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MODERATING IMPACT OF SUPPLY CHAIN VISIBILITY ON SUPPLY CHAIN RISK MANAGEMENT AND OPERATIONAL PERFORMANCE: THE ENABLING ROLE OF SUPPLY CHAIN IN FMCG INDUSTRY IN PAKISTAN

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ABSTRACT

In an increasingly volatile and complex business environment, Supply Chain Risk Management (SCRM) *has emerged as a critical strategy for enhancing operational resilience and minimizing vulnerabilities. This study investigates the role of* supply chain integration (internal, supplier, and customer integration) and supply chainvisibility(SCV) *in strengthening risk management and improving operational performance. By integrating various risk mitigation strategies, such as supplier diversification, contingency planning, and advanced digital tools, organizations can reduce supply disruptions, financial uncertainties, and operational inefficiencies.*

Using quantitative research methods*, this study evaluates the relationships between supply chain visibility, risk management, and operational performance in the* Fast-Moving Consumer Goods (FMCG) sector in Pakistan*. The findings confirm that higher levels of* supply chain integration and visibility *lead to improved risk assessment and mitigation, resulting in enhanced efficiency, flexibility, and responsiveness. Moreover,* internal integration plays a pivotal role *in streamlining processes, fostering real-time communication, and enabling firms to adapt swiftly to market fluctuations. This research contributes to the growing body of knowledge on* SCRM and supply chain visibility, *offering practical implications for businesses aiming to strengthen their* risk management capabilities and competitive advantage*.*

INTRODUCTION

1.1 Background of the Study

As the rate of business change escalates, businesses find themselves in conditions which are more volatile and complex. The changes in technology, increased globalization and changing customer needs have greatly influenced the management of affairs in organizations, and thus increased supply chain management as crucial to supporting competitiveness as well as operations. However getting involved with supply chains meant that supply chain risks also increase with the complexity of the chain. It has increased the interest in the supply chain risk management, which aims at the identification and management of hazards in the supply chain that might disrupt its operations. In the modern area of efficient and amenable supply chain networks, visibility in all over the supply chain transactions has become a base for ensuring the success of final product, financial, and information flows within the boundary of supply chain (Ali et al., 2019b). Supply chain visibility (SCV) explained as the ability to gain or share information that is salutary for supply chain operations and give mutual benefit to all supply

chain partners (Christopher and Lee, 2004). SCV bridges the space between expected and actual results, helping to reduce the costs and increase the operational flexibility. It help a holistic approach to view and understanding of supply chain flows—spanning products, information, and finances—from tears of suppliers to downstream customers or consumer.

Researcher indicate that significant benefits of SCV for supply chain performance. For instance, Kurniawan et al. (2017) examined that SCV increase the predictability and enables industries to retain optimal inventory levels. Enhanced SCV has been find that to reduce risks and costs, therefore improving overall firm performance (Christopher and Lee, 2004). Kauffman et al. (2012) explained that the standing of collaborative partnerships in achieving SCV, propose that it importantly for improving responsiveness to customer demands and reducing operational costs, which are censorious for market competitiveness. SCV also minimize repetitiveness in demand management and enhance the production efficiency (Christopher and Peck, 2004). Furthermore, visibility into merchant information helps to know and improve under-performing supply bases, minimizing the costs associated with internal shortfalls (Ali et al., 2020). Given the crucial role of SCV in enhancing strong upstream and downstream relationships, minimize supply chain risks, and adding value to end customers at optimal costs, it is clear that SCV is a important part of an effective supply chain network.

In today's era developing business landscape, Supply Chain Risk Management (SCRM) has become an important practice for firms purpose to increase the resilience and reduce vulnerabilities. Due to increasing globalization and the complexions of supply chains, industries face various risks, some of them supply disruptions, financial uncertainties, operational skillfulness, and external factors (Wagner & Bode, 2006). These risks airs important challenges for businesses, mainly small and medium enterprises (SMEs), which often shortage of the resources to take in unexpected disruptions.

SCRM function is not only to manage risks but also recently acknowledged as a key driver of the Operational Performance (OP) of a firm. OP, usually measured by cost, quality, delivery, and flexibility relates to the extent to which an organization can meet its goals. Research conducted in the recent past has presented SCRM as a core component of the achievement of optimum OP, as risk management efficiency has emerged as a key discriminator in the maintenance of competitive advantage.

1.2 Introduction

Internal integration plays a crucial part in check the efficiency and resilience of supply chains by increasing coordination between different structural units within a firm. It work as the base for supplier and customer integration, facilitating the smooth flow of information and increasing organizations to effectively process, adopt, and act on modality gained from external partners. Internal integration mitigate functional silos and improve real-time communication all over the departments, therefore reducing uncertainty and improving risk management capabilities

Schoenherr and Swink (2012) indicate that internal integration is a key change of supply chain integration (SCI) as it modify a firm's ability to change and exploit information received from external parties. Moe rover , Wong et al. (2011) stated that internal integration develop an environment of practice and shared decision-making, which is crucial for an effective supply chain risk management (SCRM) framework. Dislike its significance, many of the conformable research has mainly focused on supplier and customer integration, even overlooking the role of internal integration in mitigating supply chain risks

Supplier integration is a decisive component of supply chain management, help seamless collaboration between firms and their key suppliers to enhance operational efficiency and rebound. It also add the sharing of information, Decision making, and Process integration to ensure streamlined operations and mutual value creation. In an increasing the dynamic market landscape, organizations rely on supplier integration to reduce the uncertainties, improve responsiveness, and increase overall supply chain performance.

Research shows that supplier integration shows an important role in the supply chain risk management (SCRM) by increasing the visibility, minimize the lead times, and fostering proactive risk reducing strategies . industries that create strong ties with suppliers benefit from better coordination, directing to optimized inventory management, reduced disruptions, and increased agility in responding to market fluctuations (Flynn

et al., 2010).

Furthermore, supplier integration adding to supply chain flexibility, giving rights to firms to adapt to unprintable challenges such as demand changes , production fluctuation, uncertainties.. By positioning strategic objectives with suppliers through collaborative planning and risk-sharing mechanisms, businesses can change their competitive advantage and operational resilience.(Chaudhuri et al., 2018)

This research aim to examine the role of supplier integration in enhancing and improving operational performance. By identify how firms collaborate with suppliers to reduce to risks and raise supply chain efficiency, In today's convoluted and dynamic business condition, **Supply Chain Risk Management (SCRM)** has become a critical strategy for firms to minimize the susceptible and enhance operational resilience. Global supply chains are uncovered multiple risks, including **supply fluctuation, economic unsuitability, financial uncertainties, these all are** of which can manly effect on a firm's performance. These risks indicate the basic for **proactive risk indication, estimation, and minimize the activity** to ensure supply chain continuity and efficiency.(Lavastre et al., 2014; Manuj et al., 2014).SCRM entail **collaborative risk management approaches** among supply chain partners to enhance risk visibility and response ability. By adding the Operations, Procedures, Workflows, Mechanisms, and Systems**,relationships with key supplier and target customer**, organization can enhance information exchange**, improve decision-making, and make possible plans** to minimize the impact of undiscovered disruptions (Jüttner et al., 2003).Regardless of its advantages, executing of SCRM effectively contain a challenge due to **the complexity of supply networks and the** mutually dependent **among global suppliers**. (Christopher & Peck, 2004

A well-managed supply chain significantly adopt to improving operational performance by **minimize the lead times, reduce disruptions, and lean resource allocation** (Flynn et al., 2010). organization that implement **effective supply chain risk management (SCRM) activities** can proactively minimize the risks, thereby upgrade their ability to deliver products and services efficiently.

Furthermore, many researches suggests that **internal, supplier, and customer combine** within the supply chain positively effect on operational performance by **making real-time information sharing and coordinated decision-making**. Firms that acquire **data-driven risk management ability** and leverage digital technologies can more improve their operational resilience, giving them edge them to **respond quickly to market fluctuations and external disruptions**

Supply Chain Integration (SCI) has therefore developed as a central factor that is very key in the enhancement of SCRM and its influence on OP. The term SCI therefore is used to describe the integration of activities of manufacturers, suppliers, and distributors with a common strategic orientation. Overall the way organizations approached the decision making, information sharing and process coordination connected with the supply chain allows for better visibility, flexibility and timely responses. It does of course enhance OP but also fortifies risk management processes thereby rendering SCI as a fundamental prerequisite to efficient SCRM and superlative organizational performances.

As(Barratt & Oke, 2007) stated that Supply chain visibility (SCV) have a critical role in the improving **operational efficient and risk management,** in global supply chains. It indicate that the ability of firm to identify the products, components, and flow of information as they move through the supply chain, from firm to final delivery. The role of SCV has grown remarkably due to the enhancing complexity of supply networks and the need for real-time data access to increase **responsiveness and agility** in vital market conditions.

SCV is fulfil through sharing of the **information, digital integration, and newly added technology and tracking technologies**, helping organizations gain insights into supply and demand changes, inventory status, and potential disruptions.. Research purposed that enhanced supply chain visibility leads to **greater coordination between suppliers and customers**, decreasing the uncertainty and increasing the overall supply chain performance (Barratt & Oke, 2007).reduction of visibility can result in as **bullwhip effect.**

Supply chain visibility indicate positive impact towards supply chain responsiveness by giving organizations to easily adapt to changing market conditions, minimize the risks, and effective resource utilization. Vulnerabilities or risks can not be zero it can be appear at every stage of business

operations, impacting significant challenges to manufacturer of the goods that meet customer expectations (Wagner and Bode, 2006). However , small and medium enterprises (SMEs) are skirmish a variety of exposure stemming from newly technological advancements and globalization (Scannell et al., 2013; Klonowski, 2012). As a decesion, SMEs must identify viable vulnerability mitigation strategies (VMSs) to address these issues and ensure the seamless implementation of their daily operations (Talluri et al., 2013). Researchers, such as Wagner and Bode (2006), continue to re-examine vulnerability frameworks and work toward developing innovative VMSs aimed at reducing supply chain risks (SCR) across organizations. Many businesses find it difficult to adapt their supply chains in competitive and volatile environments. Unlike traditional trade risks, new challenges arise from misalignment within the supply chain (Hearnshaw and Wilson, 2013). These challenges are exacerbated by the inability to trace their indirect causes, which are often hidden and lead to increased SCR. Such risks, recognized as supply chain vulnerabilities, originate from factors affecting both upstream and downstream processes (Chopra and Meindl, 2007). To combat these challenges, organizations must prioritize exploring effective VMSs, as they are essential for strengthening the performance of SMEs. Consequently, additional research is needed to better understand the influence of VMSs on organizational outcomes.

1.3 SIGNIFICANCE OF THE STUDY

This research builds upon earlier studies by investi gating the connections between internal integration, customer integration and supplier integration on Supply chain visibility on supply chain risk management and the operational performance within the context of the supply chain.This analys is examines the relationship between supply chain visibility an supply chain risk management on operational performance, determining whether these factors w ill enhance or weaken their connection. The research results will contribute to mitigate the risk and enhance

1.4 Research Gap

Even the growing body of literature on **supply chain integration** and its influence on **operational performance**, there remains a lack of comprehensive understanding of the mediating role of **supply chain visibility** and its interplay with other integration dimensions, therefore this research aim to identify the integration impact of the internal integration, customer integration, supplier integration and supply chain visibility on supply chain risk management and operational permanence .

1.5 Problem Statement

In today's complex and dynamic business environment, organizations face many challenges in managing their supply chains effectively. Supply chain integration, encompassing internal, supplier, and customer integration, has been identified as a critical enabler of seamless operations and improved performance. However, the extent to which integration practices enhance supply chain visibility remains unclear, particularly in achieving transparency across product, information, and financial flows. Additionally, while supply chain visibility is recognized for its role in mitigating risks and improving responsiveness, its influence on supply chain risk management lacks thorough exploration.

Furthermore, operational performance, a key indicator of organizational success, may benefit from the mediating role of supply chain visibility in the relationship between integration practices and performance outcomes. This gap in understanding creates a pressing need to investigate how supply chain visibility bridges the connection between integration strategies and operational efficiency. Addressing these issues is crucial for organizations striving to optimize their supply chains in an increasingly competitive and risk-prone global market. This research seeks to fill these gaps by examining the influence of supply chain integration on visibility, the role of visibility in risk management, and its mediating effect on the link between integration and operational performance. However some firms do put this in practice so this research will analysis the following research gape

What is the influence of supply chain integration (internal, supplier, and customer integration) on supply chain visibility?

What is the role of supply chain visibility in enhancing supply chain risk management?

What is the mediating effect of supply chain visibility on the relationship between supply

chain integration and operational performance?

1.6 Objectives of Research

This study will address the following research obje ct:

To establish a clear definition of the concepts inv olved (internal integration, supplier integration customer integration, supply chain visibility and supply chain risk management on operational performance) and to assess the impact of supply chain visibility on supply chain risk management and operational performance

1.7 Limitations of Research

While carrying out the research there were various limitations that were encountered. The main one is that the topic is not common for many people in the industry; the concept of "visibility" may have been adopted by firms but they are not aware of the particular word and only some examples and data was gathered through an explanatory research. This led to a reduction to the targeted population as well as sample size that decreased respondents and participation in this research, although we choose convenience sampling techniques where there are no restrictions but still this is a problem. Time constraint is also a limitation for this study that we are not able to collect more data and information for further implications. More limitations are the financial support and the security purpose results in lacking resources as many research papers have restrictions of payments so we are not able to gather more knowledge in reference with our research

1.8 Thesis Structure

The following sections of the particular research will be in the manner. Section II will be a comprehensive literature over the respective subject. Section III, will demonstrate an in-depth explanation of the methods used in this study. Next, section IV shows the results and section V looks into the discussion of those outcomes. Section VI concludes the research with the constraints and recommendations

Literature Review

2.1 Internal Integration in Supply Chains

Internal integration can be explained as the degree of communication and collaboration between two or more than two departments within an organization to perform seamless information flow and operational efficiency. It require aligning processes, technology, and decision-making frameworks in all the different functional areas, increasing firms to efficient responsiveness and reduce inefficiencies (Schoenherr & Swink, 2012). Effective internal integration empower organizations to give edge to real-time data-sharing, cross-functional teamwork, and systematize workflows, leading to enhanced supply chain performance.

Many research indicate that firms with higher levels of internal integration lead to exhibit greater supply chain flexibility and responsiveness. This is due to well-integrated internal systems encourage an environment where data is regularly shared and used for decision-making, mitigate the risks of miscommunication and abnormalities (Zhao et al., 2011). By smoothing flow of information, internal integration reduce the bottlenecks and enhance a firm's ability to manage abnormalities in supply and demand effectively.

Supply chain visibility (SCV) indicate to the approach of a firm to identify materials, information, and product movement in real-time across different stages of the supply chain. A maximum approach of visibility shows that organizations can anticipate disruptions, optimize inventory levels, and respond proactively to fluctuations in demand (Barratt & Oke, 2007). The focus of SCV is directly engage to the information-sharing procedure, which give firms to add insights into supplier activities, logistics performance, and customer demand patterns

Studies indicate that enhanced supply chain visibility contributes to greater operational efficiency, risk mitigation, and supply chain agility (Wei & Wang, 2010). Organization that execute high tech tracking systems and merged with IT solutions can significantly increase their responsiveness, reducing the delays and efficient their supply chain processes.

Internal integration is main driver of supply chain visibility. Firms that have a higher degree of internal alignment among across departments are best positioned to collect, analyze, and distribute accurate supply chain data (Williams et al., 2013). Productive integration helps seamless information-sharing, eliminating irrelevant data and improving end-to-end supply chain transparency.

When internal departments are lineup, organization can more effectively leverage visibility

tools to detect disruptions early, respond to market fluctuations, and optimize resource allocation (Sabet et al., 2017). Many companies that integrate internal structure with visibility- increasing technologies realize higher levels of efficiency, reduced risks, and improved decision-making capabilities.

Supply chain visibility (SCV) refers to a firm's ability to track and monitor supply chain activities, ensuring real-time access to information about inventory levels, production status, and logistics operations. SCV enhances an organization's capability to make proactive decisions, optimize resource utilization, and mitigate risks associated with supply chain disruptions (Wei & Wang, 2010)

Research highlights that high supply chain visibility leads to better coordination among supply chain partners, improved responsiveness to market changes, and enhanced decision-making (Barratt & Oke, 2007). It plays a crucial role in reducing the bullwhip effect, which occurs due to misalignment in demand signals across the supply chain. Enhanced visibility ensures that firms have timely access to critical data.

Therefore it is hyphothesised that H1 Internal integration has positive relation with supply chain visibility

2.2 Supplier integration and supply chain visibility

Supplier integration have very important role in increasing the performance of supply chain (SCP) by enhancing the efficiency, responsiveness, and overall operational effectiveness. Sezen (2008), organization integrate with the suppliers effectively to improve flexibility, cost reduction, and reliability, leading to enhanced SCP. whereas Supply Chain Operations Reference (SCOR) model can be used to examine supplier integration, measuring performance into reliability, responsiveness, agility, asset management, and cost (Supply-chain Council, 2011). Structural Equation (Li & Chen, 2001).examined that higher the supplier integration can impact in reduce the cost and the lead time from supplier to manufacturing, whereas the , challenges will be there to identify the direct effects of supplier integration due to the lack of clear cause-and-effect relationships among SCP metrics Bourne et al. (2003). Having these challenges, research suggests that firms should focus on strategic supplier partnerships and data-driven performance measurement frameworks to optimize SCP and sustain long-term competitiveness

Supply chain visibility (SCV) and supplier integration (SI) have very important role in improving the performance of the supply chain, minimizing the bottleneck and increasing collaboration. Supply chain visibility can be define as the how much firm have access real-time data across the supply network, for the decision-making, minimizing the risk and operational efficiency (Pradhan & Routroy, 2018). Whereas Supplier integration indicate the strategic collaboration, sharing of the information, and allocation of the resource between supplier and the manufacturing, to increase the agility and the responsiveness (Caridi et al., 2010). As increasing of advance technology technology-driven visibility mechanisms, such as RFID, IoT, and inventory software, enables seamless information exchange, reducing inventory costs, stock-outs, and demand fluctuations (Delen et al., 2007). Whereas, some hurdle also face such as as data accuracy, trust issue, and higher costs often hit the visibility and integration (Francis, 2008). Effective supplier development programs (SDPs) shows long-term relationship that increase the accuracy, quality of the product, and innovation (Rajaguru & Matanda, 2013). Overcoming the problems of demand and inventory, increasing the accuracy of the further forecast, and decreasing the levels of the inventory are all tied with the concept supply chain visibility, or SCV. Nevertheless, most of the supply chains don't have SCV metrics the issue for the management. To preview SCV's attributes and analyze how the subsequent chapters would identify metrics for estimating its value to the success of companies, this paper reviews the literature. The information is categorized into three main categories Of the three dimensions of resource quality, namely quality, usefulness, and accessibility, Griffiths (1996) stated that the LD imperative has been most sensitive to the former, quality. The purpose of the study is therefore to come up with practical calibration standards for the characteristics as well as effectiveness of SCV. (somapa et al., 2018)

As supply chains become leaner, visibility becomes important to achieve the cost leadership, effective use of resource and ensuring competitiveness advantage (Wagner, 2006). The Interpretive Structural Modeling (ISM) approach indicate that

market uncertainty and resource sharing are the critical factor of supplier integration and visibility, influencing broader supply chain performance metrics (Pradhan & Routroy, 2018).

Therefore it is hyphothesised that **H2 Supplier integration has positive relation with supply chain visibility**

2.3 Customer Integration and Supply Chain Visibility

Supply chain visibility (SCV) is a critical factor in modern supply chain management, allowing businesses to increase efficiency, accuracy, and customer integration .Musa et al. (2014), SCV can be explained as the ability organization to know and track the products by their life cycle , from factory to en consumer, also track the returns and EOL(end of life) processes. This tracking s very important for improving operational processes, reducing bottlenecks, and ensuring real-time responsiveness to customer demands. The integration of newly technologies, Customer integration within the supply chain indicate supply chain operations with customer expectations, allowing that businesses always remain responsive to customer market demands. Musa et al. (2014) shows that increasing visibility better for customer integration by providing accurate and real-time information about product availability, delivery schedules, and potential bottleneck. Through SCV, a newly model can be developed as supply chain model change to customer driven model where demand occurs production can be done s per demand of the customer that have positive to words reduction of inventory, This model minimizes excess inventory, lead times can be reduce, and increase overall customer satisfaction. Also, real-time data sharing allows customers to access self-service tracking systems, providing them with greater control over their orders and improving the overall service experience (Musa et al., 2014). Supply Chain Management (SCM) is gaining importance based on reasons such as raising consumers' satisfaction, escalating competition, and rising internationalization of the market. Because visibility influences the efficiency of every aspect in the supply chain, it is one of the major areas of interest in SCM research. Visibility takes the relationship from cooperation to coordination and full collaboration of supply chain links. This is still the case in global supply networks even today: Timely and reliable information is still hard to come by. One of the most important of the factors leading to increasing visibility down the chain is the advent of new Information and Communication Technologies – ICTs. This will translate to more attention being paid to solutions like the Radio Frequency Identification, Electronic Data Interchange, and the Enterprise Resource Planning among others. Nevertheless, for managers to feel comfortable with their investment, they must understand the benefits accruing from investments in ICT. The integration of SCV into supply chain management has also showed that instrument in increasing collaboration among customer and firm. By giving access such as the EPC global Network, Firm, can share standardized information related to product, adding coordination across all the stockholder of supply chain manufacturers, suppliers, logistics providers, and retailers (Musa et al., 2014). This changes allow businesses to respond quickly if there is changes in customer preferences, demand fluctuations, and supply chain disruptions. Furthermore, supply chain risk management benefits significantly from SCV, as businesses can identify potential abnormalities, protect risks, and proactive approach to mitigate the risk (Musa et al., 2014) There are numerous advantages, implementing SCV and customer integration have manly challenges. Musa et al. (2014) refer that many firm don't have accuracy in data integration to Show the accuracy of systems that lack interoperability. Moreover, the starting investment in SCV technologies, manly in RFID and tracking sensor networks, can be a barrier for small and medium-sized enterprises. Secondly manly concern is data protection and data reliability. . Mention these challenges requires firms to adopt SOP, invest in secure cloud-based SCV solutions, (Musa et al., 2014) Furthermore SCV and customer integration may be in the adoption of newly technologies as block chain, artificial intelligence (AI), and 5G connectivity. Block chain can be refer as protection of data and provide an accurate record of product movements, increasing trust and clarity among supply chain participants (Musa et al., 2014). AI-can be analytic can accurate demand forecasting, showing businesses to know customer needs with accuracy. Lastly, the advent of 5G technology will increase real-time tracking with minimal error, further advantage the responsiveness of supply chain networks. (Musa et

al., 2014).

Capitalising on the above literature, a hypothesis is developed

H3 customer integration has positive relation with supply chain visibility

2.4 Supply chain Visibility and Supply chain Risk Management

Risk management is critical so that supply chains can be run effectively given many uncertainties that are apparent. Several researchers have over the past several years focused on SCRM, and made key efforts in the formulation of definition and measures to address risks. By way of this paper, we offer a systematic review and integration of the extant research that has been conducted in SCRM in the past decade. The objective of this paper is three fold. First, we provide an annotated bibliography of SCRM articles that have appeared in the literature during 2003 through 2013.

For this reason, many forms of businesses also applied different strategies such as outsourcing manufacturing or product diversification to gain more market shares and reduce costs. Such programmers are effective in steady conditions; however, they make a supply chain more vulnerable to various types of disruptions caused by unpredictable market situations, customer preferences' changes, and other natural and man-caused disasters. In this research we compare and analyses various quantitative models for supply chain risk management. We also benchmark the different SCRM methods that have been discussed in the literature with empirical work. The objective of this paper is three-fold. First, we put forward a general classification system for SCRM articles. Second, of course, we wish with our review some scholars found their way through the flood of research articles in this filed. Hence supply chain risk management (SCRM) is a fairly new discipline that has evolved from the appreciation of supply chain risk by both academics and industrialists. However, as for different areas have been used by these academics to investigate this field, thus there are more or less conflicting views on supply chain risk research. This paper reports on our investigation on this variation from the viewpoints of academics studying supply chain and operations management: First of all, let us discuss the research and, respectively, the most recent research-based literature by the researchers themselves. We then surveyed participants of the two focus group; the Supply Chain Thought Leaders and the International SCRM using open-ended questions. Finally, we surveyed academic scholars specializing in supply chain and operation management. at San Diego where the 2009 INFORMS meeting was held. Three "gaps" best describe the diversity according to our findings: An explanation which is devoid The development in the context of supply chain risk management (SCRM) research that has attracted a great deal of interest in several parts of the world in the recent past. To accomplish the research job citation/co-citation analysis and literature survey are used. For the literature review of supply chain operations management, a review of papers in a number of selected journals has been undertakers. Citation/co-citation analysis is done on Web of Sciences database to show the development of SCRM from 1995 to 2009. The same trends of rising publications over the last fifteen years can be observed for both of the methodologies. In this review, our capacity to identify possible risk related to different forms of flow – material, financial, and information – has been exercised. Nevertheless, it is discernible that there are a few research lacunae of which of the following can be highlighted. However, the research 'finds that there is a great demand for and awareness of SCRM', hence the present study.

The threats facing supply chain management that relates to its global nature have led to dialogue among academics and practitioners. This is evidenced by growing business risks in supply chain management which threaten the totality of the economy and network flow. The objective of this research is to establish a critical literature analysis of risk variables in supply chain management in a competitively exposed and volatile market. To select papers for theoretical assessment, those were identified, whose abstracts, titles, and keywords contained the term 'risk'. A management of risk in the supply chain is an integral part of the overall supply network. Supply chain organizations, as a result of globalization and national economic policies that have introduced uncertainty and organize barriers for supply chain organizations, meet unforeseen challenges. These have a social effect on the performances of the organizations and the economy of a nation. Thereby, a positive link btween

H4 Supply chain Visibility have positive relation with Supply chain Risk Management

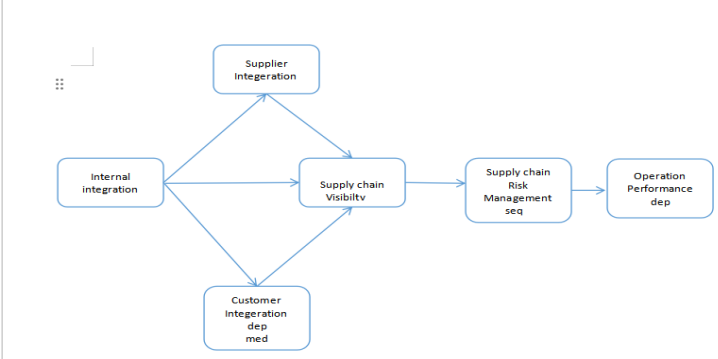
2.5 Supply chain Risk Management and operation Performance

Supply Chain Risk Management (SCRM) is increasingly recognized as a critical factor in improving operational performance by reducing disruptions and enhancing supply chain resilience. Ritchie and Brindley (2007) propose a Supply Chain Risk Management Framework that identifies five key components: risk drivers, risk management influencers, decision-maker characteristics, risk management responses, and performance outcomes. The study also examined that effective risk management activities not only reduce any threats but also increase operational performance by enhancing the decision-making and optimizing supply chain process. The study indicate that firms need to balance their risks and rewards, knowing portfolio effects, and account for timescales to introduce robust risk responses.

Aghapour et al. (2017) empirical study supporting that positive relationship between SCRM and operational performance through a survey of manufacturing SMEs.Aghapour et al. (2017) used e Supply Chain Operations Reference (SCOR) Model, to finds that high risk identification leads to know risk assessment, which enhances risk mitigation strategies. Findings indicate that firms that are focusing on structured risk management practices, such as pool of supplier , inventory controlling system, and contingency planning, can achieve best supply chain reliability, flexibility, responsiveness, cost efficiency, and asset utilization. Supply Chain Risk Management (SCRM) plays important role in increasing the operational performance by reducing the disruptions and improving supply chain efficiency. Many Studies indicates that supply chain risks, supply uncertainties, demand changes, and firm internal process and bottleneck, negatively impact on operational performance by increasing the more costs, reducing productivity, and increasing the lead time (Chen et al., 2013). The Theory of Swift, Even Flow indicate that higher the variability in supply chain networks leads to lower performance, increasing the need for effective risk mitigation strategies. (Chen et al., 2013) prove that firms adopting advance SCRM activities, such as supplier collaboration, demand forecasting, and process optimization, trend supply chain professional improved operational efficiency, reliability, and cost-effectiveness. Supplier collaboration helps to maintain quality and timely delivery, where as customer collaboration increase demand predictability, and internal coordination reduces process inefficiencies and any abnormalities in the process , leading to smoother operations (Chen et al., 2013). Furthermore, supply chain visibility (SCV) through real-time data sharing and digital analytics enables firms to anticipate and manage risks more effectively, minimizing disruptions and enhancing decision-making. Studies on manufacturing firms confirm that process risk and demand risk have a direct negative impact on supply chain performance, while strong risk mitigation efforts contribute to better responsiveness, resilience, and customer satisfaction. As businesses face increasing uncertainties due to globalization and market volatility, integrating SCRM with digital technologies and strategic collaboration has become essential for sustaining competitive advantage and achieving long-term operational excellence.. The findings underscore that effective SCRM not only prevents disruptions but also contributes to overall operational efficiency, making it a crucial component of modern supply chain strategy.

H5 Supply chain Risk Management have positive relation with operation Performance

Figure 01 Research Model



Research Methodlogy

This section entails the details regarding the methods that will be used when the research will be conducted.

3.1 Research approach:

Based on the available research on Supply chain risk Management and Business performance, a quantitative study is the best way to see if there is a connection. Any potential association between the variables will be organized and interpreted using statistical results. (SOBOTKA, 2019). To resolve the research questions, This study used a quantitative approach method. The technique used in this data was quantitative to collect data from the target population via questionnaire to know the impact of supply chain visibility on supply chain risk management and business performance also to know the impact of internal integration and supplier integration on supply chain visibility. Peter and Olson (1983), the hypothesis is generated before testing and finalizing the results in deductive research. The analytic research begins with a strong theoretical base and the presentation of indicators (Danermark, 2001). In explanatory design, Author first collect quantitative data and examined it, then create thortical data based on the quantitative data, that can provides quantitative results with a greater understanding. The process of item involves using numerical data or exploring questions that are further required in qualitative data (Creswell et al, 2003). To create the relationships and findings, the explanatory design is used. These approaches we are taking in this study is deductive, where an already developed theory is used for further research, and explanatory, where a lot of information is already known, and then further explanation is provided in the study.

3.2 Research design:

Research design provides the framework of research methodology. The problem statement of our research will determine the type of design for our research. The research design is a component of research methods and approaches selected by a researcher. An effective research design makes sure that there must be minimum bias in data and maximize the accuracy of the collected data. The error margin is very low, and the researcher gets the desired outcomes. Correlational research design is used to establish relationships between two or more variables. This design aims to check whether there is a positive relation or negative relation among the variables. The design of this study is correlational, the non-experimental design where we are interpreting the impact of lean warehousing activities in the retail industry on enhancing business performance.

3.3 Sample design:

The FMCG industry of Pakistan has above 3 million shops in it, offering basic products such as clothing, food, beverages an. It was difficult to cover all the FMCG companies in the FMCG industry that are our target population. Therefore, the companies that are taking advantage of Supply chain risk management in Pakistan market are selected to be studied as a sample for this research. The target population for this survey and research were employees at managerial, mid and lower level who are working in FMCG industry because they know more about the concept of FMCG concept. A sample of 100 responses was collected from the target population. The sampling technique used was non-probability-convenience and purposive in particular because of the cost, degree of use, benefits, and time restrictions and also because a specific kind of characteristics of the sample were responding to the survey i.e., warehouse employees. Social media websites such as Facebook, Whatsapp were used to reach out to the employees in the FMCG industry of Pakistan through convenience sampling.

3.4 Instrument of data collection:

The impact of Moderating impact of Supply Chain visibility on Supply chain risk Management and Operational Performance: The enabling role of supply chain assessed by selecting a questionnaire as the primary method of data gathering. The questionnaire was developed on google forms. The demographic part of the questionnaire asks respondents for their name, designation and years of service gender. The questionnaire had more than 24 questions and was broken down into six sections (Internal Integration, supplier integration, customer integration, supply chain visibility, Supply chain Risk Management and Operation Performance). The respondents were given a 5-point Likert scale to answer the questions (1 = strongly disagree; 5 = strongly agree)

3.5 Procedure of data collection:

A questionnaire was adopted as an instrument of data collection. The data was collected specifically from the employees working in Supply chain Department in the FMCG sector because our research is basically about the Moderating impact of Supply Chain visibility on Supply chain Risk Management and Operational Performance: The Enabling Role of Supply Chain in FMCG sector in Pakistan at first, we identified and approached the target people in our family, friends, and social circles to fill out the questionnaire and then used their contacts and references to reach out to the others to get the desired number of responses. The questionnaire is designed in such a way that has a separate section of dimension covering all four dimensions of lean warehousing. Our primary source of data is the valuable responses on our questionnaire whereas, we also reached out to some research papers that are published in HEC recognized journals.

3.6 Statistical techniques:

To analyze, interpret, and present the findings, the data was examined using the following statistical techniques. Descriptive analysis is conducted to answer a phenomenon by questioning what, when, how, who and where. It is used in this research to describe samples to identify causal effects (GILLETTE, 1984). Structure Equation Modelling (SEM) is a statistical technique through which the relationship between independent and dependent variables is analyzed. The respective methodology was used due to the convenience of distributional assumption, capability to take up small sample and to systematically measure the questions (Haier et al,. 2014 and Oyewobi et al., 2017). The data gathered was analysed via SmartPLS; its path model, according to Ma (2014), comprises two models of linear equations namely an outer model and an inner one. As per the Figure 1 in the literature review, the model was developed wherein the rectangular boxes refer to the relevant indicators and the straight arrows indicate the relation between them. Jointly analyzing for any error in measurements, linear causal relationships among all variables of the research model are examined through SEM (Hancock et al., 2019). Reliability analysis helps you to understand the characteristics of measured variables and the elements that make up the scales. A range of widely used scale reliability variables are calculated by the reliability analysis process and information is also provided on the relationships between individual items on the scale. Validity analysis ensures that the methodology used to calculate the result was effective or not. If the research done is very valid it tells that the results obtained link with the properties, characteristics, and variables included in the research paper. It is harder to evaluate the validity of a research paper but is also very important. The methodology used in the research paper must be valid to achieve an accurate result.

3.7 Ethical considerations:

The following ethical issues were put into consideration while performing this research: Confidentiality of respondents' profiles was considered. Respondents were free to decide to participate in the research and no pressure was built. No private questions were asked in this research. No information connected to the respondent is written in the paper. The questionnaire is designed in a way that it collects data through very generalized questions.

Results and Findings

4.1 Measures Utilized

Table one shows that the measurement of six variables in the study, every variable checked using Main four Key standardized Variable from authentic sources to assure validity and reliability. Internal Integration (II), Customer Integration (CI), and Supplier Integration (SI) are measured using items from Braunscheidel & Suresh (2009) and Closs et al. (2005), the main focui on collaboration and sharing of the information within the organization, with stackholder , with customer, and with suppliers, respectively. Where as Supply Chain Visibility (SCV) is analyzed using questions from Srinivasan and Swink (2018) to elaborate transparency and having clarity to critical supply chain information. Supply Chain Risk Management (SCRM) use items from Chaudhuri et al. to exmined the practices for knowing and minmizing the risks. In last, Operational Performance (OP) is measured using items from Shou et al. (2018) to measure efficiency, flexibility, and responsiveness. These standard jointly form the base for examining of the to know the relationship among the variables in the supply chain context.

Table No 01

Codes	Variables	Items	Source
II	Internal Integration	4	Braunscheidel & Suresh, 2009; Closs et al., 2005
CI	Costumer Intégration	4	
SI	Supplier intégration	4	Braunscheidel & Suresh, 2009; Closs et al., 2005
SCV	Supply Chain Visibility	4	Srinivasan and Swink (2018)
SCRM	Supply chain Risk Management	4	Chaudhuri et al
OP	Operational Performance		(Shou et al., 2018

4.2 Demographics

The respondent for this survey includes 10o people associated with the FMCG industry.

The sampling population was derived using a non-probability sampling procedure. The respondents of the survey were 71% male and 28.6% female. Out of them, 40% belonged to the managerial position, 18.1% were middle level warehouse operators, 24.8% were the other, and the rest such as incharge, assistant managers, material control officer comprise . Most of the participants (42.9%) have worked for 1-3 years, followed by those (39%) who have 2-6 years of duration of service and the rest have worked for short duration such as 13.3% for 7-10 years, 0.9% for less than 1 year and 3.8% for more than 10 years. All the respondents work in a warehouse environment providing insights about the practices and activities taken place in therein, relevant to the subject of research.

Table No 02

Items	Classification	Sample Amount	Percentage
Gender	Male	82	71%
	Female	34	29
	Employee		24.8
	Top-Level Manager	50	43
Désignation	Mid- Level	37	18.1
	Others	25	24.8
	Less than 1 year	38	42.9
Year Of Service	Less than 3 Year	66	39
	Less than 5 year	18	13.3
	Less than 7 year	9	0.9
	Above 7 Year	3	3.8

4.3 Validation of the model

The validation of the approved model explained strong reliability and convergent validity across all variables, comparing with thresholds established in prior research (e.g., Fornell & Larcker, 1981; Nunnally & Bernstein, 1994). The Cronbach's alpha values for the in dependent variable named as internal integration (0.75), where as supplier integration (0.85), customer integration (0.88), supply chain visibility (0.83), and lastly supply chain risk management have (0.85), all have greater value then the threshold of 0.7, that showes high internal consistency. Secondly, the average variance extracted (AVE) values for all variable stands the minimum benchmark of 0.5, showing that a real portion of the variance in observed variables is explained by their several latent items. The sample mean values across all construct is very high as compare to threshold, a strong level of statement among respondents regarding practices such as sharing of the information, decision-making, communication

with Key suppliers and customers, knowing supply chain activities, and having strong knowledge about the risks. These results showed the strength of the measurement model and its suitability . The validation of the measurement model showing strong reliability and merging validity across all items, aligning with thresholds established in prior research (e.g., Fornell & Larcker, 1981; Nunnally & Bernstein, 1994). Cronbach's alpha values for internal integration (0.75), supplier integration (0.85), customer integration (0.88), supply chain visibility (0.83), and supply chain risk management (0.85) all are grater then the threshold of 0.7, that's confirming high internal consistency. Secondly, the average variance extracted (AVE) values for all item is greater the the least benchmark of 0.5, showing that a substantial portion of the variance in observed variables is explained by their respective latent constructs. Moreover the sample mean data across all items reflecting a strong level of agreement among respondents regarding practices such as information sharing, decision-making, collaboration with suppliers and customers, monitoring supply chain activities, and managing risks. These results affirm the robustness of the measurement model and its suitability for further analysis, such as structural equation modeling, to explore relationships among constructs.

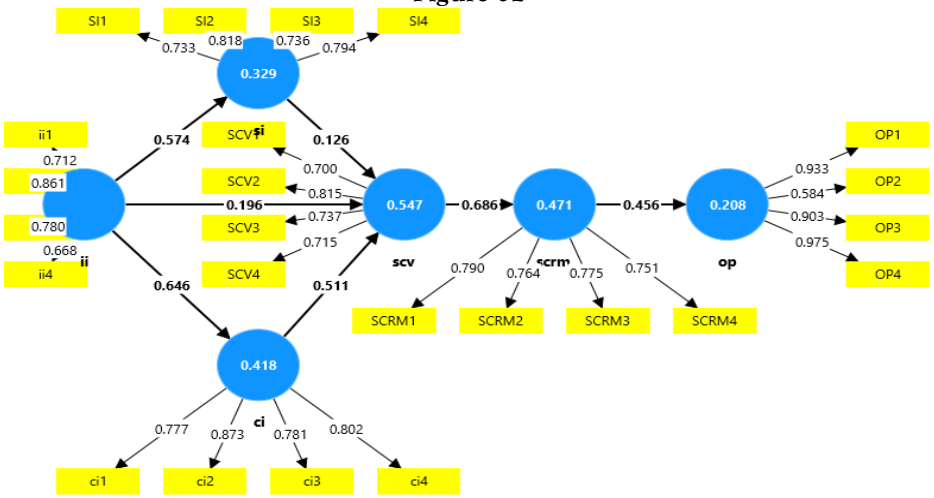
Table 03

Construct	Questions	Sample mean (M)	Cronbach's alpha	Rho C	AVE
Ii	We share information with the purchasing department regarding sales forecasts, production plans, production progress, and stock levels.	0.712	0.75	0.843	0.576
	We engage in joint decision-making with the purchasing department on sales forecasts, production plans, and stock levels.	0.861			
	We share information with the sales department on sales forecasts, production plans, production progress, and stock levels	0.78			
	We engage in joint decision-making with the sales department on sales forecasts, production plans, and stock levels	0.668			
Si	we frequently share information with our key suppliers (such as sales forecasts, production plans, order tracking, tracing, delivery status, and stock levels)	0.733	0.772	0.854	0.595
	We develop collaborative approaches with key suppliers	0.818			
	we often engage in joint decision-making with key suppliers regarding product and process design, quality improvement, and cost control	0.736			
	we often integrate our system with with key customers (e.g., through vendor-managed inventory, just-in-	0.794			

	time, Kanban, or continuous replenishment)				
Ci	we often share information with our key customer	0.777	0.823	0.883	0.655
	We develop collaborative approaches with key customers, such as risk and revenue sharing and establishing long-term agreements.	0.873			
	We engage in joint decision-making with key customers on product design, modifications, and process changes design/modifications, quality improvement, and cost control	0.781			
	We implement system coupling with key customers through methods such as vendor-managed inventory, just-in-time, Kanban, and continuous replenishment.	0.802			
scv	We and our partners communicate future strategic needs	0.7	0.728520672	0.831	0.552
	We continue to improve the integration of activities across the supply chain	0.815			
	We and our partners collaborate to monitor product movement	0.737			
	We respond to operational risks by utilizing backup suppliers, maintaining extra capacity, and arranging alternative transportation.	0.715			
scrm	We prevent operational risks by selecting more reliable suppliers, implementing clear safety procedures, and conducting preventive maintenance.	0.79	0.771783389	0.854	0.594
	We detect operational risks through internal and supplier monitoring, inspections, and tracking	0.764			
	We and our partners share knowledge of core business process	0.775			
	We and our partners keep each other informed about the customer's future needs	0.751			
OP	We are focused on continuously improving our performance standards.	0.933	0.771783389	0.854	0.594
	We are open to new ideas and approaches to improve outcomes.	0.584			

	We are focused on meeting deadlines without compromising quality	0.903			
	We are focused on building long-term relationships with our customers	0.975			

Figure 02



4.4 Discriminant Validity

The table demonstrates discriminant validity based on the **Fornell and Larcker (1981)** criterion, as the square root of the AVE (diagonal values) for most constructs is greater than their correlations with other constructs (off-diagonal values). This indicates that each construct is distinct from the others. However, a slight issue arises between **Supply Chain Visibility (SCV)** and **Operational Performance (OP)**, where the correlation (0.749) exceeds SCV's AVE square root (0.743), suggesting potential overlap. Overall, the constructs show good discriminant validity, with minor concerns requiring further investigation. The validation of the measurement model demonstrates strong reliability and convergent validity across all constructs, aligning with thresholds established in prior research (e.g., Fornell & Larcker, 1981; Nunnally & Bernstein, 1994). Cronbach's alpha values for internal integration (0.75), supplier integration (0.85), customer integration (0.88), supply chain visibility (0.83), and supply chain risk management (0.85) all exceed the threshold of 0.7, confirming high internal consistency. Additionally, the average variance extracted (AVE) values for all constructs surpass the minimum benchmark of 0.5, indicating that a substantial portion of the variance in observed variables is explained by their respective latent constructs. The sample mean values across all items highlighting a strong level of agreement among respondents regarding practices such as sharing of the information, decision-making among the department, collaboration with key suppliers and customers, over viewing supply chain operation, and managing risks.

Table 04

	ci	ii	op	Scrm	scv	si
Ci	0.809					
Ii	0.646	0.759				
op	0.482	0.456	0.863			
scrm	0.737	0.695	0.456	0.77		
scv	0.71	0.599	0.749	0.686	0.743	
si	0.574	0.574	0.355	0.68	0.532	0.771

4.5 Hypothesis testing

The table provides a detailed analysis of the significance of relationships between key factors in supply chain management, based on P-values. The significance threshold is set at **0.05**, meaning that any P-value below this level indicates a statistically

significant relationship. These relationships are critical to understanding how internal integration (II), customer integration (CI), supplier integration (SI), supply chain visibility (SCV), supply chain risk management (SCRM), and operational performance (OP) interact within an organization. **Internal integrationa and customer integration (P = 0.0000)** The P-value is highly significant, indicating that internal integration (II) has a strong and reliable impact on customer integration (CI). This suggests that when internal processes are well-coordinated, organizations are better able to collaborate and align with their customers, improving communication, demand alignment, and overall customer relationships.**Internal integration and Supplier integration (P = 0.0000)** the relationship between internal integration (II) and supplier integration (SI) is highly significant. This demonstrates that strong internal alignment positively influences the ability to integrate suppliers into the supply chain network. This can lead to better collaboration, efficient procurement processes, and enhanced supplier performance.Internal integration and Supply chain vibility have P Value **0.041 that** indicates a statistically significant relationship, though the impact is weaker compared to the relationships with CI and SI. This finding suggests that internal integration contributes to improving supply chain visibility (SCV) by fostering transparency and real-time information sharing within the organization. However, other external factors may also play a role in SCV. **Customer Integration and Supply chain visibility (P = 0.0000)**:The relationship is highly significant. This indicates that effectively collaborating with customers and sharing information enables organizations to enhance visibility across the supply chain. Improved SCV reduces uncertainty and allows for better demand forecasting, inventory management, and responsiveness to customer needs.

Supply chain integration and Supply Chain Visbility (P = 0.1832): This relationship is not significant, as the P-value exceeds the threshold of 0.05. This suggests that supplier integration (SI) does not have a statistically reliable impact on supply chain visibility in this study. This could indicate challenges in achieving transparency and information sharing with suppliers, possibly due to a lack of trust, technological limitations, or communication barriers.

Supply Chain Visbility and supply chain risk management (P = 0.0000: The highly significant P-value indicates a strong relationship between supply chain visibility (SCV) and supply chain risk management (SCRM). Enhanced visibility enables organizations to proactively identify, assess, and mitigate supply chain risks, thereby improving resilience and reducing disruptions

Supply chain risk management and Operational performance (P = 0.0000) The relationship between supply chain risk management (SCRM) and operational performance (OP) is also highly significant. This shows that risk management practices directly involve to improved operational performance, such as efficiency, cost savings, and customer satisfaction. The important relationships encourage that the critical role of internal integration in dynamic customer and supplier integration, as well as enhancing the supply chain visibility. Increased visibility supports better risk management, which in turning drives operational performance. Where as, the non-significant relationship between supplier integration and visibility (SI → SCV) points to manly gaps in collaboration with supplier or information-sharing criteria. Firms should address this by fostering stronger partnerships with suppliers, adding high technologies for data sharing, and better trust to fully realize the benefits of supply chain visibility. This investigation highlights the unified nature of supply chain factors and underscores the need for organizations to focusing on integration, visibility, and risk management to achieve superior performance in today's dynamic business environment.

Table 05

	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
ii -> ci	0.644	0.072	8.991	0
ii -> si	0.578	0.082	6.983	0
ii -> scv	0.201	0.096	2.045	0.041
ci -> scv	0.51	0.087	5.86	0

si -> scv	0.128	0.095	1.331	0.1832
scv -> scrm	0.694	0.062	11.109	0
scrm -> op	0.466	0.073	6.221	0

Discussion and Conclusion

5.1 Conclusion

The study emphasis the crucial role of supply chain integration in strengthening visibility and improving overall operational efficiency. By consolidate internal operations with suppliers and customers, Organization can raise better coordination, eliminate information silos, and make a smooth exchange of data. This integration make sure that critical information, including inventory management, production plan, forecasting for upcoming demand , and dispatch updates, is reachable to all relevant stakeholders in real- time. When businesses operation are streamline and communication share accurate, up-to-date data across all the stockholder of supply chain,so they can improve decision- making processes, mitigation of uncertainties, and improve responsiveness to any changes in market disruptions. Significant supply chain integration situate the goals and objectives of different departments within the supply chain network, authorize companies to operate as a consolidated rather than as separate, disconnected entities. This arrangement not only enhance the efficiency but also make sure resources are efficiently utilized, preventing wastage and inefficiencies that can arise due to a lack of coordination.

One of the most important benefits of supply chain integration is the ability to increase the visibility, which plays a vital role in reducing supply chain risks. When the department within the supply chain have easy to access data and accurate data, they can identify potential bottleneck early and take proactive measures to show them before they involve into significant operational challenges.If any organization faces a production delay or material shortage, real-time visibility informed to the company to procure from alternative suppliers or adjust production schedules to minimize the impact. This proactive risk management strategy is crucial in today's volatile and unpredictable market environment, where challenges such as geopolitical unreliableness, economic displace, natural disasters, and global pandemics can badly impact on supply chain operations. By having a well-integrated and highly visible supply chain, companies can build resilience and ensure business continuity even in challenging circumstances.

The proof of the proposed model through strong reliability and construct validity measures teach that the effectiveness of well-coordinated supply chain practices. The study's findings determine that organizations that invest in supply chain integration and visibility benefit from improved efficiency, mitigate the risks, and enhanced adaptability. By raising collaboration across internal department and external partners such as supplier and customer, businesses can build a more agile supply chain that is capable of responding swiftly to changes in customer demand, supplier constraints, or other unexpected events.Given the study's findings, several strategic recommendations appear for organizations identify to strengthen their supply chain risk management and operational performance.Organization should actively foster collaboration between internal departments, suppliers, and customers. Integration improves coordination, improve information flow, and enables better decision-making. Leveraging digital tools such as AI-driven analytics, blockchain, and IoT-based tracking systems can significantly enhance supply chain visibility. These technologies improve real-time monitoring, predictive analytics, and data-driven decision-making. firms should implement proactive risk management strategies, including supplier diversification, advance planning, and frequent risk analysis. This leads to resilience against supply chain disruptions and financial uncertainties.

Moreover supply chain professionals with the necessary skills and knowledge to manage supply chain risks effectively . Training programs should focus on data analytics, risk measurement, and supply chain coordination. Accuracy and collaboration among supply chain stakeholders are crucial for improving efficiency. Companies should create standardized communication protocols to ensure seamless information exchange. Simultaneous assessing supply chain processes allows organizations to know bottleneck and optimize resource

allocation. Continuous monitoring identify to help potential risks and improve responsiveness. Building long-term relationships with key suppliers and customers based on trust and mutual growth enhances overall supply chain performance. Strong partnerships contribute to stability and sustainability in supply chain operations.

This study contributes to the existing body of knowledge by exploring the mediating role of supply chain visibility in the relationship between supply chain integration and operational performance. While previous research has focused primarily on supply chain integration and its impact on performance, this study indicate the critical role of visibility in finding the gap between integration activity and risk management effectiveness. The research results emphasize that organizations must go beyond integration efforts and actively enhance visibility to achieve maximum benefits. Future researcher also could explore the role of emerging technologies, such as artificial intelligence and blockchain, in enhancing the supply chain visibility and reducing risk. Moreover, further study could be investigate the impact of supply chain visibility on different industry segment. Where as this research provides valuable insights, certain limitations should be acknowledged. Secondly, the study focused on the Fast-Moving Consumer Goods (FMCG) sector in Pakistan, which may limit the generalization of findings to other industries or regions. Future studies could be examine supply chain integration and risk management across different sectors to validate the findings further. Second, the study relied on survey data collected from supply chain professionals.

5.2 Implications

- Encourage organizations to give importance to supply chain integration by increasing collaboration between departments, suppliers, and customers to improve information flow and decision-making.
- Adopt advanced digital tools and technologies such as tracking systems, cloud platforms(invetory software), and other AI-driven analytics to enhence supply chain visibility and responsiveness.
- Develop a tool to implement strong risk management strategies, includes supplier diversification, overall planning, and identification of risk to reduce potential disruptions effectively.
- Focus on training and development platform to increase supply chain professionals with the skills needed to resolve and adapt to newly supply chain challenges.
- Establish effective communication channels and data as well information sharing tools to ensure clarity and alignment among all supply chain stakeholders.
- Daily monitoring and evaluation of supply chain performance to know the any abnormalities and opportunities for continuous improvement in operations performance.
- Promote an environment of mutual and trust in all the supply chain network to create stronger, long-term partnerships which support growth and sustainability of all the stackholder.
- Align supply chain activity with outside the organizational goals to make sure that integration and visibility efforts drive to improvements in operational performance.

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