South Asian Journal of Operations and Logistics
Vol. 3, No. 2, pp. 198-223
DOI: 10.57044/SAJOL.2024.3.2.2438
ISSN: 2958-2504

Investigating the impact of supply chain integration on operational performance with a mediating role of supply chain capabilities of the SME sector in Pakistan

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Article History

Received: 13 April 2023
Revised: 04 March 2024

JEL Classification
L60
R41
G14

ABSTRACT

Different firms do not compete like distinct units from extremely competitive business perspectives but slightly as participants in numerous supply networks. Therefore, this research aims to study the impact of supply chain integration (supplier, internal and customer) on operational performance with a mediating role of supply chain capabilities of the manufacturing industry of Karachi, Pakistan. This research will analyze 175 survey responses from employees working in the SME sector of Karachi, Pakistan. Partial Least Square-Structural equation modelling is used to analyze the data. Results show that supply chain integration has a significant impact on operational performance. Furthermore, supply chain integration significantly impacts operational performance by mediating supply chain capabilities. The results of the current study suggest that supply chain integration improves performance.

Keywords: *Supply chain integration, Supplier integration, Customer integration, Internal integration, Supply chain capabilities, Operational performance, SME sector, Manufacturing industry*

Citation of this article:

Khan, M. S. (2024). Investigating the impact of supply chain integration on operational performance with a mediating role of supply chain capabilities of the SME sector in Pakistan. *South Asian Journal of Operations and Logistics*, *3*(2), 198-223. https://doi.org/10.57044/SAJOL.2024.3.2.2438

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1. Introduction

Different firms do not compete like distinct units from extremely competitive business perspectives but slightly as participants in numerous supply networks (Rajaguru & Matanda, 2019; Rashid, 2016; Baloch & Rashid, 2022). SC members must incorporate and share resources and skills with upstream and downstream SC members to attain the proposed advantages from such moving business perspectives. Strategic knowledge and resources inside the business will likely provide little value; they can only be shared with SC members to generate value (Revilla & Knoppen, 2015). Mutual facts and understanding are transformed into valuable skills, which lead to improved performance (Albhirat et al., 2024; Revilla & Knoppen, 2015).

Integration is a critical focus in procedures and SCM literature. In the late mid-1990s, numerous researchers investigated this aspect of SCM and empirically explored the relations among various extents of SC integration, supply chain capabilities, and several performance measures (Rajaguru & Matanda, 2019; Ataseven & Nair, 2017; Hou, 2020; Pooe & Mahlangu, 2017; Schoenherr & Swink, 2012). SC integration involves internal procedures within the firm and external integration with customers and suppliers. Various research studies have emphasized integration with suppliers and customers as a crucial competitive differentiator (Shou et al., 2018; Ganbold et al., 2021). Information sharing and collaboration in the strategy of procedures and goods cooperation are among the necessary aspects to sustain integration across SC participants. These characteristics serve the interests of all companies in the supply chain and help improve overall performance rather than merely optimizing individual enterprises' internal efficiency (Hashmi, 2022). Despite the significance of SC integration, structures have been theorized and evaluated from various viewpoints in prior research.

Additionally, both internal and external integration projects within a business, as well as supply chain integration initiatives, have been shown to have diverse and varied levels of influence on numerous performance parameters. For example, Schoenherr and Swink (2012) identify different links between SC integration and operational and financial performances. Consequently, this study aims to examine the impact of supply chain integration (internal, supplier, and customer) on operational performance with a mediating role of supply chain capabilities in SMEs in Karachi, Pakistan.

The strategic necessity of participating manufacturers, suppliers, and customers has become more apparent in recent decades (Danese & Bortolotti, 2014; Kim & Chai, 2016). Rapidly varying technology, growing globalization, shorter product life cycles, focus on competence, and rising consumer prospects are just a few reasons for supply chain integration and strong connections (Soosay & Hyland, 2015; Hashmi, 2023). Manufacturers who have properly connected their internal procedures to external suppliers and consumers in distinctive supply chains are the most successful. In summary, upstream and downstream integration among suppliers and consumers has become a critical component of industrial strategy in the new period. To efficiently employ resources, proficient supply chain integration brings all required resources to all cooperative partners together and integrates all functional activities (Zhang et al., 2015).

Years ago, Rajaguru and Matanda (2019) published research that demonstrated the relevance of SC integration for rival capacities in enterprises. Many of the supply chain issues that SMEs face may be traced back to an absence of efficient SC integration, according to Kalyar et al. (2019). Inventory shortages, logistical, delivery, and quality issues, as well as cost increases, are among the problems. However, most of the research, including those listed, was carried out in industrialized nations. Given the disparities in SMEs' definitions and the socioeconomic dynamics they control in a developing country like Pakistan, it's unlikely that the conclusions of such research can be applied to the local context. Constraints on SC in developing and established nations are likely to differ, emphasizing the need for more similar research in emerging countries (Lee et al., 2016). While empirical research into

SC integration, SC capabilities, and operational performance is still lacking in Pakistan, the recent appearance of such studies is encouraging (Ziaullah et al., 2015).

Diverse aspects of supply chain integration (supplier integration, customer integration, and internal integration), according to the authors, would result in various performance results, which would affect the firm's financial performance (Munir et al., 2020; Hashmi & Mohd, 2020). Numerous academics have examined supply chain integration, capabilities, and operational performance. This is the growing need for companies to interface with a wide range of commercial partners, internal corporate departments, business procedures, and customers along the SC (Rajaguru & Matanda, 2019; Rashid et al., 2019). According to Choon Tan et al. (2010), the greater the level of integration, the better the performance, and better organizations will adapt to their difficulties purposefully, operationally, and technically. Creativity and openness to new possibilities can also help you perform better (Munir et al., 2020). The link between supplier, customer, internal integration, and operational performance has been a lively study field, with a large body of literature that is critical to SCI's financial and operational performances (Cheng et al., 2021; Lu et al., 2017; Ganbold et al., 2021). Much research shows that the three aspects of SCI—supply chain capabilities and operational performance have a favourable association (Pooe & Mahlangu, 2017; Adebanjo et al., 2018; Radhakrishnan et al., 2018). However, several studies have shown contradictory results regarding the relationship between operational performance, supply chain capabilities, and various SCI characteristics (Hong et al., 2019; Hou, 2020; Rajaguru & Matanda, 2019; Rashid & Amirah, 2017). Numerous aspects, including logistical capacities (Wiengarten et al., 2014), dynamics (Kareem & Kummitha, 2020), hazards (Wiengarten et al., 2016), and environmental unpredictability, have been addressed to explain these inconsistent outcomes (Wong et al., 2011).

1.2 Research Objectives

The existing study contends with the following research objectives:

1. *To study the impact of supplier integration on supply chain capabilities.*
2. *To analyze the effects of internal integration on supply chain capabilities.*
3. *To analyze the impact of customer integration on supply chain capabilities.*
4. *To analyze the effect of supply chain capabilities on operational performance.*
5. *To analyze the impact of supplier integration on operational performance.*
6. *To analyze the impact of internal integration on operational performance.*
7. *To analyze the impact of customer integration on operational performance.*
8. *To analyze the impact of supplier integration on operational performance with a mediation of supply chain capabilities.*
9. *To study the impact of internal integration on operational performance by mediating supply chain capabilities.*
10. *To study the effect of customer integration on operational performance by negotiating supply chain capabilities.*

1.3 Research Questions

The existing study contends with the following research questions:

1. *What is the impact of supplier integration on supply chain capabilities?*
2. *What is the impact of internal integration on supply chain capabilities?*
3. *What is the impact of customer integration on supply chain capabilities?*
4. *What is the effect of supply chain capabilities on operational performance?*
5. *What is the effect of supplier integration on operational performance?*
6. *What is the impact of internal integration on operational performance?*
7. *What is the impact of customer integration on operational performance?*
8. *How does supplier integration impact operational performance through the mediation of supply chain capabilities?*

9. *How does internal integration impact operational performance through the mediation of supply chain capabilities?*
10. *What is the impact of customer integration on operational performance through the mediation of supply chain capabilities?*

1.4 Significance of the Study

Practitioners and scholars will benefit from this research. In terms of academics, this study contributes to the literature on SMEs' operational performance and supply chains by identifying the association between supply chain integration, supply chain capabilities, and SME operational performance in Pakistan. The existing study supports the idea that SMEs may enhance their performance by capitalizing on supply integration technologies, planning cooperatively, and strengthening SC expertise. It might be attributed, among other things, to the proper arrangement of integration tools to the extent of invention, structures, correlation management, industry approach, product growth, and procedural strategy. As a result, SMEs must use combined structures and SC procedures through suppliers, consumers, logistics providers, and financial institutions, which necessitate SMEs' willingness to share figures with their suppliers and customers on demand plans and forecasts, manufacturing agendas, and delivery networks.

1.5 Definitions of Variables

1.5.1 Supply Chain Integration

It measures how well a company deliberately engages with SC members and handles inter- and intra-firm procedures (Flynn et al., 2010).

1.5.2 Supply Chain Capabilities

Organizations identify, use, and change internal and external resources and information to make the supply chains' operations more efficient (Wu et al., 2006).

1.5.3 Operational performance

Operational performance is linked to a company's interior procedure efficiency, which may help it improve its market affordability and profitability (Hong et al., 2019).

2. Literature Review

2.1 Theoretical Background

The dynamic capacities theory underpins this study. Because of the ambiguity and constant variations in the corporate environment, the idea of dynamic capabilities has developed. Dynamic capabilities are defined as a firm’s capability to create, integrate, and use abilities in reaction to fast variations in a business setting. Dynamic capabilities: Organizations' efforts to refresh and reorganize their sources rely on suitably varying customer requirements and rival approaches (Rashid et al., 2024a). In SC, the treatment of dynamic capabilities is gradually significant (Allred et al., 2011). As a result, to respond to these changes, businesses must have SC capabilities. Firms may develop a combined connection within organizations, consumers, and suppliers through dynamic supply chain capabilities and accurately forecast market expectations, boosting supply chain responsiveness to satisfy customer and supplier needs (Sanders, 2014).

Several researchers have looked into the dynamic capabilities from a supply chain perspective. The growth of dynamic capabilities within SC is critical for meeting future requirements (Mathivathanan et al., 2017). According to Oh et al. (2019), emotional supply chain skills are a company's capacity to recognize and use inside and outside assets to improve SC operations. It includes information sharing, quality, integration, and SC responsiveness as dynamic SC capabilities. According

to Ju et al. (2016), dynamic supply chain capabilities include procedures of evidence interchange, SC orientation, and informational technology that help companies satisfy consumer expectations and stay competitive in a changing market. Supply chain agility and adaptability are rational mechanisms of dynamic SC capabilities that should be combined to enable SC ambidexterity. The dynamic capability theory emphasizes distinct abilities that may be quantified due to interactions and collaboration (Barreto, 2010). According to dynamic capabilities theory, supply chain participants combine their resources and skills to gain a competitive advantage. As a result, research explores the function of SC integrations in attaining SC capabilities and organizational performances in connection with DC theory. According to the dynamic capability hypothesis, SC partners can gain a competitive advantage by developing unique SC capabilities through SC integrations (Olavarrieta & Ellinger, 1997).

Supply chain skills help participating firms increase their sales volume and market share by expediting the items towards customers. They allow SC associates to reach marketplaces that might otherwise be unavailable owing to operational and distribution restrictions. Supply chain skills allow SC associates to react to customer's inquiries efficiently, improving operational performance (Gawankar et al., 2016).

2.2 Supply Chain Integration

Munir et al. (2020) proposed that the academic community and experts broadly perceive the meaning of risk on the board and apply it to SCs to manage the intricacy and vulnerabilities confronted. Businesses endeavour to oversee hazards, hold sudden disturbances, and further develop performance in truly changing uncertain business conditions. This review expands upon the data handling perspective on risk management and investigates the relationship between SC integration and SC risk management to work on functional performances. Consequently, intervening pretends through SCRM among SCI and functional performances are analyzed. SEM was utilized to examine hypotheses using the information of 931 manufacturing organizations obtained from the sixth variant of Global Manufacturing Policy Analysis. Discoveries of review recommend that inward provider and consumer reconciliation impacts SCRM, while the effect of the inner combination is likewise, to some degree, intervened by the provider and customer integration. Also, the outcomes show that SCRM intervenes in the connection between interior integrations and functional performances and completely mediates relationships among provider, CI, and functional performances. That review contributes to the investigation by suggesting and precisely examining a comprehensive structure showing impacts.

Ganbold et al. (2021) investigate the influence of IT capability in allowing SC integration and the impact of SCI on the firm's operational performance. Based on data gathered from employees of 109 large manufacturing enterprises recorded on the Tokyo Stock Exchange, the structural equation modelling technique is utilized to examine the theoretical hypotheses linked among aspects of IT competence, SCI, and OP. Except for consistency, which negatively influences internal integration, the findings imply that IT competency favours SCI. According to the findings, SCI, mainly CI, has a clear and significant influence on overall OP measures. Outcomes will be used to guide future projects aimed at improving SCI through particular IT capabilities. Managers should examine the impact of IT capabilities on SCI when implementing such initiatives as purposeful apps, SC applications, and figures uniformity ability. SCI and OP in specific business contexts, despite the fact that some of the dimensions have a divergent and even opposing effect.

Cheng et al. (2021) examine the moderating influence of a plant's role in the manufacturing system on relations amongst their extent of integration through another plant into a similar industrial system ("internal manufacturing integration"), interactions with suppliers and customers referred to in this study, like SC integration, and operational performance. The data for this study comes from the 6th edition of the Global Manufacturing Policy Analysis. This research uses a subgroup of figures, which includes 610 plants that are recognized as part of a manufacturing system. According to the findings, the function appears to have a moderating influence on the association between internal manufacturing integration and SC integration rather than an association between SC integration and operational performance. According to our findings, Plant influence also moderates outside SCI's influence on

connections amongst inside production NI and OP. More crucially, it shows a wish to dramatically improve its OP; it must make the following changes: Whatever function it plays in the industrial network, there is a specific need to improve ties among SC associates. This research adds to the current body of knowledge by elucidating the link between production NI and production outside SCI and OP.

Kalyar et al. (2019) investigate the significance of innovation in defining supply chain integration and fostering SC performance in manufacturing SMEs. Information was gathered from 324 SMEs in Pakistan. The firm's proprietors, chief executives, and managerial employees were the participants. Data was analyzed using partial least squares-based structural equation modelling (SEM) because of the formative character of SC efficiency and efficacy measures. The findings show that innovativeness favours the dimensions of SC integration, which affects SC competence and effectiveness. Findings show the existence of moderation in SCI and performance characteristics. Outcomes show which enterprises must strive for innovation and SCI since both help to improve SC performance. Innovativeness may be a powerful tool for SMEs to strengthen SC integration and performance. The research adds to works by examining the impact of an emerging cause on SC performances and enactment through broadening and existing knowledge of innovativeness's prospective relevance in the SC set.

Ataseven and Nair (2017) proposed that this study has investigated the links between supply chain integration and several performance parameters in depth over the last decade, using a meta-analytical technique. The work adds to the literature in four significant ways. To begin with, the data demonstrate that II, SI, and CI all significantly influence a company's financial performance. Secondly, research examines how II, SI, and CI affect a company's operational success. Thirdly, it identifies particular links between SCI and performances that should be investigated more within an outline to determine the function of moderating influences. Lastly, the study delivers insights into the integration measurement, which has the most significant scope and depth of influence on numerous performance metrics, to guide management decision-making.

Lu et al. (2017) examine that market uncertainty moderates the fundamental influence of SCI on OP in a distinctive supply chain. Unique tools for producer operational performance and how that association may be mediated through the precise concept of marketplace ambiguity have been developed based on an extensive and critical empirical survey instrument created and used to collect data from a comprehensive literature review of the Chinese automobile sector. To examine the hypotheses, CFA and SEM used principal study methodologies. This study adds to the existing literature by discussing a systematic model that depicts the contributory impacts of SCI on OP for the first time regarding marketplace ambiguity, such as moderating influence.

Shou et al. (2018) discussed that supply chain integration (SCI) border conditions have been extensively researched to determine whether SCI is appropriate and successful. On the other hand, prior research has mostly focused on external contextual issues such as supply complexity, environmental unpredictability, and infrastructure at the country level. The contingency impacts of inside production systems on the link between SI, CI, and OP are examined in this study, which adds to the SCI literature. Based on organizational information processing theory, the empirical findings also show how alternative configurations of production systems may be paired with supplier and customer integration to achieve the required quality, flexibility, delivery, or cost performance.

2.3 Supply Chain Capabilities

Rajaguru and Matanda (2019) investigate how SC process integration is aided by the compatibility of SC partners' technology structures and traditional and operating values. The research also examines whether SC competencies play a role in the link between SC process integration and success. Prior study outcomes on the association between SC process integration and OP have been conflicting, indicating the necessity to look into the potential of SC capabilities to moderate the association between the two. The study relied on data from 312 employees in Australia's food and hardware retailing industries who were responsible for supply chain operations. The hypotheses were

tested using structural equation modelling (SEM), and the mediation effects were tested using Zhao et al. (2013). Findings show that SC process integration is aided by technological, operational, and cultural compatibility. The study demonstrates the need to incorporate assets across SC associates to achieve SC abilities and operative and rivalry performances, which supports the dynamic capabilities hypothesis.

Furthermore, supply chain skills were discovered to mediate the correlations between SCPI and OP in current research. By highlighting technological, operative, and social compatibility, like experiences towards SCPI, the study adds to the supply chain management literature. The study illustrates how SCPI improves operative and rivalry performances by exposing the mediating function of supply chain capabilities.

Yu et al. (2018) discussed that although the meaning and applicability of fact-determined supply networks are essential, empirical research on how sizeable data-driven supply chains influence supply chain capabilities is relatively sparse. Using a resource-based approach, this research examines the impact of fact-determined SC capabilities on financial performances. The data for this research came from manufacturing industries in China and was examined using SEM. Findings show which fact-determined SC has a strong beneficial impact on four aspects of SC abilities. Financial success is favourably and strongly connected to supply chain coordination and responsiveness.

Adebanjo et al. (2018) examine the relationship between SCI, inventive abilities, and performances. To investigate interactions in 171 companies from three rapidly emerging nations—Brazil, India, and China—the research uses institutional theory and resource-based view theory. The International Manufacturing Strategy Survey (IMSS VI) was used to collect data, which was then evaluated using structural equation modelling. According to research, supply chain linkages and integration were shown to be favourably related towards items and procedure creative abilities. In addition, item and procedure creative skills were found to be favourably related to manufacturing performance in the study.

Additionally, there is a favourable correlation between items and procedure innovation abilities. Outcomes reveal fresh information about manufacturers in three nations, demonstrating that their associations with customers have prompted them to develop the latest inventive skills. As a result of these new skills, they've been able to reap the benefits of enhanced manufacturing performance.

Pooe and Mahlangu (2017) discussed that there has been an increase in concern about the deliberate relevance of integrating suppliers, manufacturers, and consumers during the last ten years. As a result, SC integration has piqued the interest of academics. While studies have been undertaken to provide additional vision, empirical research into these antecedents' influence on the performance of small and medium enterprises (SMEs) has yet to receive much attention. The primary goal of this research is to address that gap by looking at the impact of SC integration, cooperative planning, and SC capabilities on SME rivalry and firm performance. The research takes a quantitative approach. Data from 310 SMEs was gathered to utilize the AMOS 22.0 statistical software package, which included CFA and SEM, according to the study's main result. These findings support the idea that SMEs may enhance their own performance by investing in supply integration technologies, planning cooperatively, and improving supply chain expertise.

Radhakrishnan et al. (2018) proposed that firms are progressively pursuing two primary supply chain management initiatives: external supply chain integration and the implementation of internal structural information methods. On the other hand, theoretical scholars have not fully explored the impact of such programs. We investigated the directing and indirection influence of IOS utilization on buyer-supplier dyad abilities utilizing numerical data from 157 buyer-supplier dyads. It was discovered that external integration mediates the association between IOS utilization and buyer-supplier dyad skills. This is the primary research to examine the impacts of IOS use and outside integration on buyer-supplier dyad skills.

Chen and Kitsis (2016) aim to develop a framework and recommendations for advancing justifiable SCM research and practice. SSCM is highly complex, and no concept can be applied to all cases. The authors examined over 200 critical publications from key SCM and sustainability journals and built their framework on a multi-theoretical approach. Stakeholder pressures, moral reasons, and management commitment are all linked to relational behaviours in SSCM implementation. The paper explains how combining relational practices may result in relational capacities, which can translate stakeholder demands into long-term results. Firms can use context to create and foster relational competencies while coping with increasing stakeholder constraints. Moral motivations improve top management commitment, allowing stakeholder demands to be channelled into the proactive development of relational capacities. The work satisfies a request to examine SSCM occurrences via many theoretical lenses to develop a cohesive theory of SSCM.

Brusset and Teller (2017) proposed that supply chain resilience is a characteristic that allows a disrupted or broken supply network to reassemble and become stronger than before. The dynamic capacity method, which is based on the resource-based view of favourably, is used to investigate resilience in this study. This study aims to map the linkages between the behaviours, resources, and processes that a manager has influence over to give insights into building resilience. A conceptual model that posits a link between supply chain skills and resilience, as well as the moderating influence of supply chain risks, is tested using a poll of 171 managers. Only greater integration across echelons and more flexibility contribute to increased resilience, according to variance-based structural equation modelling. The perception of supplier risk encourages supply chain managers to improve integration skills and, as a result, achieve greater resilience. Furthermore, a supply chain's perception of external threats minimizes the work required to implement external capabilities to achieve resilience. Overall, the data support the hypothesis that depending on supply chain risk factors, various resources, routines, and competencies give varied levels of resilience.

2.4 Operational Performance

Kareem and Kummitha (2020) evaluate the influence of dynamic SC capabilities on operational performances in Hungarian manufacturing firms. The data for the study was gathered using an online survey. Data from 210 SCM specialists in Hungary's manufacturing industries is used to validate the model. The presented hypotheses were tested using structural equation modelling (SEM). According to the empirical findings, supply chain dynamic characteristics such as cooperation, agility, and responsiveness are substantially and favourably connected with operational performance. The findings, however, reveal that integration competence has little bearing on operational success. The study finds that having SC capabilities could assist manufacturing business directors in building operative supply networks and achieving performance in a dynamic environment. Managers must also grasp that supply chain dynamic capabilities are multidimensional, with varied implications on operational performance for each dimension. The study also has theoretical and managerial ramifications, which are examined in depth.

Saragih et al. (2020) recognize the need for better performance and identify the relationship between SC operational capabilities and company rivalry ability. Furthermore, the research examines the impact of SC integration on interaction relationships, like the planned lever. In order to establish integrated and rational plans for the deliberate part of SCM, it is necessary to analyze the potential consequences of an efficient relationship between SC operational capabilities and corporate rivalry capabilities. SC's operational capabilities include choices in product procurement. For data analysis, the study used SEM-PLS, one of the most modern and rigorous data examination techniques, particularly for essential challenges in the societal sciences. Information is gathered via a questionnaire that was created based on previous research. Previous research on manufacturing policy and SCM has emphasized the importance of SCM choices being linked and considered within a firm's commercial plan. On the other hand, previous work has not produced consistent conclusions concerning the nature of the interaction relationship between SCM strategy and company strategy. This research has various ramifications for academics and theory creators. This research has added to earlier frameworks of supply chain practices focused on developed nation contexts by including several elements of SCI

practices in the setting of a developing country. The study has focused on manufacturing firms in Indonesia.

Chowdhury et al. (2019) examine how buyer-supplier social capital might assist SME businesses in minimizing OSR. It investigates the directly and indirectly mediated effects of three aspects of buyer-supplier societal principals, essential, personal, and intellectual, as well as SI, on SMEs' OSR and, as a result, their operational performances. This research employs structural equation modelling to analyze data from 489 Bangladeshi SMEs. According to the findings, all three elements of buyer-supplier societal capital can well lower SMEs' OSR, either directly or indirectly. The importance of supplier integration as a mediating factor in the link between societal capital and OSR was reaffirmed, as was the detrimental influence of OSR on SMEs' operational performance. Because the study exclusively collected data from SMEs in Bangladesh on the purchasing side of the buyer-supplier dyad, generalizing the outcomes should be done with caution. The results of this study may be used by SME experts to develop OSR modification techniques for improving OP. By incorporating the origins and effects of OSR in a unified framework, this research added existing works to SMEs. The application of buyer-supplier societal capital is also extended towards risk modification studies.

Duhaylongsod and Giovanni (2019) examine if executing specific innovation techniques and developing a selection of innovativeness improves the link between supplier integration and operational performance. Using a data set of 173 businesses, the authors examine many research hypotheses. Supervisors, leaders, and administrators from 10 European nations were interviewed for data. The authors assess the links between SI and OP using structural equation modelling. The authors use multi-group analysis to see if particular innovation techniques and a portfolio of inventions have an impact on these correlations. SI enhances inside OPs but has no direct influence on exterior OPs, according to the authors. Internal operations that function well are the only way to improve the latter. Another form of improvement is ineffective in enhancing SI's influence on OP. Finally, adopting a portfolio of innovations has little effect on SI's influence on OP. To increase their efficacy, enterprises must concentrate on a smaller number of innovations. Firms should focus on incremental product developments when attempting to improve the impact of SI on OP. Other solutions derived from the combination of process, incremental, and radical innovations are insufficient for this aim. The impact of supplier innovation on OP does not improve with a larger portfolio of innovations. This study reveals that by using particular innovation techniques and not broadening the portfolio of innovation projects, the impact of SI on OP may be improved.

Chavez et al. (2015) proposed that much of the research on supply chain integration is skewed towards its beneficial influence on operational performance. Inconclusive results, on the other hand, necessitate further research into the processes by which SCI might improve OP. The goal of this research is to find out whether information quality plays a mediating role in the relationship between customer integration and operational performance, as well as whether there is a direct link between the two. The data was gathered from 230 enterprises in Ireland, and regression analysis was used to examine the correlations between the constructs. According to the findings, information quality mediates a link between CI and quality, distribution, and suppleness to some extent. Furthermore, it was discovered that information quality fully mediates the link between CI and OP.

2.5 Research Framework

The below-mentioned is a research framework for the thesis under discussion. It is comprised of three independent variables, which are supplier integration, internal integration, and customer integration. On the other side, there is one dependent variable, which is operational performance. Apart from this, there is one mediating variable, which is known as supply chain capabilities. Other than that, the ten hypotheses have been formulated on the basis of this specific research model. The first hypothesis tests the relationship between supplier integration and supply chain capabilities; the second hypothesis tests the relationship between internal integration and SC capabilities; and the third hypothesis tests the relationship between customer integration and supply chain capabilities. Other than that, the fourth hypothesis analyzes the relationship among SC capabilities on operational performances,

the fifth hypothesis tests the relationship between supplier integration and operational performance, the sixth hypothesis tests the relationship between internal integration and operational performance, the seventh hypothesis analyzes relation among customer integration on operational performances, the eighth hypothesis examines the relation among supplier integration on operational performance with a mediation of supply chain capabilities, the ninth hypothesis analyze relation among internal integration on operational performance with a mediation of supply chain capabilities, the tenth hypothesis analyze relation among customer integration on operational performance with a mediation of SC capabilities.

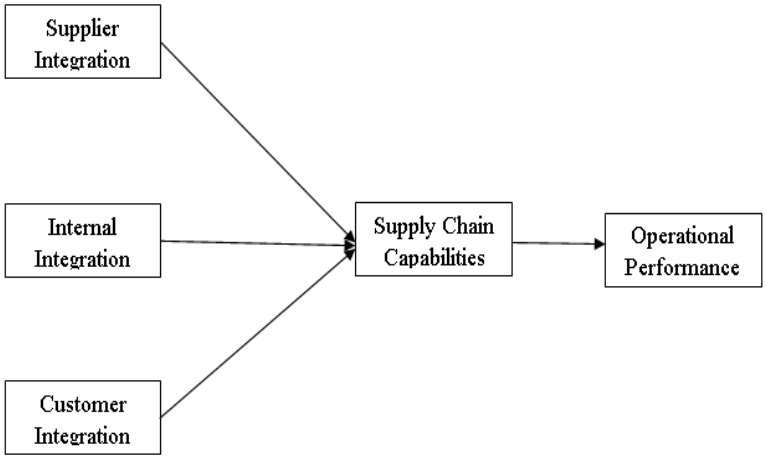

Figure 1: Research Framework

Source: From literature

Based on literature and research framework shown in Figure 1, the following hypotheses were proposed:

H1: Supplier integration significantly influences supply chain capabilities.

H2: Internal integration significantly influences supply chain capabilities.

H3: Customer integration significantly influences supply chain capabilities.

H4: Supply chain capabilities significantly influence operational performance.

H5: Supplier integration significantly influences operational performance.

H6: Internal integration significantly influences operational performance.

H7: Customer integration significantly influences operational performance.

H8: Supplier integration significantly influences operational performance with a mediation of supply chain capabilities.

H9: Internal integration significantly influences operational performance with a mediation of supply chain capabilities.

H10: Customer integration significantly influences operational performance with a mediation of supply chain capabilities.

3. Methodology

The data on operational performance in terms of supplier integration, customer integration, internal integration, and supply chain capabilities is gathered and analyzed using a quantitative methodology (Agha et al., 2021; Khan et al., 2022). Quantitative research is defined as shared research that uses empirical methodology and empirical statements that are numerically quantified (Rashid et al., 2021; Rashid & Rasheed, 2023). A social study using empirical methodology and quantitatively

expressed outcomes is referred to as quantitative research (Khan et al., 2021; Rashid et al., 2023). It is a research strategy for collecting facts, testing ideas, establishing relationships between variables, and anticipating results (Haque et al., 2021; Rasheed & Rashid, 2023). Natural science approaches are used in quantitative research to ensure objectivity, generalizability, and dependability (Wells & Stage, 2015; Rashid & Rasheed, 2022). In contrast, qualitative research poses a trustworthiness issue (Haq et al., 2023). Therefore, the quantitative method is deemed appropriate. The methods and procedures used to perform scientific investigations are research designs (Hashmi et al., 2020b; Rashid et al., 2020). Study types, data collection methods, and statistical analysis are all described in the design section. This study's research design is explanatory in nature. This method allowed researchers to observe several variables throughout time and was helpful in finding links between multiple variables (Rashid & Rasheed, 2024; Hashmi et al., 2021b).

3.1 Sampling Design

The sampling design considers the study's target population, sampling frame, sample size, and sampling process. Because the number of people interested in a particular issue is usually included as members in any analysis, sampling is a useful technique in research studies. Employees working in Karachi's SME sector, a rising industry in Pakistan, make up the target demographic for this study. The participants are chosen from several geographical regions and have several demographics; their attitudes and behaviours allow responses that help examine the data; therefore, the sample consists of 175 employees. The sampling technique used in this study is non-probability convenience sampling. This strategy is utilized when there are no probabilities involved in the components that must be chosen, and the population size is unknown (Brus & Gruijter, 2003; Das et al., 2021). The most appropriate sampling technique is convenient sampling, where respondents are readily available, and data can be collected quickly and comfortably (Etikan et al., 2016).

3.2 Instrument of Data Collection

The data collection instrument for this study is a self-administrative survey questionnaire. The questionnaire is divided into two parts. The first section includes demographic questions, and the second section includes items from the variable. The purpose of choosing a questionnaire is due to the quantitative research approach, which helps in drawing numerical conclusions. The items in the questionnaire are assessed on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). To measure factors, twenty-four questions were assumed and removed to measure relations between supplier integration, customer integration, internal integration, supply chain capabilities, and operational performance. Supplier integration is examined with five items adapted from Kalyar et al. (2019). Customer integration is examined with five items adapted from Kalyar et al. (2019). Internal integration is examined with four items adapted from Kalyar et al. (2019). Supply Chain Capabilities are examined with five items adapted from Rajaguru and Matanda (2019), and operational performance is examined with five items adopted from Hong et al. (2019)

3.3 Procedure for Data Collection

The data for this study were collected from a primary source using a questionnaire. The questionnaire is self-administered, utilizing recommended variables from several sources as well as demographic variables. There are several data collection methods to choose from, each with its own set of costs, time constraints, and other resources accessible to the researcher (Rasheed et al., 2023; Rashid et al., 2022b). The data for this research strategy were gathered using a quantitative research approach. In this study, the quantitative research method employed was administering a questionnaire. The information was acquired by distributing questionnaires to employees of SMEs in Karachi, Pakistan. We can demonstrate their devotion to the firm's operational performance by presenting, examining, and analyzing the data and information obtained from the respondents.

3.4 Statistical Technique

In the manufacturing industry in Karachi, Pakistan, Smart PLS is used to study the relationship between the variables of supplier integration, customer integration, internal integration, supply chain capabilities, and operational performance. Structural equation modelling, generally known as SEM analysis, is shown to be appropriate for this investigation. Smart PLS software is used to verify the validity and reliability of data using the PLS-SEM approach (Rashid et al., 2022a; Ringle et al., 2012). The PLS-SEM approach was employed because it is suitable for evaluating prediction models with non-normal data (Hair et al., 2019). When combined with another SEM method, PLS-SEM is also effective with tiny samples (Hair et al., 2014).

4. Result Analysis

The results and findings have been discussed in this chapter. The PLS-SEM technique was used to get results from path coefficients. In this chapter, we test convergent validity, discriminant validity, outer loadings, path coefficients, and hypothesis testing.

4.1 Respondents Profile

This research is based on the service content quality, service delivery quality, service enjoyment, commitment, and loyalty of online shopping. For that reason, the data were collected from respondents who experienced online shopping. The sample size of this research was 175; among them, 168 (96.0%) respondents were male and 7 (4.0%) respondents were female (Table 1). The age group is divided into four classifications. Table 1 indicates that 0% of the participants have not participated in age groups 1 and 2, i.e., below 25 years and 25–30 years. Whereas 87 (49.7%) of the respondents were from 31–35 years old, and 88 (50.3%) were from above 35 years old. The education group is divided into four classifications, indicating that 0% of the participants have not participated in education groups 1 and 3, i.e., bachelor's and PhDs. Whereas 86 (49.1%) of the respondents were from Group 2, i.e., the Masters, and 89 (50.9%) participants were from Group 4, i.e., others. The designation group is divided into four classifications. Table 1 indicates that 100 (57.1%) of the respondents were from designation group 1, i.e., executives; 67 (38.3%) of the respondents were from designation group 2, i.e., senior executives; 8 (4.6%) of the respondents were from designation group 3, i.e., assistant managers; and 0% of the participants were from group 4, i.e., managers. Table 1 indicates that 76 (43.4%) participants were from job experience group 1, i.e., less than three years, 91 (52.0%) participants were from group 2, i.e., 3-5 years, 8 (4.6%) participants were from group 3, i.e., 6–10 years, and 0% participants were from group 4, i.e., above ten years. Table 1 indicates that 0% of the participants were from income group 1, i.e., less than 30000; 67 (38.3%) participants were from income group 2, i.e., 3000–1,000,000; 101 (57.7%) participants were from income group 3, i.e., 60001–100000; and 7 (4.0%) participants were from income group 4, i.e., more than 100000.

Table 1: Respondent's Profile

Variable	Category	Frequency	Percentage
Age	Below 25 years	0	0
	25-30 years	0	0
	31-35 years	87	49.7
	Above 35 years	88	50.3
	Total	175	100%
Gender	Male	168	96.0
	Female	7	4.0
	Total	175	100%
Education	Bachelors	0	0
	Masters	86	49.1
	PhD	0	0
	Others	89	50.9
	Total	175	100%
Designation	Executives	100	57.1
	Senior Executive	67	38.3
	Assistant Manager	8	4.6

	Manager	0	0
	Total	175	100%
Job Experience	Less than three years	76	43.4
	3-5 years	91	52.0
	6-10 years	8	4.6
	Above ten years	0	0
	Total	175	100%
Income	Less than 30000	0	0
	30001-60000	67	38.3
	60001-100000	101	57.7
	More than 100,000	7	4.0
	Total	175	100%

Source: SPSS output

4.2 Outer Loadings and Convergent Validity

The validity and reliability of their respective constructs are examined when measuring with reflecting indicators. Analyze the factor loadings with the construct variable's outer loadings for the measurement of their construct's dependability. Cronbach's alpha and composite reliability are shown in Table 2. The values of Cronbach's alpha for components are more significant than 0.6, representing suitable inner consistency. In addition, the composite reliability value is more than 0.5. The average variance extracted is a general statistic for producing convergent validity when constructing layers. The values of AVE amongst the 0.50 and highest ordinary indicators indicate that constructions provide components that justify more than 50% of their indicator discrepancy (Hashmi et al., 2021a; Khan et al., 2023a). Likewise, AVE values less than 0.50 imply that the items are less accurate than the variance verified through constructs (Hair et al., 2011; Hashmi et al., 2020a; Khan et al., 2023b). Table 2 shows AVE values that are greater than 0.5. As a consequence, convergent validity was explored comprehensively.

Table 2: Outer Loadings and Convergent Validity

	Items	Loadings	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Customer Integration	CI1	0.603	0.814	0.869	0.573
	CI2	0.786			
	CI3	0.813			
	CI4	0.775			
	CI5	0.789			
Internal Integration	II1	0.684	0.779	0.859	0.605
	II2	0.807			
	II3	0.818			
	II4	0.794			
Operational Performance	OP1	0.616	0.808	0.868	0.572
	OP2	0.661			
	OP3	0.823			
	OP4	0.853			
	OP5	0.801			
Supply Chain Capabilities	SCC1	0.807	0.818	0.873	0.581
	SCC2	0.764			
	SCC3	0.824			
	SCC4	0.709			
	SCC5	0.698			
Supplier Integration	SI1	0.647	0.803	0.863	0.560
	SI2	0.687			
	SI3	0.805			
	SI4	0.802			
	SI5	0.785			

Source: SmartPLS output

As demonstrated in Table 2, the indicators have values higher than 0.60 on their corresponding structures. According to traditional loading criteria, each suggestion should be loaded above 0.6 (Yoo & Alavi, 2001), while other studies establish that indicators with lower outer loadings (0.5 to 0.7) were

sustained onto the model due to their influence on validity content. The model never includes weak item outer loadings (below 0.4). (Hair et al., 2011).

4.3 Cross Loadings

Table 3 indicates the cross-loadings of the items, illuminating that they are all loaded higher in their relevant construct than the linked variable. Additionally, the cross-loading variance is more significant than 0.1, which is acceptable (Rashid et al., 2024b). The loadings and cross-loadings for each indication are shown in Table 3. As the indicator CI1 has the highest loading with its equivalent construct CI (0.603), all other cross-loadings are far lower (e.g., CI1 on II: 0.454). The same holds true for CI's other indicators and those evaluating II, OP, SCC, and SI. Generally, cross-loadings support the discriminant validity of the constructs (Hair et al., 2014).

Table 3: Cross Loadings

	CI	II	OP	SCC	SI
CI1	0.603	0.454	0.250	0.208	0.237
CI2	0.786	0.247	0.301	0.371	0.326
CI3	0.813	0.235	0.336	0.356	0.267
CI4	0.775	0.287	0.304	0.378	0.286
CI5	0.789	0.388	0.456	0.505	0.355
II1	0.273	0.684	0.277	0.363	0.236
II2	0.278	0.807	0.328	0.365	0.292
II3	0.391	0.818	0.369	0.322	0.301
II4	0.351	0.794	0.326	0.347	0.299
OP1	0.381	0.323	0.616	0.565	0.338
OP2	0.332	0.346	0.661	0.298	0.217
OP3	0.327	0.287	0.823	0.313	0.407
OP4	0.320	0.307	0.853	0.284	0.352
OP5	0.301	0.296	0.801	0.308	0.304
SCC1	0.407	0.313	0.384	0.807	0.377
SCC2	0.393	0.316	0.390	0.764	0.302
SCC3	0.407	0.369	0.359	0.824	0.406
SCC4	0.326	0.378	0.386	0.709	0.349
SCC5	0.380	0.333	0.359	0.698	0.357
SI1	0.229	0.186	0.304	0.299	0.647
SI2	0.294	0.176	0.255	0.255	0.687
SI3	0.325	0.272	0.341	0.380	0.805
SI4	0.296	0.313	0.353	0.385	0.802
SI5	0.329	0.371	0.372	0.412	0.785

Source: SmartPLS output

4.4 Common Method Bias

In the context of PLS-SEM, common method bias is a phenomenon caused by the measurement method used in an SEM study and not by the network of causes and effects in the model being studied. According to Hair et al. (2014) and Rashid et al. (2024c), VIF values should be lower than the 3.3 threshold. This is indicative that the model is free from common method bias. Any value greater than 3.3 means the model is affected by CMB. Table 4 shows all values are lower than 3.3 and free from common method bias except OP3 and OP4.

Table 4: Common Method Bias

	VIF
CI1	1.422
CI2	2.013
CI3	2.166
CI4	1.874
CI5	1.577
II1	1.293
II2	1.676
II3	1.880
II4	1.707
OP1	1.147

OP2	1.357
OP3	3.898
OP4	4.426
OP5	2.068
SCC1	1.880
SCC2	1.733
SCC3	2.024
SCC4	1.447
SCC5	1.385
SI1	1.381
SI2	1.567
SI3	1.887
SI4	1.929
SI5	1.682

Source: SmartPLS output

4.5 Discriminant Validity

The Fornell-Larcker criterion was examined by comparing the correlation between the construct and the square root of AVE. The Fornell-Larcker criterion is designated if the AVE for each multi-item construct is greater than the distributed variance among constructs (Fornell & Larcker, 1981). As shown in Table 5, the square root of the AVE of all the constructs is greater than the correlation between any pair of them, which gives facts of discriminant validity (Fornell & Larcker, 1981).

Table 5: Discriminant Validity

	CI	II	OP	SCC	SI
CI	0.757				
II	0.416	0.778			
OP	0.450	0.419	0.757		
SCC	0.503	0.449	0.493	0.762	
SI	0.395	0.364	0.439	0.471	0.748

Source: SmartPLS output

In Table 5, the square root of AVE appears in the diagonal cells of the Fornell-Larcker criteria table 5, and correlations appear below it. In all value relations, discriminant validity exists if the upper number (square root of AVE) in any factor pier is greater than the numbers (correlations) underneath it.

4.6 Heterotrait-Monotrait Ratio

In PLS-SEM, a novel technique to examine discriminant validity is to generate HTMT ratios of correlations for model assessments. It cannot decide outcomes, expected operational direction, or uncertainty; they have only the result of statistical inconsistency, with discriminant validity established. The HTMT criteria outperform traditional techniques for discriminant validity assessment, for instance, the Fornell-Larcker criterion and cross-loadings, which are typically incapable of discovering discriminant validity needs. Values recommend 0.85, whereas others advocate 0.90. (Lee, 2001). The values in Table 6 are less than 0.85, suggesting that the results are correct.

Table 6: Heterotrait-Monotrait Ratios

	CI	II	OP	SCC	SI
CI					
II	0.535				
OP	0.526	0.522			
SCC	0.589	0.564	0.579		
SI	0.480	0.445	0.528	0.571	

Source: SmartPLS output

4.7 R-Square and Q-Square

R2 for operational performance and supply chain capabilities are about 0.354 and 0.380, meaning that all aspects can account for 35.4% and 38% of the variance in operational performance. Set values of 0.25, 0.50, and 0.75 are used to represent weak, moderate, and strong R2. As a result, 35.4% of respondents believe our model has moderate predictive power.

Table 7: R-Square and Blindfolding

Construct	R-Square	Q-Square
Operational Performance	0.354	0.178
Supply Chain Capabilities	0.380	0.210

SmartPLS output

The Q-square, or cross-validated redundancy, is considered for the four endogenous latent variables in the study to assess their predictive significance. A number larger than 0 indicates predictive relevance; according to Tenenhaus et al. (2005), the values of operational performance and supply chain capabilities are 0.178 and 0.210, as shown in Table 7. All Q-square values are more significant than zero, indicating this study model has appropriate predictive capacity.

4.8 Path Coefficients

After testing convergent validity, discriminant validity, and blindfolding, we perform bootstrapping. Bootstrap examination is a technique to assess the numerical significance of the relationship between path coefficients. By applying PLS-SEM, we represent the hypothesized relationships between the constructs. In table 4.8, all constructions have t-values beyond 1.96 and p-values below 0.05, indicating a substantial positive relationship among variables. As a result, all hypotheses are accepted. Figure 2 illustrates the SEM model.

Table 8: Path Coefficients (Direct Effect)

	Original Sample (O)	T Statistics (O/STDEV)	P Values
CI -> OP	0.187	2.449	0.015
CI -> SCC	0.303	3.994	0.000
II -> OP	0.166	2.263	0.024
II > SCC	0.225	3.308	0.001
SCC -> OP	0.232	2.798	0.005
SI -> OP	0.196	2.571	0.010
SI -> SCC	0.270	3.546	0.000

Source: SmartPLS output

4.9 Indirect Effects and Total Effects

According to table 9, all constructions have t-values beyond 1.96 and p-values below 0.05, indicating a substantial positive relationship among variables. As a result, all hypotheses are accepted.

Table 9: Indirect Effects and Direct Effect

	Original Sample (O)	T Statistics (O/STDEV)	P Values
CI->SCC->OP	0.070	2.316	0.021
II->SCC->OP	0.052	2.066	0.039
SI->SCC->OP	0.063	2.069	0.039
Total Effects			
	Original Sample (O)	T Statistics (O/STDEV)	P Values
CI -> OP	0.258	3.335	0.001
CI -> SCC	0.303	3.994	0.000
II -> OP	0.218	2.941	0.003
II > SCC	0.225	3.308	0.001
SCC -> OP	0.232	2.798	0.005
SI -> OP	0.258	3.440	0.001
SI -> SCC	0.270	3.546	0.000

Source: SmartPLS output

Table 9 indicates the total effect among IV and DV (b-value = 0.258, t-value = 3.440), (b-value = 0.218, t-value = 2.941), and (b-value = 0.258, t-value = 3.335), inferring that the link among IV and

DV is statistically significant. The mediator is then included (b = 0.270; t = 3.546), (b = 0.225; t = 3.308), and (b = 0.303; t = 3.994), and the relationship between IV and DV continues to be crucial. This finding demonstrates that the influence of supplier integration, internal integration, and customer integration on operational performance is fully mediated.

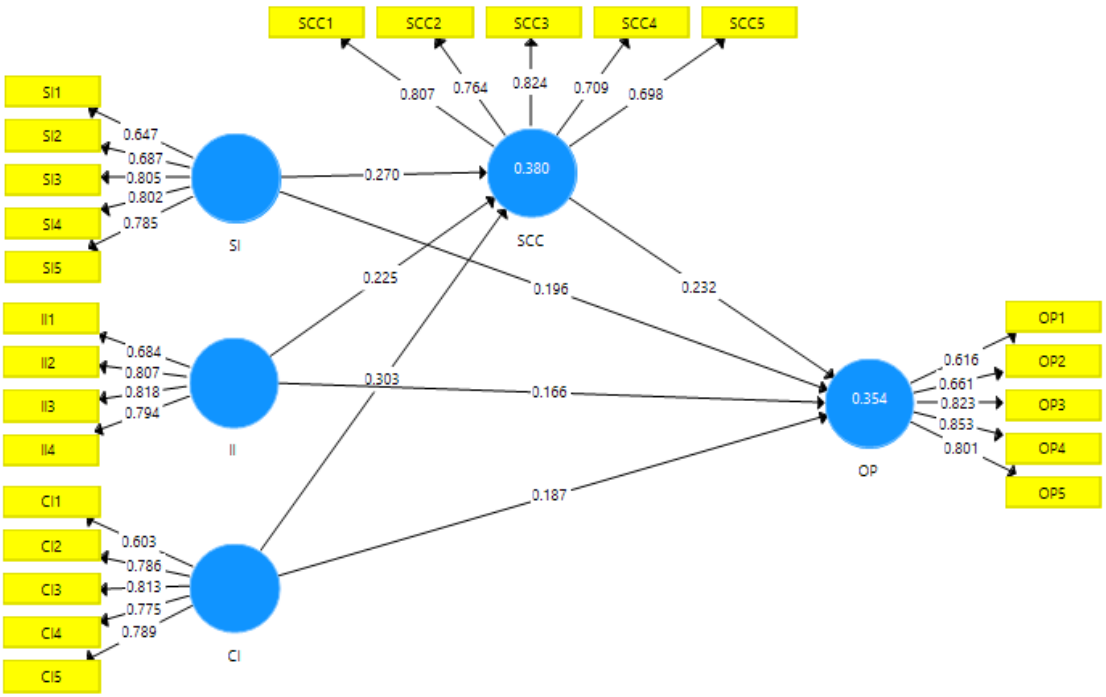

Figure 2: SEM Model

SmartPLS output

Table 10 explains the hypothesis result.

Table 10: Hypothesis testing

Hypothesis	T-Value	Sig Value	Accepted or rejected
H1: Supplier integration significantly influences supply chain capabilities.	3.546	0.000	Accepted
H2: Internal integration significantly influences supply chain capabilities.	3.308	0.001	Accepted
H3: Customer integration significantly influences supply chain capabilities.	3.994	0.000	Accepted
H4: Supply chain capabilities significantly influence operational performance.	2.798	0.005	Accepted
H5: Supplier integration significantly influences operational performance.	2.571	0.010	Accepted
H6: Internal integration significantly influences operational performance.	2.263	0.024	Accepted
H7: Customer integration significantly influences operational performance.	2.449	0.015	Accepted
H8: Supplier integration significantly influences operational performance through the mediation of supply chain capabilities.	2.069	0.039	Accepted
H9: Internal integration significantly influences operational performance through the mediation of supply chain capabilities.	2.066	0.039	Accepted
H10: Customer integration significantly influences operational performance through the mediation of supply chain capabilities.	2.316	0.021	Accepted

Source: SmartPLS output

5. Discussion

This research is important since the body of knowledge on the impact of antecedents of supplier integration, internal integration, customer integration, and supply chain capabilities on SMEs' operational performance is fragmented and, to some degree, ignored (Munir et al., 2020; Kalyar et al., 2019). In comparison to the findings of a prior study (Munir et al., 2020; Rajaguru & Matanda, 2019; Duhaylongsod & Giovanni, 2019), The findings confirmed that all variables are reliable and have substantial connections. H1, H2, and H3 indicate that relationships between supplier integration, internal integration, customer integration, and supply chain capabilities have b-values of (b-value = 0.270, t-value = 3.546>1.96 and p-value = 0.000<0.05), (b-value = 0.225, t-value = 3.308>1.96 and p-value = 0.001<0.05), and (b-value = 0.303, t-value = 3.994>1.96 and p-value = 0.000<0.05), which indicate supplier integration, internal integration, and customer integration have significant impacts on supply chain capabilities. Thus, H1, H2, and H3 are supported. Supplier integration allows suppliers to understand better and anticipate the demands of the firm (Munir et al., 2020). However, another study by Ganbold et al. (2021) said that the corporation develops its production plans and produces things on time through the reciprocal sharing of information regarding products, procedures, plans, and capacities. Customer integration, meanwhile, provides alterations to improve the accuracy of demand information, allowing the plant to cut costs, provide value, and identify demand modifications more quickly.

H4, representing the relationship between supply chain capabilities and operational performance, has a b-value of 0.232, a t-value of 2.798>1.96, and a p-value of 0.005<0.05. Direct supply chain capabilities have a significant influence on operational performance. Therefore, H4 was accepted. This indicates that supply chain capabilities are a collection of controlled and quantifiable facilities, structures, purposes, procedures, or services that enable a supply chain to conduct or attain quality actions or outcomes (Kalyar et al., 2019). However, another study by Hong et al. (2019) proposed that, to our knowledge, few current studies have focused on supply chain skills despite the fact that they may have a considerable influence on operational performance (Hong et al., 2019)

H5, H6, and H7 indicate that the relationship between supplier integration, internal integration, customer integration, and operational performance has a b-value of 0.196 and a t-value of 2.571. 1.96 and p-value=0.010<0.05), (b-value=0.166, t-value=2.263>1.96 & p-value=0.024<0.05), (b-value=0.187, t-value=2.449>1.96 & p-value=0.015<0.05), which indicate supplier integration, internal integration, and customer integration have significant influence on operational performance. Hence, H5, H6, and H7 are supported. The literature on SC integration has been considered to be biased in favour of its good influence on operational performance, yet inconclusive results have been found. According to growing research, SC integration appears to favourably influence operational performance (Flynn et al., 2010; Wong et al., 2011). However, another study by Chavez et al. (2015) said that despite this data, research has yielded equivocal and sometimes contradicting results.

H8, H9, and H10 indicate a relationship between supplier integration, internal integration, customer integration, and operational performance with mediation of supply chain capabilities (b-value = 0.063, t-value = 2.069). 1.96 & p-value=0.039<0.05), (b-value=0.052, t-value=2.066> 1.96 & p-value=0.039<0.05), (b-value=0.070, t-value=2.316> 1.96 and p-value = 0.021<0.05), which indicate supplier integration, internal integration, and customer integration have a significant influence on operational performance through the mediation of supply chain capabilities. Thus, H8, H9, and H10 are accepted. SC integration has the ability to promote the formation of distinctive SC capabilities that can improve operational performance, according to the literature (Rajaguru & Matanda, 2019). However, another study by Munir et al. (2020) said that capabilities ingrained into organizational procedures are more likely to result in the setting of operational performance for a company.

5.1 Conclusion

The research focused on Pakistani SMEs. SMEs must implement integrated systems and supply chain procedures with their suppliers, consumers, logistical services, and banks. This will necessitate SMEs' willingness to share information with their suppliers and customers on demand plans and

forecasts, manufacturing agendas, and delivery networks. It is past time for SMEs to start putting technology at the centre of their plans. While this investment may be prohibitively expensive for SMEs, current research outcomes suggest that SC integration improves performance. The first step in our study is to identify the research problems through a literature evaluation. Hypotheses have been generated to try a conceptual development in terms of the link between SCI and OP under the mediating factor of supply chain capabilities based on further synthesizing a cluster of more relevant literature. The research data suggests that for a successful SCI, researchers should concentrate on supplier integration, customer integration, and internal integration. This study uses a rigorous technique, namely SEM, to determine the relationship between operational performance and SCI. It assists in acquiring a more profound understanding beyond the outcomes of distinct research and serves as a basis for developing theory in this vital field of operations and SCM research. While there is general knowledge of how SC integration affects performance, this study aimed to apply an efficient statistical approach to assessing these interactions.

Supply chain integration (SCI) refers to the manufacturer's and its supply chain partners' strategic collaboration, information sharing, shared decision-making, and system coupling, particularly throughout the manufacturing phase (Kauppi et al., 2016). Some research has looked into the circumstances in which SCI is successful. As a result, sharing resources and capabilities throughout SC has become more significant, as it improves SC capabilities that are necessary for organizational competitiveness and performance (Rajaguru & Matanda, 2019). SC abilities are viewed as essential drivers of organizational performance and subsistence, in addition to maintaining blocks for SCM. The integration of supply chains across SC (Rajaguru & Matanda, 2019) may be used to utilize such capabilities, improving SC resilience and robustness. Supply chain integration also fosters a sense of belonging amongst SC members, motivating them to become more invested and valuable members of certain SCs.

Numerous studies (e.g., Alfalla-Luque et al., 2015; Ataseven & Nair, 2017; Zhao et al., 2013) have empirically examined the association between SC integration and several performance indicators, but the results could be more consistent. For example, Kalyar et al. (2019) and Zhao et al. (2013) found a significant positive impact of SC integration dimensions on performance measures. However, Kalyar et al. (2019) encouraged a significant negative relationship, whereas a few other studies reported an insignificant relationship (Flynn et al., 2010). The imperfect and developing nature of SC integration conceptualization and the varied study environments and performance metrics utilized may be the primary cause of contradictory outcomes (Zhao et al., 2013). As a result, the purpose of this study is to reconsider the causal relationship between supply chain integration (SCI) and SME operational performance (OP) using an empirical instrument to create an analytical model that further depicts and explains the interplay of those three constructs using the full spectrum of supply chain capabilities (SCC) as an exogenous mediating factor.

5.2 Managerial Implications

This research provides numerous insights for managers responsible for managing operations within their firms and beyond the extended supply chain. Managers should be attentive to how the link between SC integration and performance varies depending on the circumstances. The outcomes of this research suggest specific mediating effects that may be enhancing or weakening SC integration and performance correlations. When making SC integration choices, managers must be aware of the requirements of the business environment in which they operate to arrange the extent of cooperation both within and outside. Managers must examine their contextual surroundings and integrate based on popularity or benchmarking projects.

5.3 Limitations

There are certain limitations to this study, and these limitations suggest topics for further investigation. To begin with, the findings are constrained by the fact that they are based on self-reported data. Second, the findings are limited to a single country, Pakistan. Second, some variables, such as

supply chain integration and capabilities, may have a distinct impact in various countries. Finally, the sample size and single-source data are limitations of this study.

5.4 Future Recommendation

This study offers several recommendations for researchers to consider. Firstly, researchers should expand the sample size and focus on a different demographic to explore optimal operational performance outcomes through SC integration (supplier, customer, and internal) and supply chain capabilities. Secondly, objective measurements can be used to complement self-reporting in assessing operational performance, as well as supply chain capabilities and deployment. Additionally, employing multiple informants may yield additional insights into the investigated connection and aid in generalizing the findings in future studies.

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