over the last two decades, global supply chains have undergone unprecedented transformation driven by globalization, digitalization, and rapidly changing market expectations. In this context, supply chain performance (SCP) is no longer explained solely by the presence of operational capabilities such as agility, flexibility, innovation, and digitization. Instead, the

effectiveness of these capabilities often depends on underlying dynamic mechanisms, particularly Risk Management Capacity (RMC) and Digital Absorptive Capacity (DAC). Grounded in the Resource-Based View and Dynamic Capabilities Theory, this study investigates how firms in the Bangladeshi apparel manufacturing industry, an industry of global significance, translate their supply chain capabilities into performance outcomes through these mediating mechanisms.

Data were collected through a quantitative survey of 368 valid responses from mid- to senior-level supply chain managers across apparel manufacturing firms in Bangladesh. The research employed a variance-based Structural Equation Modelling (SEM) technique using Partial Least Squares (PLS), following a two-stage process of measurement and structural model assessment. Fourteen hypotheses were tested, comprising eight direct and six mediated relationships among supply chain agility, flexibility, innovation, digitization, RMC, DAC, and SCP. The findings reveal that agility, flexibility, and innovation exert significant positive effects on RMC, while agility, innovation, and digitization strongly enhance DAC. However, neither agility nor digitization demonstrated a statistically significant direct effect on SCP, highlighting that their contributions to performance are contingent upon other enabling mechanisms. Mediation analysis provided crucial insights: RMC significantly mediated the relationship between flexibility and innovation with SCP, whereas DAC strongly mediated the effects of agility, innovation, and digitization on SCP. Remarkably, five of the six mediation hypotheses were supported, affirming the centrality of RMC and DAC in transforming capability investments into tangible performance gains. These results advance the understanding that supply chain agility and digitization, though necessary, are insufficient in isolation to enhance performance; robust digital and risk-oriented absorptive capacities are indispensable conduits for performance improvement.

Theoretically, this study contributes to supply chain management literature by extending the dynamic capability perspective and the resource-based view into an emerging market context. It challenges the conventional assumption of a direct link between operational capabilities and performance, showing instead that these relationships are conditional and complex. The findings emphasize that agility, flexibility, innovation, and digitization function as dynamic capabilities whose performance value materializes only when integrated with effective risk management and digital knowledge absorption processes. Practically, the study offers actionable implications for supply chain managers and policymakers in emerging markets. Organizations must not only invest in agile, flexible, innovative, and digitized systems but also develop strong RMC and DAC frameworks to safeguard against risks, harness digital

knowledge, and ensure resilience in the face of disruptions. This is particularly vital for Bangladesh's apparel sector, which operates within highly volatile global markets and serves as a critical pillar of the national economy. By embedding digital absorptive and risk management capacities into their supply chain strategies, firms can better leverage emerging technologies such as AI, blockchain, and cloud computing to build resilience, secure competitive advantage, and sustain performance. Methodologically, the study underscores the value of PLS-SEM for analysing complex, multi-construct supply chain models and highlights the need for future research to explore additional mediators, moderators, and longitudinal analyses to better capture the evolving nature of supply chain dynamics. Limitations such as the industry-specific sample and demographic skewness suggest caution in generalizing the results beyond the Bangladeshi apparel industry, while also offering avenues for comparative and cross-industry research.

Additionally, this research provides a nuanced understanding of the mechanisms by which supply chain capabilities translate into performance outcomes. It demonstrates that agility, flexibility, innovation, and digitization achieve their intended value not directly, but through the orchestrating roles of RMC and DAC. These insights enrich both theory and practice by emphasizing that supply chain excellence requires not only capability development but also the strategic embedding of absorptive and risk management capacities to ensure resilience and sustained competitive performance in uncertain global environments.

VIII. APPENDIX

Appendix A. References

1. ALDHAHERI, R. T., & AHMAD, S. Z. (2023). Factors affecting organisations' supply chain agility and competitive capability. *Business Process Management Journal, 29*(2), 505–527. https://doi.org/10.1108/BPMJ-11-2022-0579
2. ALI, O., KRSTESKA, K., SAID, D., & MOMIN, M. (2023). Advanced technologies enabled human resources functions: Benefits, challenges, and functionalities: A systematic review. Cogent Business & Management, 10(2), 2216430. https://doi.org/10.1080/23311975.2023.2216430
3. ALJAWAZNEH, B. E. (2024). The mediating role of supply chain digitization in the relationship between supply chain agility and operational performance. *Uncertain Supply Chain Management, 12*(2), 669–684. https://doi.org/10.5267/j.uscm.2024.1.017
4. BA AWAIN, A. M. S., ASAD, M., SULAIMAN, M. A. B. A., ASIF, M. U., & SHANFARI, K. S. A. (2025). Impact of supply chain risk management on product innovation performance of Omani SMEs: Synergetic moderation of technological

turbulence and entrepreneurial networking. *Sustainability*, *17*(7), 2903.https://doi.org/10.3390/su17072903.

5. BURIN, ARACELI ROJO GALLEGO, MARIA NIEVES PEREZ-AROSTEGUI, AND JAVIER LLORENS-MONTES (2020). Ambidexterity and IT competence can improve supply chain flexibility? A resource orchestration approach. *Journal of Purchasing and Supply Management* 26: 100610 https://doi.org/10.1016/j.pursup.2020.100610
6. BÜYÜKÖZKAN, G., & GÖÇER, F. (2018). Digital supply chain: Literature review and a proposed framework for future research. *Computers in Industry*, 97, 157–177. https://doi.org/10.1016/j.compind.2018.02.010
7. CHEN, C. J. (2019). Developing a model for supply chain agility and innovativeness to enhance firms' competitive advantage. *Management Decision*, *57*(7), 1511–1534. https://doi.org/10.1108/MD-12-2017-1236
8. CHEN, P., & KIM, S. (2023). The impact of digital transformation on innovation performance-The mediating role of innovation factors. *Heliyon*, *9*(3).
9. CRAIGHEAD, C. W., KETCHEN, D. J., & DARBY, J. L. (2020). Pandemics and supply chain management research: Toward a theoretical toolbox. *Decision Sciences*, 51(4), 838–866. https://doi.org/10.1111/deci.12468
10. DEWANTI, S. A., & SANTOSA, W. (2025). The effect of absorptive capacity on supply chain innovation performance through supply chain agility in manufacturing companies in Bogor, Indonesia. *Golden Ratio of Marketing and Applied Psychology of Business, 5*(2), 414–425. https://doi.org/10.52970/grmapb.v5i2.983
11. EMON, M. M. H. (2025). The mediating role of supply chain responsiveness in the relationship between key supply chain drivers and performance. *Brazilian Journal of Operations & Production Management, 22*(1), 2580. https://doi.org/10.14488/BJOPM.2580.2025
12. FAN, Y., & STEVENSON, M. (2018). A review of supply chain risk management: Definition, theory, and research agenda. *International Journal of Physical Distribution & Logistics Management, 48*(3), 205–230. https://doi.org/10.1108/IJPDLM-01-2017-0043
13. GANGULY, A., CHATTERJEE, D., & RAO, H. V. (2019). Evaluating the risks associated with supply chain agility of an enterprise. In *Supply Chain and Logistics Management* (pp. 1546–1567). https://doi.org/10.4018/978-1-7998-0945-6.ch075
14. GLIGOR, D. M., & HOLCOMB, M. C. (2012). Understanding the role of logistics capabilities in achieving supply chain agility: A systematic literature review. *Supply Chain Management: An International Journal*, 17(4), 438–453. https://doi.org/10.1108/13598541211246594
15. HAIR, J. F., RISHER, J. J., SARSTEDT, M., & RINGLE, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, *31*(1), 2-24.https://doi.org/10.1108/EBR-11-2018-0203
16. HOVE-SIBANDA, P., & POOE, R. I. D. (2018). Enhancing supply chain performance through supply chain practices. *Journal of Transport and Supply Chain Management, 12*, 1–9. https://doi.org/10.4102/jtscm.v12i0.400
17. IVANOV, D., & DOLGUI, A. (2020). Viability of intertwined supply networks:

Extending the supply chain resilience angles towards survivability. *International Journal of Production Research*, 58(10), 2904–2915. https://doi.org/10.1080/00207543.2020.1750727

18. JAHED, M.A., QUADDUS, M., SURESH, N.C., SALAM, M.A. AND KHAN, E.A. (2022), "Direct and indirect influences of supply chain management practices on competitive advantage in fast fashion manufacturing industry", *Journal of Manufacturing Technology Management*, Vol. 33 No. 3, pp. 598-617. https://doi.org/10.1108/JMTM-04-2021-0150
19. JANG, S. H., & LEE, C. W. (2025). Digital entrepreneurial orientation, technology absorptive capacity, and digital innovation on business performance. *Systems, 13*(4), 40300. https://doi.org/10.3390/systems13040300
20. JÜTTNER, U., PECK, H., & CHRISTOPHER, M. (2003). Supply chain risk management: Outlining an agenda for future research. *International Journal of Logistics Research and Applications*, 6(4), 197–210. https://doi.org/10.1080/13675560310001627016
21. KASTELLI, I., DIMAS, P., STAMOPOULOS, D., & TSAKANIKAS, A. (2024). Linking digital capacity to innovation performance: The mediating role of absorptive capacity. *Journal of the Knowledge Economy, 15*(1), 238–272. https://doi.org/10.1007/s13132-022-01092-w
22. MANHART, P., SUMMERS, J. K., & BLACKHURST, J. (2020). A meta-analytic review of supply chain risk management: Assessing buffering and bridging strategies and firm performance. *Journal of Supply Chain Management, 56*(3), 66–87. https://doi.org/10.1111/jscm.12219
23. MUAFI, M., & SULISTIO, J. (2022). A nexus between green intellectual capital, supply chain integration, digital supply chain, supply chain agility, and business performance. *Journal of Industrial Engineering and Management, 15*(2), 275–295. https://doi.org/10.3926/jiem.3831
24. MUKHSIN, M., TAUFIK, H. E. R., RIDWAN, A., & SURYANTO, T. (2022). The mediation role of supply chain agility on supply chain orientation-supply chain performance link. *Uncertain Supply Chain Management, 10*(1), 197–204. https://doi.org/10.5267/j.uscm.2021.9.008
25. NAZEMPOUR, R., YANG, J., & WAHEED, A. (2020). An empirical study to understand the effect of supply chain agility on organizational operational performance. In *Supply Chain and Logistics Management* (pp. 1608–1630). IGI Global. https://doi.org/10.4018/978-1-7998-0945-6.ch078
26. NDAYISENGA, I., UWIMANA, R., & MUGISHA, D. (2025). Relationship between supply chain flexibility and supply chain resilience: A review of literature. *Journal of Procurement and Supply Chain Management, 4*(1), 22–40. https://doi.org/10.58425/jpscm.v4i1.345
27. OLIVEIRA-DIAS, D., MOYANO-FUENTES, J., & MAQUEIRA-MARÍN, J. M. (2022). Understanding the relationships between information technology and lean and agile supply chain strategies: a systematic literature review. *Annals of Operations Research*, *312*(2), 973-1005. https://doi.org/10.1007/s10479-022-04520-x
28. PIPRANI, A. Z., JAAFAR, N. I., ALI, S. M., MUBARIK, M. S., & SHAHBAZ, M.

(2022). Multi-dimensional supply chain flexibility and supply chain resilience: The role of supply chain risks exposure. *Operations Management Research, 15*(1–2), 307–325. https://doi.org/10.1007/s12063-021-00232-w

29. QUEIROZ, M. M., WAMBA, S. F., & TRINCHERA, L. (2019). Blockchain adoption in supply chain management: Empirical research from an emerging economy. *International Journal of Production Economics*, 210, 211–224. https://doi.org/10.1016/j.ijpe.2019.01.032
30. QURESHI, F., ELLAHI, A., JAVED, Y., REHMAN, M., & REHMAN, H. M. (2023). Empirical investigation into impact of IT adoption on supply chain agility in fast food sector in Pakistan. *Cogent Business and Management, 10*(1). https://doi.org/10.1080/23311975.2023.2170516
31. SRIVASTAVA, M., & ROGERS, H. (2022). Managing global supply chain risks: Effects of the industry sector. *International Journal of Logistics Research and Applications, 25*(7), 1091–1115. https://doi.org/10.1080/13675567.2021.1873925
32. SUSITHA, E., JAYARATHNE, A., & HERATH, H. M. R. P. (2025). Stitching competition with digital threads: Unveiling the drivers of competitive success in the apparel sector. *PloS one*, *20*(6), e0325945.https://doi.org/10.1371/journal.pone.0325945
33. TALLARICO, S., PELLEGRINI, L., LAZZAROTTI, V., & LAZZINI, S. (2024). Boosting firms' absorptive capacity: The digital technologies edge. *European Journal of Innovation Management.* https://doi.org/10.1108/EJIM-09-2023-0741
34. TARIGAN, Z. J. H., SIAGIAN, H., & JIE, F. (2021). Impact of internal integration, supply chain partnership, supply chain agility, and supply chain resilience on sustainable advantage. *Sustainability (Switzerland), 13*(10). https://doi.org/10.3390/su13105460
35. TEECE, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal, 28*(13), 1319–1350.https://doi.org/10.1002/smj.640.
36. TEECE, D. J., PISANO, G., & SHUEN, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509–533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z
37. UM, J. (2017). Improving supply chain flexibility and agility through variety management. *The International Journal of Logistics Management, 28*(2), 464–487. https://doi.org/10.1108/IJLM-07-2015-0113
38. UMAM, R., & SOMMANAWAT, K. (2019). Strategic flexibility, manufacturing flexibility, and firm performance under the presence of an agile supply chain: A case of strategic management in fashion industry. Polish Journal of Management Studies, 19(2), 407–418. https://doi.org/10.17512/pjms.2019.19.2.35
39. WANG, M., & WANG, B. (BILL). (2024). Supply chain agility as the antecedent to firm sustainability in the post COVID-19. *International Journal of Logistics Management, 35*(1), 281–303. https://doi.org/10.1108/IJLM-02-2022-0059
40. WANG, Y., JIANG, B., & WAKUTA, Y. (2024). How digital platform leaders can foster dynamic capabilities through innovation processes: the case of taobao. *Technology*

Analysis & Strategic Management, *36*(4), 679-691.https://doi.org/10.1080/09537325.2022.2050690.

41. ZHANG, C., LI, S., & LIU, X. (2025). Data-driven supply chain orientation and supply chain performance: Empirical investigation using a contingent resource-based view perspective. *European Journal of Innovation Management.* https://doi.org/10.1108/EJIM-01-2024-0017

LIST OF PUBLICATIONS

Peer-reviewed Scientific Published Articles

1. CHOWDHURY, A. H. M. Y., **SHAHADAT, M. M. H**., TALUKDER, S. C., CSONKA, A., & FARKAS, M. F. (2025). Integrating CRM, Lean Practices, and Use of IT to Enhance Operational Performance: The Mediating Role of Quality Information Sharing. *Logistics*, *9*(3), 123. https://doi.org/10.3390/logistics9030123 (Scopus-Q2)
2. **SHAHADAT, M. H.,** CHOWDHURY, A. Y., JAHED, M. A., NATHAN, R. J., & FEKETE-FARKAS, M. (2024). Innovativeness, visibility, and collaboration effect on supply chain performance: moderating role of digital supply chain integration. *Cogent Business & Management*, *11*(1), 2390168.https://doi.org/10.1080/23311975.2024.2390168 (Scopus-Q2)
3. **SHAHADAT, M. H**., NEKMAHMUD, M., EBRAHIMI, P., & FEKETE-FARKAS, M. (2023). Digital technology adoption in SMEs: what technological, environmental and organizational factors influence in emerging countries?. *Global Business Review*, 09721509221137199.https://doi.org/10.1177/09721509221137199 (Scopus-Q2, ABDC-C)
4. **SHAHADAT, M. H**., CHOWDHURY, A. H. M. Y., NATHAN, R. J., & FEKETE-FARKAS, M. (2023). Digital technologies for firms' competitive advantage and improved supply chain performance. *Journal of Risk and Financial Management*, *16*(2), 94.https://doi.org/10.3390/jrfm16020094 (Scopus-Q2, ABDC-B)

Conference Proceedings and Presentations

1. **Hussain, M. S**. "Impact Factors to ICT Adoption and Its Barrier to Adoption in SMEs in Bangladesh. *Challenges of Nowadays in the Light of Sustainability*, 125.8th VUA YOUTH Scientific Session, 26 November 2021, Gödöllő, Hungary.
2. **Shahadat, M. M**., Suha S. "Information Technology: Ensuring Sustainability through Implementing Corporate Social Responsibility. *VII. International Winter Conference of Economics PhD Students and Researchers.* February 2021, Organized by Óbuda University, Budapest, Hungary
3. **Shahadat, M. M**., Nathan, R. J., & Fekete-Farkas, M , Understanding Drivers of Technology Adoption in the Apparel supply chain: A DOI and UTAUT Perspective. Sustainability and Resilience International Scientific Conference. April, 2025. Organized by MATE, Gyongyos.