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**Role of Information Sharing in Supply Chain
Performance; A context of Pakistan.**



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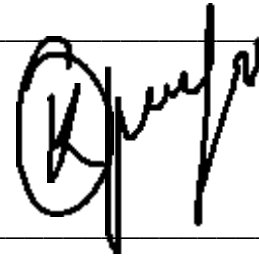
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Abstract

This research explores the complex dynamics of supply chain management within the framework of Pakistan, a developing nation. Due to the specific challenges this environment presents, such as inadequate infrastructure, cultural diversity, and geopolitical issues, a thorough investigation of the variables affecting supply chain performance is required. The focus of this research is how supply chain outcomes are shaped by operational and strategic information sharing in the unique business environment of Pakistan. A questionnaire was used to gather data from 253 supply chain professionals in Islamabad using a quantitative technique. A demographic analysis showed that the representation was diversified, with different age groups, gender distributions, company sizes, and educational levels all being represented.

Strong positive correlations between supply chain performance and operational and strategic information sharing were revealed by correlation analysis, indicating a strong relationship. Regression analysis further supported these findings by showing a significant combined impact (88.2%) of operational and strategic information sharing on supply chain performance. The results of the regression analysis demonstrated a strong and favorable effect of both strategic and operational information sharing on supply chain performance, supporting the acceptance of both hypotheses.

In summary, the results offer strong support for the hypotheses, confirming that, in the context of Pakistan, supply chain performance is positively impacted by both operational and strategic information sharing. This study adds insightful new information to the body of knowledge on supply chain management and has applications for companies that operate in similar developing-nation environments.

Keywords: Strategic Information Sharing, Supply Chain Management, Supply Chain Performance, Performance, Metrics, Operational Information Sharing, Pakistan.

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Chapter 1: Introduction

1.1. Background of Supply Chain Management

Supply Chain Management (SCM) is a complex and ever-changing process that entails the coordination and smooth flow of products and services from producers/manufacturers to the end customers (Kleab, September 2017). In today's globalized economy, the supply chains need to be efficient and effective, supply chains play a critical role in the individual performance of a firm and the overall satisfaction of customers (Uvet, 2020). The number of challenges faced by supply chains are multiple, that becomes even more challenging and difficult when faced by developing countries (Uvet, 2020).

1.1.1. Supply Chain Management in Developing Countries:

Within the context of supply chain in developing countries, such as Pakistan, the difficulties of supply chain management and performance are further increased by unique challenges, these challenges include inadequate infrastructure, cultural diversity, transportation issues and more (Long-Wu, Chuang, & Hsu, 2014). These unique and familiar challenges of supply chain management warrant a thorough study of the factors that may influence supply chain performance in the business landscape of Pakistan (Hussain, Hussain, Akbar, Sulehri, & Maqbool, 2014). Tailored strategies and techniques are required to improve supply chain processes in Pakistan as it is a developing nation with distinct economic characteristics (Ding, Guo, & Liu, 2011).

1.1.2. Importance of Well-Managed Supply Chain:

A well-managed supply chain works like a fine-tuned machine, which is more than just mere facilitation of raw materials and product flow, it becomes an asset strategically for a company

and significantly aids in the economic development of the company, as well as the nation(Alzoubi & Yanamandra, 2020). A supply chain's strength is highly dependent on the capabilities of the individual participants in it, these range from suppliers to retailers(Alzoubi & Yanamandra, 2020). Therefore, it is crucial for companies in Pakistan to improve their performance, which would make them a harbinger of elevating supply chain performances of companies across the nation and contribute to its growth(Atkins, Yurova, Gudi, & Ruppel, 2022).

1.1.3. Supply Chain Performance Measures:

Optimum performance of supply chain in Pakistan will be met when the KPIs (key performance indicators), such cost, delivery, flexibility, and quality are enhanced. These performance measures combined set up the effectiveness and efficiency of a company's supply chain operations, directly affecting competitiveness of the company in market, and customer satisfaction(Kleab, Septempber 2017). The improvement and understanding of supply chain performance (SCP) is a strategic goal crucial for individual businesses, but also plays a critical role in the economic growth of a developing nation such as Pakistan(Marinagi, Trivellas, & Reklitis, 2015).

1.1.4. Information Sharing (IS) as a key tool:

Information sharing (IS) is a crucial instrument for reaching a well-managed supply chain. Through IS, it is possible to coordinate different SCM procedures and provide efficient communication among supply chain actors (Ding, Guo, & Liu, 2011). Effective supply chain management depends on the sharing of vital data, including demand forecasts, order fulfillment, and inventory levels (Alzoubi & Yanamandra, 2020). In the context of Pakistan, operational and strategic information sharing could be a key part for process optimization, cost reduction, and overall supply chain performance (SCP) enhancement (Hung, Lin, & Ho,

Sharing information in a high uncertainty environment: lessons from the divergent differentiation supply chain, 2013).

In this background, this paper explores the function of sharing information in SCP, with a special emphasis on Pakistan. The impact of operational and strategic information sharing on supply chain performance in Pakistan will be further examined in the sections that follow. With an empirical investigation and a meticulous assessment of the unique attributes of Pakistan's supply chain environment, this study endeavors to offer significant insights to the current literature in supply chain management.

1.2. Problem Area:

Pakistan's supply chain management has unique difficulties because of factors like the country's limited geographic area, unstable political conditions, and significant cultural differences. The effectiveness, affordability, and overall performance of supply chain networks in the area are all affected by these issues. Although information sharing (IS) is widely acknowledged as being crucial for streamlining supply chain operations worldwide, little is known about how IS particularly affects Supply Chain Performance (SCP) in Pakistan.

1.2.1. Problem Statement:

The problem at hand is the shortage of detailed empirical research that particularly examine how information sharing and supply chain performance relate to one another in Pakistan. Although existing research offers a basis for understanding these processes within a broad framework, the distinct challenges and prospects offered by the economic situation in Pakistan demand a focused study.

Key Challenges:

- **Geopolitical Factors:** The transportation of commodities is affected by political and geographic limitations, which create uncertainty in supply chain operations.
- **Cultural Influences:** Pakistan's diverse culture presents supply chain management issues that have an impact on cooperative efforts and information sharing.
- **Obstacles in the Logistics Chain:** Inadequate connectivity and infrastructure lead to logistical problems that affect the overall effectiveness of supply chain operations.
- **Market Dynamics:** Supply chain professionals face difficulties due to the unique consumer preferences and regulatory environments that define the Pakistani market.

Rationale for Study:

Businesses looking to improve performance, reduce risks, and seize new possibilities must understand how Information Sharing may be strategically used inside the Pakistani supply chain.

1.2.2. Research Gap

While information sharing in supply chain management has been studied partially, there is still a lack of knowledge regarding how it affects supply chain performance in the setting of Pakistani businesses (Zhou & Benton Jr. , 2011). Studies that have already been conducted, lack the unique opportunities and difficulties that exist in Pakistani supply chains, which function in a unique socioeconomic and cultural context (Khan & Siddiqui, 2018).

By examining how information sharing practices affect different areas of supply chain performance in Pakistan, this study seeks to close this gap (Khan & Siddiqui, 2018). The study acknowledges the necessity for specific insights considering the unique market circumstances, legal frameworks, and cultural elements influencing supply chain operations in this country (Khan & Siddiqui, 2018).By an in-depth analysis, the study aims to offer helpful recommendations for enhancing Pakistan's supply chain performance (Hussain,

Hussain, Akbar, Sulehri, & Maqbool, 2014). To improve the efficiency of supply chain management techniques in the Pakistani corporate environment, this research gap can be filled.

1.3. Objectives of the Study

This study's main objective is to examine and assess how Information Sharing (IS) affects Supply Chain Performance (SCP) in the setting of Pakistan. The objectives consist of:

✓ **To Assess the Relationship between Operational Information Sharing and Supply Chain Performance (SCP):**

Examine the effects of operational information sharing amongst supply chain partners on a range of performance indicators, such as flexibility, quality, cost, and delivery.

✓ **To Examine the Impact of Strategic Information Sharing on Supply Chain Performance(SCP):**

Examine the ways in which the supply chain network's strategic information sharing affects the designated performance metrics.

✓ **To Determine the Relative Significance of Operational and Strategic Information Sharing:**

Evaluate the contributions made by operational and strategic information sharing to supply chain performance (SCP) by contrasting and comparing their effects.

✓ **To give contextual insights for Pakistan:**

Modify the current research framework to consider Pakistan's particular business environment, considering things like market dynamics, cultural influences, and geographic limitations.

1.4. Research Questions:

The exploration of the dynamics and relationships within the scope of this study will be guided by the following research questions:

1. What is the effect of operational information sharing on multiple aspects of Pakistan's Supply Chain Performance (SCP)?
2. In the Pakistani context, how does strategic information sharing will affect SCP?
3. How do the effects of strategic and operational information sharing on SCP measures compare in the context of Pakistan?

1.5. Significance of the Study:

The significance of this study is on multiple fronts:

✓ **Theoretical Contribution:**

Advances knowledge of the connections between information sharing and supply chain efficiency, particularly considering Pakistan's particular circumstances.

✓ **Practical Implications:**

Offers solutions to maximize supply chain performance through efficient information exchange procedures, giving firms working in Pakistan relevant insights.

✓ **Policy Recommendations:**

Educates decision-makers on the need for information sharing in supply chain management and supports the creation of laws that encourage cooperative efforts.

✓ **Global Supply Chain Insights:**

Offers perspectives from a developing economy to the global conversation on supply chain management, which may help shape tactics for companies in comparable environments.

✓ **Academic Enrichment:**

Expands on the collection of material already written about IS and SCP, opening the door for more research and investigation in this area.

1.6. Scope and Limitations of the Study:

The time and geographical limitations of this study force it to be undertaken specifically in the context of Islamabad, Pakistan. Owing to time constraints and practical difficulties, the focus of data gathering will be on businesses and experts found in Islamabad. As the capital of the country, Islamabad acts as a center for multiple industries, offering a vibrant and varied environment for study.

By focusing only on Islamabad, the study hopes to obtain insights that are representative of the city's distinct business environment, possibilities, and difficulties. With an emphasis on Islamabad's unique features, this method enables for a more thorough examination of the complexities of information sharing (IS) and how it affects supply chain performance (SCP).

A focused analysis into local business practices, supply chain dynamics, and the impact of information-sharing procedures within this regional context is possible by the research location choice of Islamabad. The results of this study should supply useful information to businesses which run in Islamabad and, by extension, other similar urban areas in Pakistan.

1.7. Research Contributions:

This study makes a substantial contribution to our understanding of information sharing and supply chain management in a number of important areas. First off, by concentrating on the business environment in Pakistan, it closes a significant gap in the body of literature by providing specific insights into the ways in which supply chain performance is impacted by information sharing in Pakistan.

Furthermore, the actual data obtained by means of detailed statistical analyses offers substantial evidence for the positive impact of operational and strategic information sharing on the performance of the supply chain. In addition to providing direction for the current study, the proposed theoretical framework is a useful resource for future researchers looking into related subjects. It deepens our theoretical understanding of the key role that strategic and operational information sharing plays in the supply chain. The study provides supply chain practitioners with useful insights into practical implications. The results offer direction to businesses functioning in related environments, empowering them to make informed decisions with the goal of improving total efficiency of their supply chains. Additionally, by pointing out its limitations and outlining potential topics for further research, this study lays the groundwork for future research.

Chapter 2

This is a crucial chapter where the researcher will undertake a comprehensive review of the body of knowledge and scholarly literature relevant to the primary focus of the study. This literature review chapter will be cornerstone that establishes a structure for understanding the complex relationship between supply chain performance and information sharing.

2.1. Introduction:

2.1.1. Overview of Literature Review:

A crucial step in the study process is the literature review, which offers a thorough analysis of the body of knowledge already available on supply chain performance, information systems, and their complex interactions. This review seeks to establish a strong theoretical framework for the subject under investigation by exploring academic literature.

2.1.2. Importance of Literature Review:

Within the field of academic research, the literature review functions as a navigational aid. Its importance stems from its capacity to shed light on the conceptual history of the past, point out knowledge gaps, and offer a theoretical basis for pursuing research problems. This literature review aims to provide context and depth for the current study by methodically examining previous research.

2.1.3. Purpose of Literature Review in context of this study:

Multiple important goals are met by the literature review in the setting of this study. It serves as a link between the opportunities and difficulties of today and the historical viewpoints on supply chain performance and information exchange. This serves as the foundation for formulating research questions, generating hypotheses, and directing the entire technique.

2.2. Variables in the Study

2.2.1. Identification and definition of key variables

- **Information Sharing**
 - Operational Information Sharing
 - Strategic Information Sharing
- **Supply Chain Performance**
 - Cost
 - Quality
 - Delivery
 - Flexibility

Information sharing and supply chain performance are the key factors influencing this research. Operational and strategic information sharing are two subcategories of the broad concept of information sharing (Hung, Lin, & Ho, Sharing information in a high uncertainty environment: lessons from the divergent differentiation supply chain, 2013). Contrarily, Supply Chain Performance consists of four essential parameters: Delivery, Quality, Cost, and Flexibility. All these variables together comprise the key elements in this research.

2.3. Factors Influencing Supply Chain Performance:

2.3.1. Key Factors influencing Supply Chain Performance:

To fully understand the varied dynamics of supply chain management, an investigation into the factors impacting supply chain performance is essential (Koçoğlu, İmamoğlu, & H, 2011). Organizational procedures, technical developments, and environmental uncertainty are some of the crucial factors. Understanding the complexity of supply chain performance requires an understanding of these elements.

2.3.2. Empirical Studies on these factors:

The empirical landscape provides insightful information about how the variables affecting supply chain performance manifest in real-world situations (Atkins, Yurova, Gudi, & Ruppel, 2022). Prior research has examined the effects of external influences, technology integrations, and organizational strategies on supply chain performance (Long-Wu, Chuang, & Hsu, 2014). A comprehensive understanding of the practical consequences of all these elements will be possible through the integration of these empirical studies.

2.4. Literature Review

2.4.1. Information Sharing and Supply Chain:

A vital component of supply chain management, information sharing is essential to the smooth operation of modern corporate organizations. The procedures of information sharing become critical as rivalry spreads beyond individual firms to entire supply chains. (Long-Wu, Chuang, & Hsu, 2014). The procedure involves complex operations involving numerous trading partners, therefore a deeper look at the fundamental ideas guiding this information sharing is required.

The reviewed study sheds light on four essential characteristics that are crucial to the core dimensions of information sharing: power, reciprocity, trust, and commitment. These characteristics serve as the cornerstone of social exchange theory (SET) and are essential in determining how supply chains' dynamics of information sharing are shaped (Long-Wu, Chuang, & Hsu, 2014). Previous studies have mostly concentrated on addressing the complex interactions between power, reciprocity, trust, and commitment regarding information sharing in supply chain contexts (Long-Wu, Chuang, & Hsu, 2014). The study emphasizes how crucial these social exchange elements are and how they function as preconditions for productive cooperation and information sharing.

This section explores the complex world of information sharing in supply chains, driven by how information system technology has transformed the industry (Long-Wu, Chuang, & Hsu, 2014). These technological advancements have sparked a paradigm change in supply chain management toward improved coordination and performance optimization among chain participants (Lee & Whang, 2014).

Previous literature emphasizes how important information sharing is and how technological improvements have made it possible. Supply chain partners now work together to maximize performance by sharing critical information including order status, sales KPIs, demand projections, inventory condition, and production schedules (Lee & Whang, 2014). A review of several forms of shared information offers an extensive understanding of the factors that influence supply chain performance.

Academic discourse has its origins in practical applications through the seamless integration of real-world examples. The classification of shared data, which includes industry-specific examples, highlights the distinct effects of information sharing procedures. The conceptual framework is further enhanced by the addition of three alternative system models: the information hub, the third-party, and the information transfer models (Lee & Whang, 2014). This literature evaluation aids in the process of understanding the complexity involved in sharing information within supply chains. It establishes the foundation for understanding the more comprehensive effects on supply chain performance by splitting through the mechanisms of information sharing and its categories (Lee & Whang, 2014).

The complexity of sharing information within supply chains is shown in the Indonesian apple agroindustry of East Java. The analysis of this industry shows that performance in Small and Medium-Sized Enterprises (SMEs) and supply chain collaboration

are both indirectly impacted by information sharing (Tutuhaturunewa, Surachman , Santoso, & Santoso, 2019).

The narrative emphasizes how important supply chains are to giving companies a competitive edge, with an emphasis on improving supply chain performance. Partial Least Square (PLS) analysis is used in this study, which is focused on small and medium-sized enterprises (SMEs) in the apple agroindustry, to clarify the intricate connections between information sharing, supply chain partnerships, collaboration, and overall supply chain performance (Tutuhaturunewa, Surachman , Santoso, & Santoso, 2019).

The pattern that was identified suggests a complicated relationship in which information sharing influences supply chain collaboration and performance for small and medium-sized enterprises in the apple industry (Tutuhaturunewa, Surachman , Santoso, & Santoso, 2019). This finding adds depth to our understanding of the function of information sharing by recognizing its detailed influence on collaborative efforts and the overall efficiency of supply chains.

Amid the complicated structure of modern supply chains, information sharing is crucial and a major factor in improved performance. The revolutionary potential of enhanced exchange of information among supply chain partners is explored in the present research (Yu, Yan , & Cheng , 2016). The most important lesson is that these collaborative efforts result in a Pareto improvement in performance, which is characterized by lower inventory levels and consequent cost reductions for all supply chain partners (Tutuhaturunewa, Surachman , Santoso, & Santoso, 2019). The study acknowledges that partnerships within the supply chain are greatly enhanced by information technology. It tackles the difficulties posed by distributed control systems and seeks to mitigate the well-known "bullwhip effect." By studying a decentralized supply chain case study between a producer and a retailer, the research clarifies

the best inventory practices in various information-sharing situations. The main finding emphasizes how enhanced information sharing in a decentralized supply chain creates a mutually beneficial relationship. Because of this synergy, there is a Pareto improvement, which has the dual benefits of lower inventory levels and real cost savings (Yu, Yan, & Cheng, 2016). The study offers a useful case study to support its theoretical foundations, illustrating the observed principles' relevance and applicability in the actual world.

2.4.2. Operational Information Sharing:

The current literature explores the dynamics of effective operational information sharing in Malaysian supply chains and highlights the complex interactions among several elements that greatly influence this essential aspect of supply chain management. The study emphasizes how businesses must become more flexible, adaptable, and efficient in the larger context of global competitiveness (Zailani, Premkumar, & Fernando, 2014). The management of information across the supply chain channel is essential to this effort since it is understood to be an essential tool for promoting operational efficiency. Empirical studies provide insight into the aspects that have been found as influencing the effectiveness of operational information sharing in supply chains located in Malaysia. The foundation of this study is a survey of supply chain managers in Malaysia's Electrical and Electronics (E&E) industry (Zailani, Premkumar, & Fernando, 2014). Information quality, IT commitment, SCM commitment, organizational size, and partner trust are the five main independent variables identified by the study as critical factors influencing the effectiveness of operational information sharing. Information quality is very important, and it's also important for the recipient to be able to use the information in different technological environments (Yu, Yan, & Cheng, 2016). Operational information sharing is shaped by several important aspects, including organizational size, the development of trust among partners, and dedication to information technology and supply chain management (Zailani, Premkumar, & Fernando,

2014).The study highlights the importance of these identified parameters by linking these findings with the critical function that operational information plays in promoting collaboration across supply chain participants. Addressing these issues can enable professionals to develop their capacities and, as a result, improve their capacity to successfully compete on an international level (Zailani, Premkumar, & Fernando, 2014).

Within the dynamic landscape of modern business, the literature explores the complex interactions of supply chain dynamics, innovation, and organizational learning to gain a competitive advantage (Atkins, Yurova, Gudi, & Ruppel, 2022). This study spans the domains of exploitation and exploration, which are essential elements of ambidextrous learning and collectively enhance an organization's capacity to adjust to changing market conditions and seize new possibilities. The literature has detailed the significance of strategic and operational information sharing between suppliers and consumers in promoting ambidextrous learning. The study reveals the varied impacts of information sharing on exploitative and exploratory performance. It is based on a survey of supply chain managers in American manufacturing companies (Atkins, Yurova, Gudi, & Ruppel, 2022).Operational information sharing helps businesses maximize their current capabilities and encourages greater performance. On the other hand, it has been found that strategic information sharing acts as a stimulant to encourage exploratory performance and an active approach to innovation and new prospects(Yu, Yan , & Cheng , 2016).The present research demonstrates a connection between better financial performance for buyers and improvements in both exploratory and exploitative performance (Atkins, Yurova, Gudi, & Ruppel, 2022). This relationship is complex, though, because the buyer's approach to product innovation serves as a moderator. Exploratory performance is much more important while pursuing a high innovation strategy to maximize financial results. Through the synthesis of these observations, the literature draws attention to the complex dynamics of information sharing in

supply chains and emphasizes how important it is for determining a firm's performance trajectory, learning orientation, and, eventually, financial success (Atkins, Yurova, Gudi, & Ruppel, 2022).

The quality of logistics services is a critical factor in determining customer happiness, underscoring the need to satisfy customers to stay competitive in the market. The study highlights the lack of research in the field of logistics services, which calls for an empirical investigation into the variables affecting the quality of logistic services and how they affect consumer satisfaction (Uvet, 2020). Order condition, punctuality, handling order discrepancies, staff quality contact, and operational information exchange are among the identified logistics service quality aspects. Confirmatory factor analysis (CFA) and structural equation modeling (SEM) are used in the study to examine the complex interactions between these constructs and how they all affect customer satisfaction. This study makes a significant addition by studying, for the first time, how operational information sharing affects customer satisfaction within the context of logistics service quality (Uvet, 2020). The study enhances our comprehension of the essential components that support customer satisfaction in logistics services by adding this new dimension. In the context of logistics services, customer satisfaction may be clarified and improved by addressing the aspects of staff quality contact, order condition, timeliness, order discrepancy handling, and operational information sharing (Uvet, 2020). In addition to providing practitioners with useful guidance on how to raise customer satisfaction, this empirical evidence advances academic discourse by illuminating the complex interactions between logistics service quality factors and the pursuit of competitiveness in the logistics services industry (Uvet, 2020).

2.4.3. Strategic Information Sharing:

To fill a significant study gap regarding the complexity of information sharing strategy (ISS), this literature review explores the complex environment of strategic

information sharing and coordination within supply chains(Hung, Ho, Jo, & Tai, 2011). Based on data from a survey carried out in Taiwan's manufacturing sector, the research shows that ISS includes coordination and information sharing elements, and that it has a significant effect on reducing supply chain uncertainty. The study highlights the two-fold character of supply chain alliances, highlighting the need to exchange high-quality data while also negotiating mutual adjustment and codified inter-organizational procedures. These salient insights offer implications for decision-making processes and substantially advance our understanding of the strategic aspects of information exchange in supply chains (Hung, Ho, Jo, & Tai, 2011). In addition, the study offers insightful information for future directions in the field of supply chain management and expands theoretical viewpoints.

Effective information sharing and supply chain practice are essential components of improving overall supply chain performance in the ever-changing world of supply chain management(Zhou & Benton Jr. , 2011). This study, which uses data from 125 manufacturing companies in North America, shows a direct correlation between efficient information sharing and supply chain performance. The study notably emphasizes the critical function of supply chain dynamism and shows that it has a significant positive impact on information exchange and supply chain operations(Zhou & Benton Jr. , 2011). The study's main finding is that supply chain dynamism has an uneven impact on information sharing, with a stronger effect on sharing than supply chain practice. Moreover, the results highlight how crucial efficient supply chain management is becoming as information sharing levels rise. When taken as a whole, these observations highlight the complex relationships between information exchange, supply chain dynamism, and practice, and they offer practitioners insightful advice on how to maximize supply chain performance in the fast-paced corporate world of today(Zhou & Benton Jr. , 2011).

The need to address disruptions, both natural and man-made, forces supply chains to rethink and restructure their operational plans. This calls for the development of extremely adaptable, transparent, dependable, and economical procedures that eventually result in the implementation of an Agile Supply Chain (ASC)(Alzoubi & Yanamandra, 2020). In today's competitive market, supply chain agility requires dynamic leadership, a clear strategic vision, collaboration among all participants, and efficient use of information technology with a customer-centric approach(Alzoubi & Yanamandra, 2020). With a few exceptions of major organizations, medium-sized and small-sized manufacturing enterprises find it difficult to adopt and construct supply chains that support ASC, despite the broad initiatives among organizations to embrace ASC for increased performance. The paucity of previous research in this field emphasizes how urgent it is to investigate this field. In order to close the research gap, this study looks at how Information Sharing Strategy (ISS) mediates Agile Supply Chain (ASC) practices, which in turn improves Supply Chain Performance (SCP) in medium-sized manufacturing firms in the United Arab Emirates(Alzoubi & Yanamandra, 2020). An important and crucial function that information sharing plays as a mediator in reaching ASC and achieving superior supply chain performance is revealed by the empirical survey that was carried out among supply chain managers in the United Arab Emirates. Thus, in the context of medium-sized manufacturing enterprises in the United Arab Emirates, this analysis highlights the critical role that information sharing plays in establishing agile supply chain processes, offering a valuable basis for improving supply chain resilience and performance(Alzoubi & Yanamandra, 2020).

The main topic of this literature review is information sharing in supply chains, with a focus on how important it is for increasing customer value, improving collaboration, and optimizing profit distribution(Ding, Guo, & Liu, 2011). The paper tackles a major issue in supply chain management: partners' efficient profit and benefit sharing. The emphasis is on

the benefits of exchanging information, especially when it comes to lowering inventory levels. The specific research in this paper focuses on the cooperative mechanisms that provide merchants with incentives through profit-sharing agreements that are started by partners upstream(Ding, Guo, & Liu, 2011). The cooperative game approach is utilized by the study to effectively navigate the inherent conflicts of interest inside the supply chain. To show possible cooperative solutions for profit distribution, a three-dimensional graphic model is shown, providing a thorough understanding of the dynamic dynamics. The necessity of efficient profit allocation as a driving force behind partner cooperation is emphasized in the review's conclusion (Ding, Guo, & Liu, 2011). The study adds to a better knowledge of how information sharing techniques can enhance customer value and overall supply chain effectiveness by revealing the complex dynamics of information sharing in a three-echelon supply chain system.

The vital topic of information sharing in the context of a supply chain with diverging differentiation is the focus of this review. The study's main finding emphasizes how important it is for partners to have mutual trust to promote information exchange, which lowers uncertainty and improves order fulfillment performance(Hung, Lin, & Ho, Sharing information in a high uncertainty environment: lessons from the divergent differentiation supply chain, 2013). The paper tackles the inherent difficulties in information sharing in supply chain management, concentrating on the instance of Taiwan's printed circuit board industry, which serves as a model for a supply chain with diverging differentiation functioning in a highly unpredictable environment. The goal of the study is to identify the variables that affect effective information sharing and explore the ways in which efficient information exchange can reduce uncertainty. The findings show that while uncertainty is shown to be the main barrier, trust emerges as a crucial element that promotes greater information sharing. The study shows that exchanging vital data, such "demand forecast

information," can greatly enhance the efficiency of the order fulfillment process (Hung, Lin, & Ho, Sharing information in a high uncertainty environment: lessons from the divergent differentiation supply chain, 2013). Furthermore, putting vendor-managed inventory systems into place through information exchange works well to lessen supply chain uncertainty and bullwhip effects, which improves coordination between organizations. To improve overall order fulfillment performance, this review highlights the practical implications of developing trust in supply chain partnerships. It also sheds light on how to improve information exchange and handle uncertainty in supply networks with diverging differentiation (Hung, Lin, & Ho, Sharing information in a high uncertainty environment: lessons from the divergent differentiation supply chain, 2013).

The review of the research concentrates on how important information sharing is in moderating the connection between supply chain performance and information quality in manufacturing companies. The main lesson is how efficient information exchange functions as a go-between, enabling improved supply chain performance all around. To improve supplier-customer relations, the study emphasizes how crucial it is for supply chain participants to coordinate activities through information exchange (Marinagi, Trivellas, & Reklitis, 2015). Maintaining information quality becomes crucial since confidential and proprietary information is shared across the supply chain. Information sharing is identified in the study's proposed research methodology as the mediating relationship between supply chain performance and information quality (Marinagi, Trivellas, & Reklitis, 2015). The results, which came from a survey of sixty-one Greek manufacturing companies, support the idea that information exchange acts as a mediator. The implications for managers emphasize that improved overall performance is a result of encouraging information sharing among supply chain partners. The improvement in information dependability and quality is ascribed to the use of Supply Chain Management methods (Marinagi, Trivellas, & Reklitis, 2015). This

study offers practitioners aiming to optimize their supply chain processes in the manufacturing industry useful insights by examining the complex dynamics between information quality, sharing, and supply chain performance.

Supply chain integration (SCI) and its significant effects on information exchange and supply chain performance (SCP) are the focus of this study. The primary takeaway is how SCI greatly improves information exchange, which eventually results in better coordination, higher-quality goods and services, lower costs, and an advantage over competitors for businesses (Koçoğlu, İmamoğlu, & H, 2011). By concentrating on the impact of SCI on information sharing and emphasizing the critical role that information sharing plays in forming SCP, the study fills a vacuum in the literature. Within the framework of an increasingly interconnected and competitive global economy with complex relationships both within and between organizations, the study identifies SCI as an essential precondition for efficient information exchange (Koçoğlu, İmamoğlu, & H, 2011). The conceptual model classifies levels of SCI as integration with suppliers, customers, and interorganizational integration. It consists of three study hypotheses with three primary constructs (SCI, information sharing, and SCP). Information sharing can be classified into four categories: intra-organizational, inter-functional, supplier, and customer sharing. Costs, asset utilization, supply chain dependability, and supply chain responsiveness and flexibility are the metrics used to measure SCP (Koçoğlu, İmamoğlu, & H, 2011). The empirical study, which involved 158 manufacturing companies in Turkey, offers strong evidence in favor of the hypotheses and shows how important supply chain integration (SCI) is for fostering cooperation, coordination, and connection among supply chain participants. The research highlights the strategic significance of SCI in gaining competitive advantages in the dynamic field of supply chain management, providing insightful guidance to firms looking to improve SCP through information sharing (Koçoğlu, İmamoğlu, & H, 2011).

Chapter 3

3.1. Research:

The different types of business research are outlined in this section, with a distinction made between basic and applied research. Primarily a quantitative research approach will be used for this study's objectives.

3.1.1. Types of Business Research:

3.1.1.1. Applied Research

Applied research is used to address realistic problems and offer answers that can be used in everyday life. Its main goal is to close the knowledge gap between theory and practice.

3.1.1.2. Basic Research

Expanding the theoretical knowledge base by investigating basic principles and concepts is the goal of basic research. Although it doesn't directly address real-world issues, applied research is built upon it.

3.2. Methodology:

The research's methodology section outlines the methods and approaches used to gather and process data. The two types of research methodologies are Quantitative and

Qualitative research. Due to the research's complex design, quantitative research methodology will be used in this research.

3.2.1. Quantitative Research:

Quantitative research is systematic empirical research that uses data quantification and statistical analysis to find patterns, correlations, or trends within a population or sample. This approach utilizes a systematic methodology, frequently utilizing numerical data, to derive unbiased conclusions and establish generalizations concerning a broader population. Evaluating variables and determining causal linkages is the main goal since it makes it possible to test theories and make predictions.

3.2.1.1. Methods for Conducting Quantitative Research:

✓ **Questionnaires & Surveys:**

A common approach in quantitative research is the use of surveys, which use structured questionnaires to gather information from a pre-defined sample. This method works effectively for compiling data on beliefs, attitudes, and actions among a sizable participant sample. With the use of surveys, researchers can gather data for statistical conclusions and examine responses in a methodical manner.

✓ **Experiments:**

In quantitative experiments, factors are changed to evaluate the effect on the dependent variable. Researchers can establish cause-and-effect linkages in controlled environments with this strategy. Through meticulous planning and management of experimental variables, scientists can make inferences on the impact of factors on the results that are observed.

✓ **Observational Research:**

The careful observation and documentation of activity, frequently without direct participant engagement, is the core concept of observational research. This approach is useful for observing natural behavior in its unhindered setting. To gather information on participant behaviors, responses, and interactions as well as to obtain insights into real-world occurrences, researchers use observational approaches.

✓ **Secondary Data Analysis:**

Using secondary data analysis, quantitative researchers can examine already-existing datasets. Examining data that was gathered for a different reason but is still pertinent to the goals of the current study is part of this. This approach saves money and time, particularly when there are big datasets available for investigation and analysis.

✓ **Content Analysis:**

Text and media content are carefully analyzed and interpreted as part of the quantitative process known as content analysis. This method is used by researchers to find themes, patterns, or trends in textual data. Understanding the frequency of various ideas or attitudes throughout a collection of writings or media sources is one area in which content analysis is very helpful.

3.2.2. Qualitative Research:

Exploratory and interpretive in nature, qualitative research aims to comprehend complex phenomena within their natural setting. This approach entails gathering non-numerical data with the goal of understanding the underlying attitudes, motives, and behaviors. A common use of qualitative research is the exploration of unknown or developing subjects and the generation of research hypotheses.

3.2.2.1. *Methods for Conducting Qualitative Research:*

✓ **In-depth Interviews:**

One-on-one conversations between the researcher and participants during an in-depth interview enable a thorough examination of experiences, viewpoints, and opinions. This approach promotes a greater comprehension of various points of view and offers rich, context-specific data.

✓ **Focus Groups:**

Focus groups bring people together in small groups for facilitated, participatory discussions on specific subjects. This approach promotes candid communication and gives researchers the chance to investigate common viewpoints, attitudes, and experiences in a group setting. Focus groups are useful for producing in-depth qualitative data and revealing a range of viewpoints.

✓ **Case Studies:**

A case study entails a detailed analysis of a particular situation, which may pertain to a person, group, organization, or occasion. This approach offers a comprehensive understanding of the topic, enabling researchers to investigate the details and dynamics present in real-life circumstances. Case studies are helpful when examining uncommon or unusual phenomena.

✓ **Participant Observation:**

When a researcher engages in participant observation, they actively observe and interact with people in their natural setting. With the help of this approach, researchers can fully immerse themselves in the setting of their study and obtain firsthand knowledge about social interactions, behaviors, and practices. Studying social processes in real-world contexts is where participant observation really stands out.

3.3. Nature of Study:

The general structure and features of the research are determined by the type of the investigation. This study is mostly quantitative in nature and focuses on supply chain performance within the setting of Pakistan. In quantitative research, numerical data is systematically gathered and analyzed to find trends, patterns, and connections among the selected variables. This study's quantitative design is in line with the necessity for statistical analysis and empirical data to investigate the connections between supply chain performance measures and information sharing. Using a quantitative methodology, the research seeks to offer quantifiable insights into how information sharing affects supply chain performance.

To ensure a representative perspective of the targeted population, quantitative approaches collect data from a wide sample of participants using structured surveys or questionnaires. Statistical analysis, hypothesis testing, and the discovery of noteworthy patterns and correlations are all made possible by this method. The quantitative design of the study makes it easier to establish findings that can be applied to a wider context. The study's results are more objective and reliable due to the statistical analyses and focus on measurable variables. This helps to provide a solid knowledge of the linkages between supply chain performance and information sharing in the unique context of Pakistan.

3.4. Sampling:

Utilizing a purposive sample approach, this study focuses on supply chain-related businesses in Islamabad, Pakistan. The population for this study comprises 700 supply chain experts from 10-15 companies in Islamabad.

3.4.1. Population:

Due to timing and geographical limitations, the study concentrates on Islamabad and targets a particular region for data gathering. The participating businesses span many different sectors of the city's industry.

3.4.2. Sample Size

The computed sample size for a population size of 700 is found to be 249 using Morgan's table. This sample size guarantees a trustworthy representation of the population, enabling accurate analysis and insightful findings.

Result

Sample size: **249**

This means 249 or more measurements/surveys are needed to have a confidence level of 95% that the real value is within $\pm 5\%$ of the measured/surveyed value.

Confidence Level:?	95%	▼	
Margin of Error:?	5	%	
Population Proportion:?	50	%	Use 50% if not sure
Population Size:?	700		Leave blank if unlimited population size.
Calculate ▶		Clear	

3.4.3. Sampling Technique

Purposive sampling is used in this study to choose study participants based on standards relevant to the goals of the research.

Purposive Sampling: Purposive sampling is a purposeful selection of participants based on specific characteristics or standards that are relevant to the goals of the study (Campbell, Greenwood, & Walker, 2020). It enables researchers to concentrate on certain population subgroups, guaranteeing that the selected sample offers significant insights into the research problems.

Purposive Research: On the other hand, purposive research is a broader term that includes the planned and purposeful structuring of the whole research project to fulfil objectives

(Campbell, Greenwood, & Walker, 2020). It involves intentional selection at several points in the research process, such as choosing a study topic, formulating research questions, and selecting research methodologies.

Integration of Both Concepts:

Using a purposive sampling approach in this study is consistent with the overall purposive research design (Campbell, Greenwood, & Walker, 2020). To obtain insightful conclusions on the relationship between supply chain performance and information sharing, organizations were purposefully chosen based on their relevance to the research objectives (Campbell, Greenwood, & Walker, 2020). This methodical technique ensures that the design of the study is customized to meet the goals stated in the research. This study intends to provide a focused and targeted analysis of the relationship between information sharing and supply chain performance within the chosen environment of Islamabad, Pakistan, using both purposive sampling and purposive research (Campbell, Greenwood, & Walker, 2020).

3.5. Research Design

To systematically examine the effects of operational and strategic information sharing on supply chain performance within the context of Pakistan, this quantitative study uses a descriptive research design.

3.5.1. Descriptive Research Design:

The descriptive research design enables an unaltered, in-depth description of the phenomena under study. It aims to provide readers a solid understanding of operational and strategic information sharing as well as how they affect Pakistan's supply chain performance.

3.5.2. Research Instruments:

The primary tool for the research is a structured questionnaire. The purpose of this questionnaire is to gather quantitative data regarding supply chain performance, operational information sharing, and strategic information sharing. A Likert scale will be used to quantify the responses, making statistical analysis and numerical representation easier. The research design's emphasis on description and exploration makes it ideal for identifying trends and connections between the relevant variables, which will add insightful new information to the body of knowledge already available on supply chain management.

3.6. Data Collection:

Any research study must include collection of data since it directly affects the validity and reliability of the findings. For the collection of primary data, structured questionnaires are the main tool for data collection used in this quantitative study. Employees of the chosen companies in Islamabad were given the questionnaires; according to Morgan's table, a sample size of 250 respondents was targeted. For secondary data, to be used for literature review, data was collected from online journals such as ScienceDirect, Elsevier, and IEEE to name a few.

3.7. Analysis and Interpretation of Data:

Using the proper instruments and software, a statistical analysis of the gathered data was performed. To enumerate the salient features of the data, descriptive statistics like mean, median, and standard deviation are used. Regression analysis is one of the inferential statistical approaches that are used to investigate the relationships between variables. The purpose of the analysis is to shed light on how supply chain performance is affected by the sharing of operational and strategic information.

3.8. Procedure of Research:

To reach the desired sample size of 250 people, 300 questionnaires were distributed to prospective participants as part of the research process. It is crucial to remember that achieving the intended goal proved to be a challenging task, and the procedure took a long time. To gather information for the study, the participants were asked to complete the questionnaires. The difficulties encountered in achieving the intended sample size highlight the unique characteristics and complexity of the data collection procedure in this study.

3.9. Theoretical Framework:

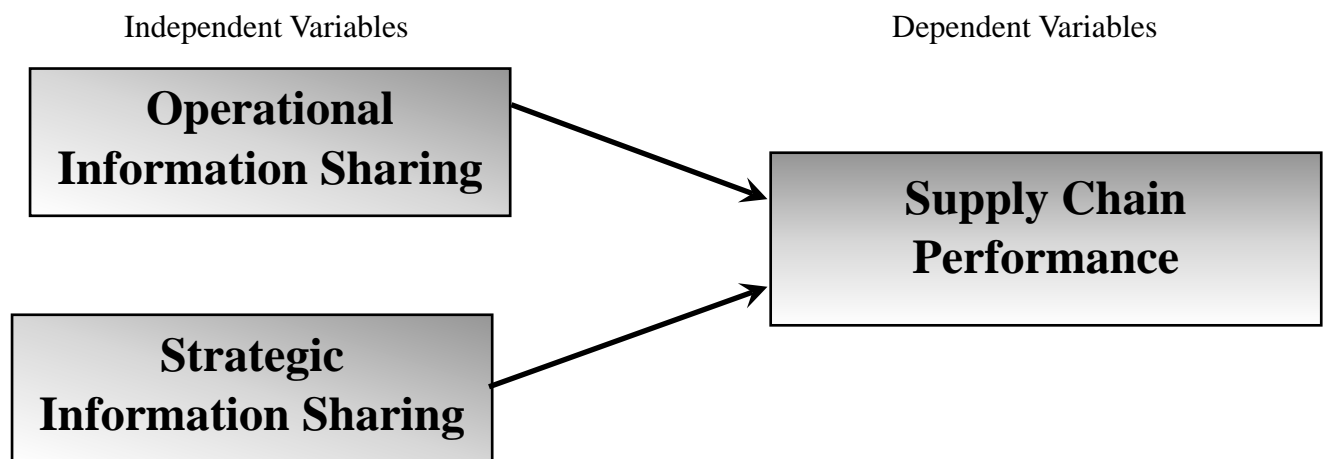


Figure 1

The relationship between supply chain performance, strategic information sharing, and operational information sharing forms the basis of this study's theoretical framework. In this context:

- **Operational Information Sharing:** It measures how much real-time data on sales, inventories, demand projections, order status, and production plans are shared by companies throughout the supply chain.
- **Strategic Information Sharing:** This variable refers to the exchange of longer-term, higher-level information between supply chain partners about corporate plans, overarching strategy, and market trends.

- **Supply Chain Performance:** The total performance of the supply chain, which includes aspects like cost, quality, delivery, and flexibility, is the dependent variable in this framework.

The theoretical framework suggests that exchange of operational and strategic information is one of the main factors affecting the performance of the supply chain. The arrows show the projected impact's direction. Improved supply chain performance is a result of both strategic and operational sharing.

3.10. Research Hypothesis:

- H1: There is a positive impact of operational information sharing on supply chain performance.
- H0: There is no significant impact of operational information sharing on supply chain performance.
- H2: There is a positive impact of strategic information sharing on supply chain performance.
- H0: There is no significant impact of strategic information sharing on supply chain performance.

Chapter 4

This chapter consists of the statistical analysis results taken after running statistical tests on the data collected for research. The data is collected using a questionnaire that's filled in by 253 experts in the supply chain industry. The chapter shares results of Cronbach Alpha, regression tests, T-tests, and correlation test. The researcher interprets the results of the statistical tests to perform analysis on the hypothesis of this research.

Demographics:

Frequency Tables for the demographics (Company size, Age group, Gender, and Educational Background) are given below:

Statistics

		Company Size	Age Group of Employee	Gender	Educational Background
N	Valid	253	253	253	253
	Missing	0	0	0	0

Company Size

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	.8	.8	.8
Enterprise (>1,000)	12	4.7	4.7	5.5
Large (501-1,000 Employees)	25	9.9	9.9	15.4
Medium (51-500 Employees)	155	61.3	61.3	76.7
Small (1-50 Employees)	59	23.3	23.3	100.0
Total	253	100.0	100.0	

Age Group of Employee

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	.8	.8	.8
21-26	72	28.5	28.5	29.2
27-35	123	48.6	48.6	77.9
36-45	48	19.0	19.0	96.8
45 or above.	8	3.2	3.2	100.0

Total	253	100.0	100.0
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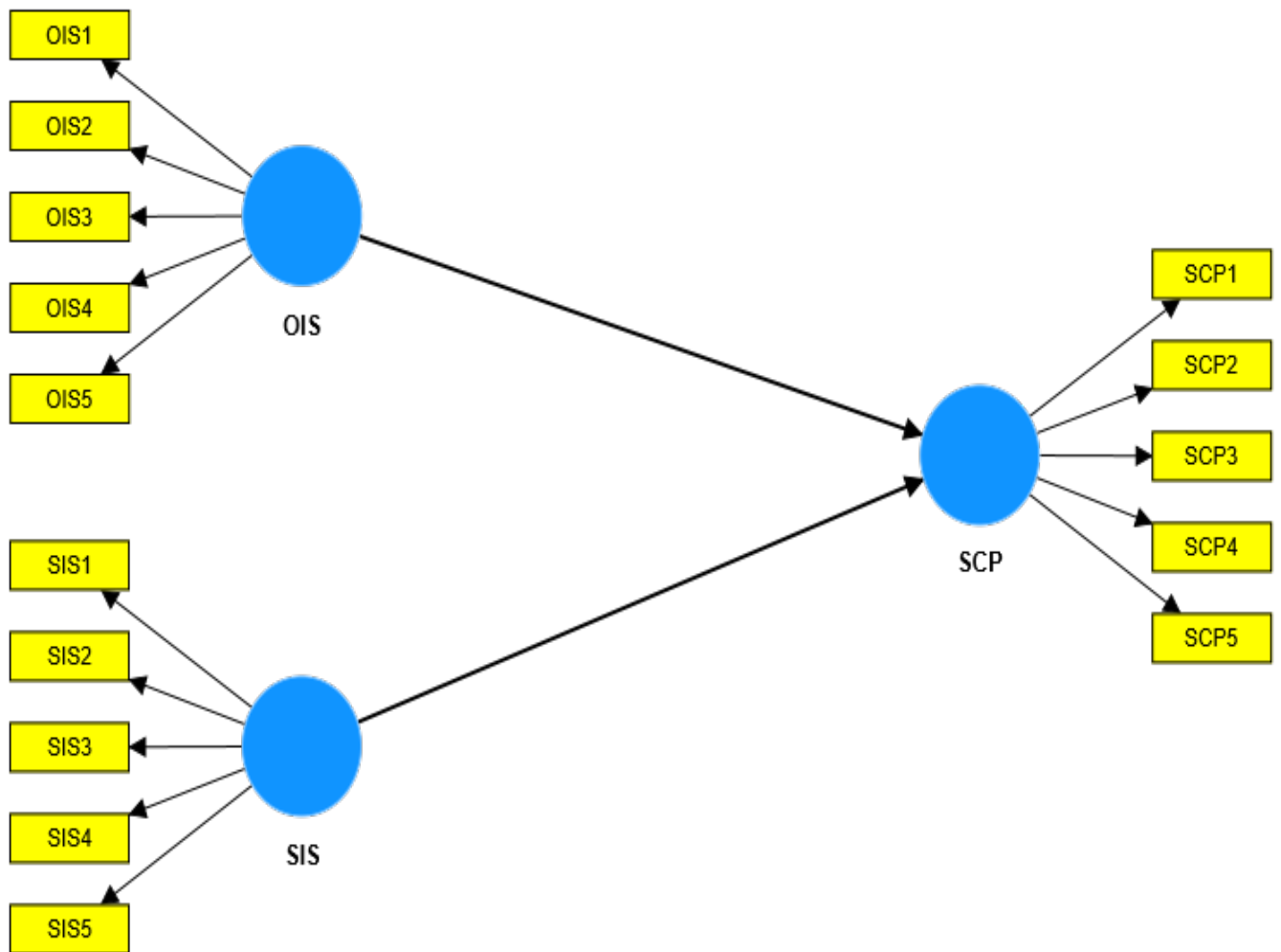
Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	.8	.8	.8
Female	82	32.4	32.4	33.2
Male	169	66.8	66.8	100.0
Total	251	100.0	100.0	

Educational Background

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	.8	.8	.8
Bachelor's degree	148	58.5	58.5	59.3
BBA	1	.4	.4	59.7
Diploma/High School	33	13.0	13.0	72.7
Master's degree	56	22.1	22.1	94.9
Ph.D.	12	4.7	4.7	99.6
Undergraduate	1	.4	.4	100.0
Total	253	100.0	100.0	

Research Model:



Correlations:

	OIS	SCP	SIS
OIS	1.000	0.806	0.889
SCP	0.806	1.000	0.937
SIS	0.889	0.937	1.000

Table 4. 1

- **Interpretation:**

Correlation between variables shows if one variable increase or decreases if the other one increases or decreases. In this study, the correlation between 3 variables is a strong positive correlation.

- The correlation between Operational Information sharing, and Supply Chain performance is 0.806, and correlation between Strategic Information Sharing and Supply chain performance is 0.937.
- The result from the table suggests that both independent variables; OIS and SIS have a positive impact on the dependent variable SCP. Meaning when OIS or SIS increases, SCP increases as well.

Regression:

Regression analysis is a statistical method that researchers use to analyze the relation between independent and dependent variables of a study. The purpose of this statistical analysis is to quantify the said relationship between independent and dependent variables. The quantification of the relation allows researchers to understand the relation better and make predictions.

	R-square	R-square adjusted
SCP	0.882	0.881

Table 4. 2

- **Interpretation:**

Results from table 4.2. shows the combined effect of the independent variables on the dependent variable SCP is 88.2%.

Coefficients:

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
OIS -> SCP	0.295	0.298	0.079	3.737	0.000
SIS -> SCP	0.463	0.471	0.074	6.267	0.000

Table 4. 3

- **Predictors:** OIS and SIS.
- **Dependent Variable:** SCP (Supply Chain Performance)
- **Interpretation:**
 - The impact or role of Operational information sharing on Supply Chain Performance is positive and significant as shown by the T value of 3.737 in table 4.3 for the path from OIS to SCP. Similarly, the T value of 6.267 for the path from SIS to SCP also suggests a significantly positive impact of Strategic Information sharing on Supply Chain performance.
 - The results present strong evidence that aligns with H1 and H2 hypothesis which suggested a positive impact of Operational and Strategic information Sharing on Supply Chain.

Cronbach Alpha:

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
OIS	0.737	0.745	0.736	0.361
SCP	0.699	0.711	0.701	0.323
SIS	0.663	0.671	0.656	0.282

Table 4. 4

- **Interpretation:**

Cronbach Alpha's for OIS, SCP, and SIS are 0.737, 0.699, and 0.663 respectively, which are all under acceptable threshold, generally Cronbach alpha between 0.6 and 0.8 are acceptable. The AVE for both IVs is under the desirable threshold of 0.5, which suggests further research may be needed in the future. Overall, the reliability measures are acceptable for the study.

Chapter 5

5.1. Discussion:

The overall results of the study show the role of Information sharing (Operational and Strategic) on Supply Chain Performance. Examining the correlations between the variables from table 4.1 from chapter 4 we see that correlation between Operational Information sharing, and Supply Chain performance is 0.806, and correlation between Strategic Information Sharing and Supply chain performance is 0.937, which suggests a strong positive impact. The results from regression analysis further reinforce these findings of positive impact of information sharing on Supply chain performance.

The t-tests conducted show a T value of 3.737 in table 4.3 for the path from OIS to SCP. Similarly, the T value of 6.267 for the path from SIS to SCP also suggests a significantly positive impact of Strategic Information sharing on Supply Chain performance. The respective p-values along the T statistics of both OIS and SIS are also considerably low.

Final Verdict:

After conducting regression analysis, t-tests, reliability tests, and correlation tests, the results of the statistical analysis provide strong evidence to accept the following hypotheses:

- H1: There is a positive impact of operational information sharing on supply chain performance. (Accepted)
- H2: There is a positive impact of strategic information sharing on supply chain performance. (Accepted)

5.2. Conclusion of the Study:

In conclusion, the overall study has been a success in exploring the relation of Information sharing and supply chain performance, information sharing practices, both

strategic and operational have an impact on supply chain performance. Through the results of the study, supply chain experts can conclude that sharing information in supply chains can help improve the overall performance of a company's supply chain.

5.3. Implications for Practice:

5.3.1. Theoretical Implications:

The research conducted contributes to theoretical foundation of supply chain, it sheds light on the role of operational and strategic information sharing. The identification of the role that these variables play in the performance of supply chain contributes to the present research on supply chain management. The study has laid the groundwork for future researchers seeking to study role of information sharing in supply chain management and performance in Pakistan or use this research as a base for in other countries.

5.3.2. Practical Implications:

The findings from this study give supply chain experts actionable insight into how they can improve the supply chain performance of a company overall. The use of information sharing practices, a balanced approach of both strategic and operational information sharing would help the supply chain practitioners to improve the supply chain performance. These findings and actionable insights can guide decision making in supply chain processes as well.

5.4. Limitations of the Study:

Although this research has provided valuable contributions to the supply chain literature, it is not without its limits. Two noticeable limitations in this study are the limited geographical constraint of Islamabad city due to time constraints, and the second limitation would be the study's reliance on self-reported data filled by employee of the companies, which could be sometimes biased, although the sample size was carefully decided, it still

does not fully represent the entirety of supply chain landscape of Pakistan. However, the positive results still encourage further study and exploration into the study.

5.5. Future Recommendations:

Future research on the same area of study can build upon this study to further explore different aspects of information sharing, or they can further improve this study entirely by looking into data collected from all over Pakistan. Furthermore, this study only investigated role of information sharing on supply chain performance overall, and not the aspects of supply chain performance, future research can focus on how information sharing impacts the aspects of supply chain performance, which are cost, quality, delivery, and flexibility.

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