The importance of supply chain integration in the performance nexus: A case from developing country

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Effective supply chain management (SCM) hinges on seamless integration among stakeholders, a concept extensively explored in literature. This involves efficient coordination, collaboration, and swift information sharing to align everyone toward common goals, ultimately reducing costs and inefficiencies. Integration enhances communication decision-making and standardizes processes, reducing errors and waste. Organizations must continually assess and monitor integration processes, emphasizing effective communication and collaboration in areas such as vendor management, procurement, and distribution. Success in SCM depends on vigilant monitoring and assessment of integration strategies, ensuring optimized outcomes. The study conducted a quantitative data analysis with survey questionnaires. The study found that for sustainable supply chains, it is essential to consider the competitive priorities of networked firms, industry type, and stakeholder collaboration. Different industries require varying levels of supply chain integration, necessitating exploration of integration-related topics for a comprehensive understanding. Sustainable supply chains depend on member collaboration, ethical practices, and a balance of economic and environmental considerations. Specifically, the agricultural food sector’s focus on sustainability drives the demand for better integration. The lack of integration results in inefficiencies, higher costs, and a lack of collaboration, preventing the realization of potential benefits.Current research aims to explore the reliability of adopting SCM integration methods in the Asian agricultural food industry. This research explored the practical aspects of integrating supply chains in this sector that was neglected in the Asian agricultural food industries, hindering efficiency and cost reduction.

Keywords: Agriculture, Food, Supply chain management, Environmental performance, Economic performance, Operational performance
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1. Introduction

Supply Chain Management (SCM) requires effective integration among all parties for successful outcomes. This concept, which has been widely explored in the literature, is all about efficient coordination and collaboration between different stakeholders. This helps to ensure that information is shared swiftly and accurately, that everyone is working towards the same goals, and that costs and inefficiencies are reduced. Furthermore, integration aids in the improvement of communication between parties, allowing for better decision-making and problem-solving. Standardizing processes is also possible through integration, further reducing waste and minimizing errors. To ensure successful SCM, organizations must constantly monitor and assess their integration processes and strategies. Through this, they can identify areas for improvement and make sure they are getting the most out of their integration efforts. Moreover, it is important to make sure all stakeholders are communicating and collaborating effectively, which includes monitoring and improving processes such as vendor management, procurement, and distribution. In the end, the success of any SCM is dependent on effective integration. By improving integration within a supply chain, organizations can reduce costs, increase efficiency, and create a more robust and efficient supply chain. Companies must be vigilant in monitoring and assessing their integration strategies to ensure their integration efforts are successful and that they are getting the most out of their integration strategies (Baloch & Rashid, 2022).

It requires the alignment of objectives, data exchange, and the interlinking of various business activities to bring value to the customer. By creating a unified, streamlined system, companies can save time, money, and resources while providing a higher-quality product or service. This integration also allows for better communication and collaboration between suppliers and customers, resulting in further cost savings and enhanced customer satisfaction. Ultimately, supply chain integration allows for a more efficient and profitable business model, ensuring the long-term sustainability of the company. Strategic management offers organizations the ability to gain a competitive advantage over competitors. This is achieved through cost reduction, technology improvement, increased understanding and use of technology, and the creation of higher value for customers. By implementing these strategies, firms are able to increase their performance and gain a competitive edge. It’s important for firms to understand how to effectively use strategic management to achieve their desired results. This can be done by focusing on the customer experience, utilizing cost-effective methods, leveraging technology, and creating value for customers. By doing this, firms can gain a competitive edge and be better positioned to succeed in a highly competitive environment. By unifying different departments and aligning their efforts, businesses can optimize their operations and deliver better goods and services to their customers. This synergy creates a well-coordinated and efficient flow of resources, promoting a cohesive and responsive supply chain. The key focus of internal integration lies in establishing smooth communication and collaboration between departments. This collaborative environment facilitates the sharing of information, insights, and expertise across the organization. As a result, decision-making becomes more informed and aligned with the overall supply chain objectives. Such collaboration breaks down silos and barriers, promoting a unified approach towards achieving common goals. Coordination between operations and logistics control is vital for managing the physical flow of goods and ensuring timely delivery to customers. By integrating these departments, organizations can optimize inventory management, reduce lead times, and minimize transportation costs, leading to improved supply chain efficiency. Additionally, the collaboration between marketing, advertising, and sales departments ensures that the products or services offered by the organization meet the needs and preferences of customers. This alignment helps in designing effective marketing strategies, creating compelling advertising campaigns, and ultimately driving sales. Furthermore, internal integration fosters a culture of continuous improvement within the organization. As departments work together towards supply chain objectives, they can identify areas for optimization and innovation. This proactive approach helps businesses adapt to changing market demands, enhance product offerings, and maintain a competitive edge. A well-integrated internal environment also leads to better utilization of resources, reducing redundancies, and minimizing waste. By streamlining processes and eliminating inefficiencies,
organizations can achieve cost savings, enabling them to offer competitive prices while maintaining profitability. In conclusion, internal integration is a fundamental process that unifies various departments within an organization, harmonizing their efforts to achieve supply chain objectives.

It is essential to consider the competitive priorities of the networked firms and the industry type when looking at the correlation between SCI and performance. For instance, fast customer delivery and cost efficiency should be taken into account when structuring SCI. Furthermore, different industries necessitate different levels of SCI. Therefore, SCM experts need to explore further integration-related topics using theoretical and empirical data in order to gain a complete understanding of the relationship between SCI and performance. By considering the complexity of the process, the competitive priorities of the networked firms, and the industry type, we can gain a stronger comprehension of the connection between SCI and performance (Brockhaus et al., 2013). Given procedures involved in strict integration and interconnection among intercompany processes. Recent studies (Wiengaarten et al., 2015; Shee et al., 2018; Kang et al., 2018). For a supply chain to be sustainable, it is essential that all the network's stakeholders have compatible goals and that each participant acts ethically, morally, and socially. This means that all parties must work together to ensure that their operations comply with the same set of values and that they are mutually beneficial. The success of sustainable supply chains relies on each member understanding their responsibility to the environment and to one another and taking the necessary steps to ensure that their actions are beneficial for all. (Wu et al., 2013; Herczeg et al., 2018). Supply chain integration is essential for the successful design and operation of supply chains that are both profitable and sustainable. Research has been conducted on how integration influences sustainable supply chains in project-based industries such as construction. Outcomes show that a certain degree of integration is required to ensure the balance of economic and environmental/social considerations. Without such integration, supply chain networks are unlikely to be successful (Dallsega et al., 2017; Zeng et al., 2018). This development is related to the first factor and the second factor already mentioned. The agricultural food sector is increasingly focused on sustainability, driving the necessity for better integration in the supply chain. To that end, there is growing demand for the integration of different stakeholders, including suppliers, producers, and logistics providers. This integration will help to ensure that the entire process is more sustainable, reducing waste and increasing efficiency. Moreover, the increased transparency and communication between partners will lead to a better source for the supply chain as a whole. In the presence of environmental and market complexity, as well as process and coordination complexity, integrating the supply chain is a difficult task. Climatic uncertainty and water scarcity create unexpected changes, while prices and demand can be highly volatile. Additionally, there are logistical risks and limited capacity when dealing with perishable goods, and multiple stakeholders must work together effectively to meet operational and regulatory goals. Thus, integrating the supply chain in such a complex environment is a challenge. Research on the SCI of agricultural food is limited. Most of the available studies explore the theoretical aspects of integration or examine how it can affect the performance of the supply chain. Few studies have been conducted to understand how integration can be used to optimize the operations and efficiency of the agricultural food sector. In the agricultural food sector, supply chain managers are focused on advancing the integration of all actors in the networks as well as determining the potential benefits. To support this, many initiatives have been put in place, such as the International Foodservice Manufacturers Association. This association works to bring all the actors in the food chain together and to ensure that everyone is able to capitalize on the increased integration in the supply chain.

1.2 Research Gap

SCM integration for agricultural food industries has always been neglected and never discussed to be modified in such a way to improve costing and reduce waste. This research is exploring the reliability of adopting this method. The agricultural food industry in the Asian region has not yet adapted an integrated supply chain system, which could potentially improve efficiency and reduce costs. This lack of integration has resulted in a lack of visibility and control over the supply chain, leading to inefficiencies and higher costs. Additionally, the lack of integration has caused a lack of collaboration between different stakeholders, resulting in a lack of trust and communication. As a result, the agricultural food industry in the Asian region is not able to take advantage of the potential benefits of
an integrated supply chain system.

2. Literature Review

2.1 Theoretical Background

2.1.1 Dimension of SCI

Research that has focused on the factors influencing smallholder involvement in citrus supply networks in Pakistan is limited. Such studies have largely overlooked the effect that active participation in these networks has on smallholder productivity and wellbeing. The current state of citrus supply networks in Pakistan is hindered by substantial post-harvest losses, which inhibit the development of these networks. As such, it is essential to further explore the connection between smallholder involvement and the growth of citrus supply chains (Rabia Mazhar et al., 2022).

Strategic management offers organizations the ability to gain a competitive advantage over competitors. This is achieved through cost reduction, technology improvement, increased understanding and use of technology, and the creation of higher value for customers. By implementing these strategies, firms are able to increase their performance and gain a competitive edge. It’s important for firms to understand how to effectively use strategic management to achieve their desired results. This can be done by focusing on the customer experience, utilizing cost-effective methods, leveraging technology, and creating value for customers. By doing this, firms can gain a competitive edge and be better positioned to succeed in a highly competitive environment (Alfalla-Luque et al., 2012; Zhao et al., 2013; Chang et al., 2016). External integration involves the crucial process of linking diverse customers and/or suppliers together, fostering seamless information and resource sharing to establish an efficient and cost-effective operational approach. The scope of external integration may differ based on specific business needs, encompassing various aspects such as data exchange, process automation, and even joint endeavors in developing innovative products or services. This collaborative environment facilitates a cohesive and mutually beneficial relationship among stakeholders, leading to enhanced customer satisfaction and substantial cost savings for the companies involved. By integrating external partners, businesses can optimize their operations and gain a competitive edge in the dynamic market landscape, ultimately driving overall growth and success (Huo et al., 2012; Ataseven et al., 2017). A SC that is highly integrated enables organizations to draw in, choose, and maintain stakeholders involved in the chain of operations (Huang et al., 2014). Whereas A significant internal integration has taken place among various departments within the organization. Internal integration is a crucial process that aims to unify the diverse departments, units, and functions of an organization, harmonizing their efforts to achieve the objectives of the supply chain. This comprehensive approach involves seamless coordination between operations, logistics control, marketing, advertising, and sales departments, among others. The overarching goal is to foster effective collaboration across departments, streamline the supply chain, and ultimately reduce costs. Effective internal integration is paramount for organizations seeking to enhance their competitiveness in the market and ensure customer satisfaction. By unifying different departments and aligning their efforts, businesses can optimize their operations and deliver better goods and services to their customers. This synergy creates a well-coordinated and efficient flow of resources, promoting a cohesive and responsive supply chain. The key focus of internal integration lies in establishing smooth communication and collaboration between departments. This collaborative environment facilitates the sharing of information, insights, and expertise across the organization. As a result, decision-making becomes more informed and aligned with the overall supply chain objectives.

Such collaboration breaks down silos and barriers, promoting a unified approach towards achieving common goals. Coordination between operations and logistics control is vital for managing the physical flow of goods and ensuring timely delivery to customers. By integrating these departments, organizations can optimize inventory management, reduce lead times, and minimize transportation costs, leading to improved supply chain efficiency. Additionally, the collaboration between marketing, advertising, and sales departments ensures that the products or services offered by the organization meet
the needs and preferences of customers. This alignment helps in designing effective marketing strategies, creating compelling advertising campaigns, and ultimately driving sales. Furthermore, internal integration fosters a culture of continuous improvement within the organization. As departments work together towards supply chain objectives, they can identify areas for optimization and innovation. This proactive approach helps businesses adapt to changing market demands, enhance product offerings, and maintain a competitive edge. A well-integrated internal environment also leads to better utilization of resources, reducing redundancies, and minimizing waste. By streamlining processes and eliminating inefficiencies, organizations can achieve cost savings, enabling them to offer competitive prices while maintaining profitability. In conclusion, internal integration is a fundamental process that unifies various departments within an organization, harmonizing their efforts to achieve supply chain objectives. It emphasizes effective communication and collaboration, promoting a cohesive flow of goods and services. By aligning operations, logistics control, marketing, advertising, and sales departments, organizations can optimize their supply chain, reduce costs, and enhance customer satisfaction. This synergy creates a more competitive and customer-centric organization capable of thriving in the dynamic market landscape (Feyssa et al., 2019; Chang et al., 2016; Kakar et al., 2023). The parallel domain of external integration refers to an organization's ability to collaborate effectively with its partners within the supply chain to advance inter-organizational strategies. This entails the development and implementation of processes, procedures, norms, and behaviors that are integrated, synchronized, and compatible across all involved entities. By achieving this level of alignment, companies ensure that their communication and coordination with external partners are both effective and efficient, thereby contributing to the establishment of a stronger and more resilient supply chain. The successful practice of external integration empowers organizations to derive various benefits, including improved collaboration, reduced costs, and enhanced revenue streams. External integration hinges on the seamless collaboration between organizations within the supply chain. It extends beyond individual entities and involves harmonizing strategies, sharing information, and jointly pursuing common objectives. When organizations work together in a cohesive manner, they create a formidable force capable of tackling challenges and capitalizing on opportunities within the supply chain ecosystem. Central to external integration is the synchronization of processes, procedures, and norms among all partner organizations. This synchronization ensures that the flow of activities is seamless and consistent, minimizing bottlenecks and disruptions.

When all entities adhere to compatible procedures, the supply chain becomes more agile and responsive to dynamic market demands. Effective communication is a cornerstone of external integration. Organizations must establish clear lines of communication with their external partners, promoting open dialogue and information sharing. Through enhanced communication, entities can swiftly respond to changes, address emerging issues, and capitalize on market trends, fostering adaptability within the supply chain. Collaboration, both within and between organizations, is crucial to driving external integration. Partner organizations must view each other as strategic allies rather than competitors, fostering a cooperative and mutually beneficial relationship. By sharing resources, expertise, and insights, the supply chain gains a competitive edge, and partners can achieve shared success. To achieve successful external integration, organizations must first focus on internal integration. Internal integration involves aligning and harmonizing internal processes and procedures to ensure their seamless extension into external activities. It is the foundation upon which external collaboration can be built. In essence, internal integration ensures that an organization's internal operations are well-coordinated and optimized, setting the stage for productive engagement with external partners. By aligning internal processes, organizations can overcome inefficiencies, reduce redundant efforts, and streamline operations. Internal and external integration are two key aspects of new product development (NPD). Internal integration refers to the coordination and collaboration between different departments or functions within an organization, such as engineering, marketing, and manufacturing. External integration refers to the coordination and collaboration between an organization and its external partners, such as suppliers, customers, and research institutions.

Both internal and external integration are essential for successful NPD. Internal integration helps to ensure that all aspects of the product development process are aligned, from concept to launch. External integration helps to ensure that the product meets the needs of customers and that it can be
manufactured efficiently. There are a number of ways to achieve internal and external integration in NPD. One way is to use cross-functional teams, which bring together people from different departments or functions to work on the same product development project. Another way is to use information technology (IT) tools to facilitate communication and collaboration between different stakeholders.

The level of internal and external integration that is needed for successful NPD will vary depending on the specific product and the organization. However, in general, organizations that are able to achieve a high level of integration are more likely to be successful in NPD. Here are some of the benefits of internal and external integration in NPD: Increased speed to market: By coordinating and collaborating across different departments and functions, organizations can reduce the time it takes to bring new products to market.

Improved product quality: By getting input from a variety of stakeholders, organizations can ensure that their products meet the needs of customers and that they are manufactured to a high standard.

**Reduced costs:** By sharing information and resources, organizations can reduce the costs of product development.

**Increased customer satisfaction:** By working closely with customers, organizations can ensure that their products meet customer needs.

In conclusion, internal and external integration are two key aspects of successful NPD. By achieving a high level of integration, organizations can increase their chances of bringing new products to market quickly, efficiently, and to the satisfaction of customers.

To ensure successful data integration, businesses need to develop a comprehensive data integration strategy. This strategy should outline the purpose and objectives of data integration, identify the key stakeholders involved, specify the data sources to be integrated, define the scope of integration, and establish a clear timeline for implementation. Additionally, organizations must carefully consider the security and privacy implications of the data integration process to protect sensitive information and comply with relevant data regulations. Data integration is indeed a complex task, requiring close collaboration between different parts of the supply chain. Successful data integration involves seamless data sharing between various entities, such as manufacturers, suppliers, distributors, and customers. This collaboration ensures that each participant has access to the right information at the right time, enabling them to make well-informed decisions that positively impact the overall supply chain performance. The benefits of data integration extend far beyond the immediate gains in efficiency and cost savings. With a fully integrated supply chain, businesses gain the agility and responsiveness needed to thrive in the rapidly changing market landscape. The ability to access real-time data and insights allows organizations to respond swiftly to shifts in demand, supply disruptions, and market trends, giving them a competitive advantage. Operational integration is a critical outcome of successful data integration. It involves the coordination of efforts between various parties within the supply chain to ensure that each entity plays a well-defined and complementary role in the development process. Operational integration facilitates seamless collaboration among stakeholders, allowing for a smooth flow of goods and information throughout the supply chain. By streamlining operations and optimizing processes through data integration, businesses can make better decisions in a timely manner, leading to improved customer experience and satisfaction. With the ability to anticipate customer needs and respond rapidly to market dynamics, organizations can build stronger relationships with their customers, foster brand loyalty, and drive sustainable growth. Ultimately, operational integration is an essential tool for businesses seeking to remain competitive and relevant in the modern market landscape. By embracing data integration and leveraging the power of information, businesses can unlock new opportunities for growth, better manage their resources, reduce costs, and improve productivity. The ability to make data-driven decisions empowers organizations to navigate complexities and uncertainties in the supply chain, positioning them for long-term success and resilience. As businesses continue their digital transformation journey, data integration will continue to play a central role in shaping the future of supply chain management.
In Pakistan, supply chain operating systems are facing several challenges in terms of sustainability. These can have adverse effects on the performance of firms, preventing them from reaching their maximum potential, especially when it comes to the large exports of mandarin production. Supply chain integration is a crucial aspect of a business’ success, as it allows the various members across the chain to work together in order to achieve mutual benefits. Integration helps to ensure that all stakeholders involved in a supply chain are treated fairly and compensated accordingly. When properly managed, it can lead to increased profits and better customer satisfaction. The first step in making sure that all members of a supply chain benefit from integration is recognizing and valuing their contributions. This means that all stakeholders should be given the opportunity to share in the rewards and have a voice in decision-making. To ensure that this happens, companies should strive to create a fair and equitable compensation system where everyone is rewarded for their efforts. Additionally, companies should strive to create a system that encourages collaboration and communication between stakeholders, as this will help to ensure that all parties are receiving the best value for their contributions. Another way to ensure that all stakeholders benefit from supply chain integration is by providing them with the necessary tools and resources to help them succeed. This could include providing them with access to the latest technology as well as training and support services. Additionally, companies should strive to create a system that rewards innovation and encourages the development of new ideas and processes. By doing this, companies can ensure that everyone is able to contribute to the success of the supply chain and is rewarded for their efforts. Finally, companies should strive to create a system that ensures that all stakeholders are properly compensated. This could include creating a system where farmers and consumers both receive fair and equitable returns for their efforts. Additionally, companies should strive to create a system that allows for flexibility and adaptability so that all stakeholders are able to benefit from the changes that occur in the supply chain (Siddique et al., 2018).

Companies can significantly enhance the sustainability, efficiency, and effectiveness of the supply chain by implementing measures to ensure fair treatment and adequate compensation for all participants. Such steps not only foster a more harmonious and cooperative system but also lead to increased profitability and heightened customer satisfaction. By valuing and recognizing the efforts of each stakeholder, companies can strengthen relationships within the supply chain and promote a more cohesive and supportive network. Ensuring fair treatment encompasses various aspects, including equitable distribution of profits, transparent business practices, and ethical sourcing. Companies should strive to create a system that ensures that all stakeholders are properly compensated. This could include creating a system where farmers and consumers both receive fair and equitable returns for their efforts. Additionally, companies should strive to create a system that allows for flexibility and adaptability so that all stakeholders are able to benefit from the changes that occur in the supply chain. Recognizing the value of their contributions encourages a sense of loyalty and commitment, ultimately leading to improved performance and reliability within the system.

The positive effects of these measures extend beyond individual stakeholders. When companies prioritize fair treatment and adequate compensation, the entire supply chain functions as a cohesive unit, with each participant working collaboratively towards shared objectives. This unified approach results in streamlined operations, reduced inefficiencies, and optimized resource allocation, leading to a more sustainable and efficient supply chain. Furthermore, integrating fairness and adequate compensation into the supply chain enhances customer satisfaction. Ethical and sustainable practices resonate positively with consumers, who are increasingly conscious of the social and environmental impacts of their purchasing decisions. As companies prioritize fairness and sustainability, they can build a loyal customer base that aligns with their values and contributes to the overall success of the supply chain. By fostering a culture of fairness and collaboration, relationships among stakeholders are strengthened. Trust and mutual respect develop as participants recognize their shared interests and commitment to achieving common goals. Such cohesive relationships create a supportive environment for problem-solving, conflict resolution, and innovation, promoting the collective success of the supply chain. Ultimately, embracing fair treatment and adequate compensation in the supply chain creates a
positive cycle of benefits. As participants feel valued and rewarded for their contributions, they are more motivated to invest time, resources, and expertise in the system. This, in turn, leads to improved performance, higher-quality products, and increased customer satisfaction, resulting in enhanced profitability for companies. In conclusion, prioritizing fair treatment and adequate compensation for all participants in the supply chain yields numerous benefits, fostering a more sustainable, efficient, and effective system. By nurturing a culture of collaboration and support, companies can strengthen relationships among stakeholders, leading to increased profitability and customer satisfaction. Embracing these principles is crucial to ensuring that all members of the supply chain can reap the benefits of integration, creating a better and more prosperous future for everyone involved (Leuschner et al., 2009; Shou et al., 2018; Demeter et al., 2016; Mackelprang et al., 2014). Integrating practices into daily activities can help maximize performance. By doing this, it can improve efficiency and help to reach desired goals. (Chang et al., 2016; Ataseven et al., 2017; Kim et al., 2018). Recent developments in the relationship between conceptual and contextual factors have sparked inquiries into the nature of their dependence and non-linearity, with studies revealing their intricate interconnection and complexity under various conditions, highlighting the need for further research to gain a comprehensive understanding. As researchers delve into the combination and contradictions of observations, they are increasingly intrigued by the effective factors contributing to successful supply chain integration, prompting discussions on supply chain management (SCM) and its two distinct categories of drivers, particularly the role of information technology in deepening the exploration of the underlying mechanisms of supply chain integration success (Rashid et al., 2020).

2.2 Theoretical Model& the Hypotheses Developments

A supply chain is a network of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer. It includes all the stages involved in getting a product or service to market, from the initial raw materials to the final delivery to the customer. Theoretical models of supply chains are used to understand how these networks work and to identify ways to improve their efficiency and effectiveness. There are many different theoretical models of supply chains, but they all share some common elements. One of the most important elements of a supply chain is the flow of information. Information flows through the supply chain in both directions, from suppliers to customers and from customers back to suppliers. This information is used to make decisions about everything from production levels to inventory levels. Another important element of a supply chain is the flow of materials. Materials flow through the supply chain from suppliers to customers, and they are transformed and added value at each stage. The flow of materials is closely linked to the flow of information, as decisions about production levels and inventory levels are based on the availability of materials (Rashid & Rasheed, 2022). Theoretical models of supply chains also consider the relationships between the different organizations in the network. These relationships can be formal or informal, and they can be cooperative or competitive. The nature of these relationships has a significant impact on the efficiency and effectiveness of the supply chain. Theoretical models of supply chains can be used to identify a number of different ways to improve the performance of the network. These improvements can include reducing costs, improving customer service, or increasing flexibility. One of the most common ways to improve the performance of a supply chain is to reduce costs. This can be done by optimizing inventory levels, improving transportation efficiency, or reducing waste. Another way to improve the performance of a supply chain is to improve customer service. This can be done by reducing lead times, improving product availability, or providing better information to customers. Finally, the performance of a supply chain can be improved by increasing flexibility. This can be done by making the network more responsive to changes in demand, or by making it easier to switch between suppliers. Theoretical models of supply chains are a valuable tool for understanding how these networks work and for identifying ways to improve their performance. By understanding the flow of information, materials, and relationships in a supply chain, businesses can make better decisions about how to operate their networks and how to improve their performance.

The hypothesis development theory of supply chain has a number of implications for the practice of supply chain management. First, it emphasizes the importance of understanding the supply chain before developing hypotheses. Second, it highlights the importance of using data and analysis to
test hypotheses. Third, it suggests that hypotheses should be evaluated based on their ability to explain the data and to predict future outcomes. The hypothesis development theory of supply chain can be used to improve the practice of supply chain management in a number of ways. First, it can help businesses to develop better hypotheses about the behavior of their supply chains. Second, it can help businesses to test these hypotheses more effectively. Third, it can help businesses to evaluate their hypotheses more rigorously. The hypothesis development theory of supply chain is a valuable tool for understanding and improving the practice of supply chain management. By understanding how hypotheses are developed and tested, businesses can make better decisions about how to manage their supply chains.

2.3 Precedents of SCI

Building trust and establishing effective supply chain management requires collaboration between farmers, food manufacturers, suppliers, and distributors. This requires understanding the various backgrounds, knowledge, and characteristics of each of the stakeholders in the agricultural food supply chain. Developing and nurturing such trust is a complex process, but it is essential for maintaining resilient communication, commitment, and interaction between all parties involved (Dania et al., 2018). Trust is the belief that partners will act in a beneficial way for all involved, no matter their ability to be monitored or held accountable (Zhang et al., 2013). The concept of supply chain integration is not new. In fact, there are many precedents of supply chain integration throughout history. One of the earliest examples of supply chain integration can be seen in the Roman Empire. The Romans had a complex supply chain that stretched across their vast empire. They used a system of roads and canals to transport goods and materials, and they had a sophisticated system of record-keeping to track the flow of goods. Another example of supply chain integration can be seen in the Age of Exploration. European explorers needed to develop efficient supply chains in order to support their voyages. They developed a system of supply depots that were located at strategic points along their routes. These depots were stocked with food, water, and other supplies that the explorers needed to survive. The Industrial Revolution also saw a significant increase in supply chain integration. As businesses began to mass-produce goods, they needed to develop efficient ways to get those goods to market. They developed a system of railroads, canals, and steamships to transport goods, and they began to use warehouses to store goods.

In the 20th century, supply chain integration continued to evolve. The development of computers and telecommunications technology made it possible for businesses to share information and collaborate with their partners in real time. This led to the development of new supply chain management techniques, such as vendor-managed inventory and collaborative planning, forecasting, and replenishment (CPFR). Today, supply chain integration is essential for businesses of all sizes. In a globalized economy, businesses need to be able to quickly and efficiently move goods and materials around the world. By integrating their supply chains, businesses can improve their efficiency, reduce their costs, and improve customer satisfaction. Research conducted by SCM scholars suggests that trust is a major factor in increasing the level of commitment and collaboration in supply chain integration (Fawcett et al., 2012; Tsanos et al., 2014; Capaldo et al., 2015; Cai et al., 2013). Due to farmers' hesitance to put their faith in outsiders, building trust in the agricultural food supply chain is a difficult task. Farmers must be convinced that a third party can be relied on in order to ensure proper performance and security (Jraisat et al., 2013). The major food producers are seeking to collaborate with reliable, experienced farmers who have the knowledge and capability to cultivate successful agricultural operations. These partnerships will not only ensure a secure food supply chain but will also help to generate trust and confidence among all stakeholders involved (Placeholder 1), and the farmers' positive reputation could help attract other investors, creating a beneficial cycle of success for everyone (De Sousa et al., 2018). The concept of trust is increasingly seen as an essential component for successful supply chain integration in agricultural food supply chains. Through discussions, it has become apparent that trust is an integral factor in the process of integration and can be the difference between successful collaboration and failure. Trust is necessary for successful collaboration between parties that are geographically dispersed and have different levels of information and capabilities. It is essential for the successful flow of information between various stakeholders and for the implementation of strategies that are mutually beneficial. Trust enables effective communication, coordination, and problem-solving,
leading to an integrated and efficient supply chain. Thus, we nominate these hypotheses:

\( H_1: \text{There is a significant impact of trust on SCI.} \)

Commitment is an important attitude in supply chain management. It involves one partner placing a great deal of importance on their relationship with another, such that they are willing to go to great lengths to keep it in a healthy state. Commitment is essential for successful supply chain integration. It involves sharing a common vision, communicating effectively, trusting each other, and committing the necessary resources. Benefits of commitment in supply chain integration include improved efficiency, reduced costs, enhanced customer service, and enhanced competitive advantage. Challenges of commitment in supply chain integration include lack of trust, different cultures, and technology incompatibility. To build commitment in supply chain integration, businesses should set clear goals and expectations, provide regular communication, and celebrate successes. This commitment involves the belief that the relationship between partners will last a long time and that both are willing to invest effort in ensuring its success. Commitment is key to making sure that business relationships remain strong and beneficial for both parties (Kwon et al., 2005). Collaborative decision-making and better integration of intra-firm processes are facilitated by the use of commitment, enabling improved supply chain operations (Chen et al., 2011; Richey et al., 2009; Bezuidenhout et al., 2012).

Integration is the process of sharing information and connecting activities to reach objectives. It is essential to align goals, understand requirements, and collaborate with counterparts to achieve desired outcomes. Integration provides an opportunity to optimize operations and create value for all involved parties of objectives (Tsanos et al., 2014). Farmers in the agricultural food sector often face challenges due to natural disasters that affect agriculture and food production. These difficulties are often caused by seasonal changes, logistical disruptions, and fluctuating demands, resulting in changes in the demand and prices of agricultural products (Dania et al., 2018).

Farmers' resistance to taking part in contribution, collaboration, and integration initiatives is often caused by a variety of factors. Commitment is a key factor in the success of any supply chain integration initiative in the agricultural food supply chain. A shared vision, mutual trust, open communication, and clear incentives are all important factors that contribute to commitment. When these factors are present, commitment in the agricultural food supply chain is more likely to be achieved, which can lead to a number of benefits, including improved efficiency, increased profitability, and improved food safety. These include a lack of trust in supply chain partners, a lack of knowledge of the benefits of integration, a fear of exploitation, a lack of access to resources, and a lack of support from the government and local institutions. To overcome these barriers, supply chain partners must demonstrate commitment to the relationship by sharing business risks, providing access to resources, and showing willingness to collaborate with farmers. Furthermore, the government and local institutions must take steps to ensure that smallholder farmers are given the support they need to engage in the integration process. Additionally, farmers must be made aware of the potential benefits of integration, such as increased income, more market access, and better access to resources. With the right commitment from all parties, farmers will be more likely to take part in integration initiatives and benefit from the opportunities that collaboration and integration can bring. We formulate the following hypothesis:

\( H_2: \text{There is a significant impact of commitment on SCI.} \)

SCI is an indispensable component of success for any organization in the modern business landscape. By connecting strategic and operational activities, this process ensures that all participants in the supply chain are working together in a cohesive manner. This integration is essential in order to guarantee the most efficient system possible, with the goal of increasing profits and reducing costs. To achieve this integration, interconnected investments from each supply chain member are needed. This can be done through a variety of methods, such as sharing information, collaborating on decision-making, and using common technologies. There are many potential outcomes of supply chain integration. Some of the most common include: Improved efficiency: Supply chain integration can help to improve efficiency throughout the supply chain by reducing waste, improving communication, and
coordinating activities more effectively. This can lead to lower costs and increased profits for all parties involved. Increased visibility: Supply chain integration can help to improve visibility throughout the supply chain by providing all parties with access to real-time data. This can help to identify and address problems more quickly, improve decision-making, and ensure that products are delivered on time and in good condition. To influence performance, collaboration, alignment, and coordination must be achieved, but further research is needed to determine how to best achieve this (Mackelprang et al., 2014; Rashid et al., 2023). Ultimately, integration could lead to improved performance, and a better understanding of the drawbacks could provide greater insight into how to optimize integration. The Asian region's agricultural food supply chain is the object of our analysis. We seek to identify the environmental constraints, such as changing climates, water scarcity, and price volatility, that can affect the chain.

In addition, the structure of the chain needs to be examined, including coalition and coordination assumptions, in order to address these issues. Furthermore, we need to consider the perishability of the products, which can make the chain distinct from the market manufacturers. All these factors need to be evaluated in order to build the necessary capacity and capability to effectively manage the chain. It is essential to understand the complexities of the Asian region's agricultural food supply chain and how it is affected by environmental variables. By doing so, we can develop a better system to manage the chain and ensure its continued success (Jraisat et al., 2013; Bezuidenhout et al., 2012; Rashid et al., 2022a). Investing in complex information splitting, collaborative NPD, and integration procedures can improve a supply chain’s efficacy and efficiency. By implementing these initiatives, inventory levels can be optimized, customer wants and needs can be better understood, and the interconnection processes can be strengthened. As such, the hypothesis is that investing in these solutions will lead to improved supply chain performance. To test this hypothesis, research should be conducted to measure the effects of these solutions on supply chain performance. The results from this research could provide valuable insights into the efficacy of these solutions, helping to inform further decision-making. Additionally, the research could help identify any further changes that could be made to the supply chain to further optimize performance.

**H3: There is a significant impact of SCI on OP.**

Operational performance plays a significant role in improving economic performance. It is essential for businesses to have efficient and accurate production as well as responsiveness to changes in the market. An integrated agricultural food supply chain at its upper level has a profound and positive influence on operational performance, revolutionizing the way food is produced, processed, distributed, and consumed. In this modern era, where the global population is continually growing and environmental challenges loom large, the need for a more efficient, sustainable, and responsive food supply chain has become paramount. The upper level of integration refers to the collaboration and coordination among primary producers, manufacturers, distributors, retailers, and other key stakeholders involved in the food supply chain (Rashid et al., 2022b). By fostering seamless interactions and data sharing, this integration unlocks numerous benefits that optimize resource utilization, reduce waste, improve product quality, enhance market responsiveness, and create a more resilient and transparent food system. At the core of an integrated agricultural food supply chain lies the seamless flow of information and resources, starting with the primary producers, such as farmers and ranchers. Through advanced technologies and data-driven approaches, information about crop yields, livestock health, weather conditions, and soil quality can be shared in real-time with other stakeholders up the supply chain. This transparency enables upper-level actors, like manufacturers and processors, to make informed decisions about production planning, inventory management, and sourcing strategies.

Consequently, operational efficiency is greatly enhanced as the entire supply chain operates with a better understanding of current and future demands, reducing inefficiencies and waste. Integration also enables effective collaboration among different entities within the supply chain. For instance, primary producers can work closely with research institutions and agricultural experts to implement best practices, adopt innovative technologies, and optimize land use. This collaboration facilitates continuous improvement in agricultural practices, leading to higher yields, better-quality...
produce, and increased sustainability. Moreover, manufacturers and processors can collaborate with suppliers to optimize procurement processes, negotiate better pricing, and ensure the timely availability of raw materials, all of which contribute to improved operational performance. One of the significant advantages of an integrated agricultural food supply chain at the upper level is the improved ability to address challenges related to food safety and quality control. With enhanced traceability systems, it becomes easier to track the origin of raw materials and monitor the various stages of production, processing, and distribution. In case of any contamination or quality issues, swift actions can be taken to isolate affected products, minimizing the risk of widespread recalls and reputational damage. As a result, consumers gain confidence in the food supply chain, further strengthening the market position of businesses operating within it.

Additionally, integration fosters a culture of innovation throughout the supply chain. Companies that collaborate closely with research institutions and technology providers are more likely to adopt cutting-edge advancements in agricultural practices, automation, and data analytics. For example, the use of precision agriculture techniques, such as remote sensing and Internet of Things (IoT) devices, can optimize irrigation, nutrient application, and pest management, leading to higher yields and resource conservation. These innovative practices not only boost productivity but also support environmental sustainability by reducing water usage, chemical inputs, and greenhouse gas emissions. An integrated agricultural food supply chain also enables businesses to respond more effectively to dynamic market conditions and changing consumer preferences. With improved data analytics and demand forecasting, retailers can better align their inventory with consumer demand, reducing stock-outs and overstock situations. At the same time, manufacturers can swiftly adjust production levels based on real-time market feedback, ensuring that products are readily available when and where they are needed. This agility in the supply chain not only improves customer satisfaction but also enhances the overall competitiveness of businesses in the market. Sustainability is another crucial aspect positively influenced by an integrated food supply chain. As sustainability concerns become more prominent, consumers increasingly demand products that are ethically sourced, environmentally friendly, and socially responsible. The upper level of integration facilitates the implementation of sustainable practices throughout the supply chain. For instance, stakeholders can collaborate to promote regenerative agriculture techniques, which help restore soil health, enhance biodiversity, and sequester carbon. Additionally, by optimizing transportation routes and adopting eco-friendly packaging solutions, the carbon footprint of the supply chain can be significantly reduced. Furthermore, integration promotes better risk management within the supply chain.

By having access to comprehensive data and insights, businesses can identify potential vulnerabilities and proactively develop strategies to mitigate risks. This could include diversifying sourcing locations to reduce dependence on a single region, building contingency plans for supply disruptions, and investing in modern technologies to monitor food safety more effectively. As a result, the supply chain becomes more resilient to external shocks, such as extreme weather events, natural disasters, or geopolitical uncertainties. In conclusion, the upper level of an integrated agricultural food supply chain is a driving force behind the positive transformation of the entire food system. By fostering seamless collaboration, efficient resource allocation, data-driven decision-making, and sustainable practices, integration optimizes operational performance at every stage of the supply chain. The benefits are far-reaching, encompassing improved productivity, reduced waste, enhanced product quality, greater market responsiveness, and heightened resilience to challenges. Moreover, integration supports the transition towards a more sustainable and transparent food system, meeting the demands of an ever-growing global population while safeguarding the environment for future generations. As businesses and stakeholders continue to embrace integration, the potential for further advancements and positive impacts on the food supply chain's operational performance remains limitless.

Furthermore, the ability to innovate and use resources more efficiently is a key factor in achieving economic success. This can result in increased market share and higher returns on investments. Additionally, meeting customer demand is essential to maximizing sales and profits. The economic performance of any business is greatly affected by many different elements. These include the quality of goods and services offered, the efficiency of operations and processes, the management
and marketing strategies used, the financial resources available, and the policies and regulations that govern the industry. All of these factors must be managed to ensure the company is operating optimally and achieving its economic objectives. Investing in operational performance is essential for businesses to ensure they are successful and their economic objectives are met. This can involve improving processes and procedures, introducing new technologies, and investing in staff training and development. It is also important to ensure the marketing and management strategies are effective and that the business remains compliant with industry regulations. Having access to sufficient financial resources is also important in order to support the operational performance of the business. This can involve obtaining additional funding or capital through traditional or alternative sources. It is also important to ensure the company has access to the right resources, such as technology, to keep up with industry trends and developments. Finally, businesses must also have a good understanding of the regulatory environment in which they operate. This includes understanding the policies and regulations that govern their industry and making sure they are compliant. In summary, businesses must ensure they are performing optimally in order to maximize their economic success. This involves investing in operational performance, introducing new technologies, having access to the right resources, and understanding the regulatory environment. By taking the necessary steps to ensure their performance is optimized, businesses can increase their chances of achieving their economic goals (Zhao et al., 2015; Baloch & Rashid, 2022).

In the agricultural food industry, supply chain integration is essential to achieving sustainability. By optimizing the entire supply chain process, companies can reduce environmental impacts and improve working conditions for their employees. Furthermore, integrating systems and data allows for the most efficient and cost-effective flow of goods and services, resulting in greater economic and market performance. To ensure the success of supply chain integration, companies must take advantage of technology such as big data and analytics. These tools provide visibility throughout the supply chain, allowing companies to identify potential risks and opportunities. Additionally, predictive analytics can be used to forecast demand and optimize supply. The successful implementation of supply chain integration in the agricultural food industry can have a number of beneficial effects, including improved customer service, reduced costs, increased efficiency, and enhanced sustainability. To ensure that these benefits are achieved, companies must ensure that their supply chain is adequately integrated. This can include the coordination of supply and demand, the optimization of inventory, the integration of production and ordering systems, and the optimization of logistics. Furthermore, information systems such as enterprise resource planning (ERP) should be integrated to ensure that data is shared and analyzed across all stakeholders. Overall, supply chain integration is essential for the agricultural food industry to remain competitive and maximize profitability. By integrating systems, data, and technology, companies can minimize environmental impacts, improve working conditions, and reduce the number of products and logistics required to meet standards. This can lead to improved customer service, decreased costs, increased efficiency, and ultimately, increased sustainability. As such, it is imperative for companies in the agricultural food industry to ensure that their supply chain is adequately integrated in order to remain competitive and maximize profitability (Ortas et al., 2014). Thus, we nominate the following hypothesis:

**H4: There is a significant impact of OP on EcoP.**

Environmental performance determines the waste quantity in the process of supply chain integration. From the raw material to the end product, there’re several processes in which we can expect waste. To utilize this waste, recycling plants are there to make waste capable of being used again in the product (e.g., packaging). Logistics practitioners are suggested to utilize clean energy for delivering products and use transport return flow to bring packaging, plastic, pallets, and unrecoverable machines to recycling. Waste is not waste until we waste it (McIntyre et al., 1998; Hashmi et al., 2021a). In the supply chain of agri-food, the first parameter is transportation (e.g., consumption of fuel); the second parameter is its packaging; and the third parameter is waste production. Suppliers play an important part in the supply chain by supporting the environmental initiative of the organization and improvising the functions that deal with it (Seuring et al., 2008; Rashid & Rasheed, 2023). SGSC is responsible for taking decisions against waste, whereas environmental performance is the impact of those decisions.
H5: There is a significant impact of OP on EnvP.

3. Research Methodology and Results

The selected method was the primary method for data collection to examine the connection and correlation in the conceptual framework. This method has been previously used to investigate SCI-related issues, antecedents, and performance (Rasheed & Rashid, 2023). To further expand the scope of the study, a survey of agriculture and food industry executives in the Asian region, particularly Pakistan, was conducted. The survey data was used to gain an understanding of the difficulties faced by executives in the industry and the factors that may contribute to their performance. Additionally, the survey data provided insights into the attitudes and beliefs of the executives, which could help explain their motivations and decision-making (Agha et al., 2021; Haque et al., 2021; Das et al., 2021). The survey data was then analyzed to identify patterns and correlations between the various factors, such as job satisfaction, work-life balance, and the level of support received from their employers (Rasheed et al., 2023). This information was then used to inform recommendations and strategies to improve the performance of the executives in the industry (Khan et al., 2021; 2022; Mora-Monge et al., 2019; Zhang et al., 2013; Zhao et al., 2013). Supply Chain Integration and Commitment Management (SCIM) is an empirical research methodology that requires empirically tested and validated literature and theories. To analyze SCIM, the agricultural food industry in the Asian region was chosen as the focal area of research. Over the past few decades, the grain supply chain has seen significant growth, making it an important part of the agricultural food supply chain.

Despite the different choices adopted by different stakeholders, the structure and relationships within the food supply chain remain largely unchanged (Hashmi et al., 2021b). It also studies the impact of SCIM on the performance of the supply chain, as well as its benefits and limitations. By understanding the dynamics of SCIM in different cultural settings, it will be possible to make informed decisions about its implementation and effectiveness (Nakandala et al., 2017; Rashid et al., 2021). China is a major player in the global agricultural food supply chain. The country has established itself as a major producer and manufacturing market for grains, such as wheat, rice, maize, and other staple crops. The structure and relationships in the Chinese agricultural food supply chain are similar to those found in other countries. From the point of view of producers, they need to ensure they have the necessary resources and technology to produce a quality product. At the same time, they must also ensure they are able to meet the demands of the market (Khan et al., 2023a, b). On the other side of the chain, the distributors and wholesalers are responsible for ensuring that the agricultural products are accurately and efficiently distributed to the consumers. They must also ensure that the products are properly stored and preserved in the right conditions. Finally, retailers play an important role in making sure that the products reach the end-users safely and in a timely manner (Alrazehi et al., 2021). The agricultural food supply chain in China is tightly integrated and complex. All of the various actors need to collaborate and cooperate to ensure that the supply chain runs smoothly. This is particularly important when it comes to quality control and safety. Everyone involved must make sure that the products are safe and of the highest quality. This is especially true for grains, which are a staple of the Chinese diet. Overall, the structure and relationships in the Chinese agricultural food supply chain are not much different from those in other countries. All of the various actors have their own roles and responsibilities, but they must work together to ensure the chain runs efficiently and that the products reach the consumers safely and in a timely manner (Bedoya-Perales et al., 2018; Zhao et al., 2008; Hashmi & Mohd, 2020).

The demand for agricultural and food products has been rapidly increasing, making it necessary for farmers and other members of the supply chain to be equipped with integrated, collaborative, and structured mechanisms. This is especially true for those associated with low-socioeconomic-status cooperatives and communities. Entrepreneurial orientation and supply chain management skills are often limited for farmers, preventing them from accessing resources and opportunities that could benefit the entire supply chain (Rashid et al., 2019). Achieving a deeper level of integration could allow farmers to identify potential operations and access resources that would enhance the performance of grain products on the market and improve their quality and availability (Mercado et al., 2017; Hashmi et al., 2020a).
In addition, integrated efforts between farmers and manufacturers could provide access to more profitable and high-value markets while reducing costs, environmental impacts, and risks. This could also create a supply chain with greater resilience to seasonal and weather changes, logistical disruptions, and fluctuations in demand. Moreover, it will empower farmers to take control of any unforeseen events that may arise in agricultural and food production. Overall, the integration of the supply chain is essential for farmers and other stakeholders to increase their potential and access to resources. This could not only improve the performance of grain products on the market but also reduce costs, environmental impacts, and risks. Empowerment of the farmers through collaboration and integration is necessary to ensure a successful and resilient supply chain (Dania et al., 2018; Hashmi et al., 2020b).

3.1 Biasness to Controlled and Approach for Data Analysis

In the strengthened biases survey, protocol design and data analysis were taken into account. Many pathways (e.g., by phone call, email, and assurance to share the outcomes) were taken to ensure a high response rate and neglect a nonresponsive bias (Frohlich & Westbrook, 2001; Rashid & Amirah, 2017). We took non-designed tests for confirmation that no prominent differences existed in disruption of the firm size (no of workers) or the part of the supply chain. The responsibility of confidentiality and the utilization of questions that show concern for the organization and its partners’ rather than their individual deeds reduced social desirability. The institutional items are less susceptible to social desirability bias because they are unrelated to the actions or accomplishments of any one person.

To assess the path structural model, we’re suggested to perform t-test, but due to limitation we had to use bootstrap in PLS. As it’s not directly provided the significance and confidence interval. We applied bootstrap model with the bias-corrected interval of 97.5 % to generate T-static and standard error (Rashid, 2016). Model testing confirming the all the hypotheses supported, S.C. Integration has positive effect on operational performance. Likewise, operation performance has positive effect on environmental performance with positive beta and no exceeded p-value from 0.05 (see table 1).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Original Sampling/ Beta</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment -&gt; S.C. Integration</td>
<td>0.678</td>
<td>0.00</td>
</tr>
<tr>
<td>Operational Performance -&gt; Economical Performance</td>
<td>0.540</td>
<td>0.00</td>
</tr>
<tr>
<td>Operational Performance -&gt; Environmental Performance</td>
<td>0.670</td>
<td>0.00</td>
</tr>
<tr>
<td>S.C. Integration -&gt; Operational Performance</td>
<td>0.601</td>
<td>0.00</td>
</tr>
<tr>
<td>Trust -&gt; Commitment</td>
<td>0.711</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Source: Test results

5. Discussion

Tested statistics confirm the robustness of the theoretical structure of variables, as well as reliability and validity. The given hypotheses (H3 and H5) are strongly supported, and both are hypothesized antecedents. Integration and operational performance are driven by trust and commitment, which are the main drivers of the grain supply chain. The results are aligned with the previous contributions because we’ve added a new construct, “environmental performance.” Previous contributions were given by Wu et al. (2013). Given that factors are the most important factors of high integration, however, it’s specifically import factors in the agricultural food supply chain.

In the Asian region, agricultural food supply chains are facing a significant surge in demand for their products. This escalating demand presents both opportunities and challenges for organizations involved in the supply chain. To effectively meet the growing demand and cater to the needs of consumers, it becomes imperative for these supply chains to undergo substantial improvements. The key to success lies in ensuring that the supply chains function in a proper and coordinated manner, thereby optimizing performance and minimizing shortcomings. However, achieving this level of seamless coordination and efficiency can be particularly challenging due to the presence of unstructured, informal, and untrained organizations, particularly among farmers who form a critical part of the agricultural food supply chain. The lack of formal structures and training impedes the
establishment of a high level of trust and commitment among all actors in the chain, which are essential prerequisites for successful supply chain integration. In this intricate web of dependencies, the variables of trust and commitment play a pivotal role, influencing the overall performance of the supply chain. In an agricultural food supply chain, there are multiple stakeholders involved, including farmers, organizations, intermediaries, and exporters, each contributing to the overall flow of products from farm to market (Hashmi, 2022). Among these stakeholders, farmers often operate in unstructured and informal settings, with limited access to formal training and resources. As a result, they may face difficulties in adopting modern practices and technologies, hindering their ability to meet the increasing demands of consumers and markets. Additionally, the lack of structured organizations among farmers can lead to challenges in establishing efficient communication and collaboration between different actors in the supply chain. To ensure the success of supply chain integration, the trust and commitment of all participants become paramount. Trust is the foundation upon which relationships are built and maintained in any supply chain. When all participants trust each other, they are more willing to share critical information, collaborate on joint initiatives, and make decisions that benefit the entire supply chain rather than individual interests. Furthermore, a high level of commitment ensures that all actors remain dedicated to fulfilling their roles and responsibilities, even in the face of challenges or uncertainties. This commitment drives the smooth functioning of the supply chain and helps in building long-term, cooperative relationships among stakeholders. Cooperation among all participants, including farmers, organizations, intermediaries, and exporters, can lead to better integration and performance of the agricultural food supply chain. By working together and pooling their resources and expertise, stakeholders can identify opportunities for improvement, optimize processes, and address bottlenecks effectively. This collaborative approach fosters a sense of shared responsibility, promoting collective efforts to achieve common goals. As a result, the supply chain becomes more resilient, adaptive, and capable of meeting the increasing demands placed upon it.

Moreover, improving the performance of supply chain integration can yield numerous other benefits. One of the most significant advantages is enhanced overall efficiency. When all actors in the supply chain are well-coordinated and committed to their respective roles, the flow of goods and information becomes smoother and more streamlined. This efficiency translates into reduced lead times, lower operational costs, and minimized waste throughout the supply chain (Hashmi, 2023).

Furthermore, a well-integrated supply chain facilitates better visibility and traceability of products. With improved communication and collaboration, stakeholders can easily track the movement of goods from the farm to the consumer, ensuring product quality, safety, and compliance with regulatory standards. This transparency fosters consumer confidence, enhances brand reputation, and contributes to the overall success of the supply chain. Additionally, supply chain integration enables better demand forecasting and inventory management. When all participants are well-informed about market trends and consumer preferences, they can plan production and distribution more effectively, avoiding stock outs or excess inventory situations. This optimization of inventory levels results in cost savings and improved financial performance for all stakeholders involved.

Supply chain integration also promotes innovation and the adoption of new technologies. As participants work together, they can collectively invest in research and development, exploring novel ways to improve agricultural practices, enhance product quality, and reduce environmental impacts. These innovations not only benefit the supply chain but also contribute to the sustainable development of the agriculture sector as a whole. In conclusion, the increasing demand for agricultural food products in the Asian region necessitates significant improvements in the supply chains of organizations involved in this sector. Achieving proper coordination, efficiency, and responsiveness in the supply chain requires addressing the challenges posed by unstructured, informal, and untrained organizations, particularly among farmers. To succeed in supply chain integration, building trust and commitment among all participants is of utmost importance. Cooperation among stakeholders further enhances the performance of the supply chain, leading to greater efficiency, transparency, and resilience. The benefits of supply chain integration extend far beyond improved performance, encompassing enhanced visibility, inventory management, innovation, and overall sustainability. By embracing integration and nurturing cooperative relationships, the agricultural food supply chain in the Asian region can meet the
increasing demand while ensuring long-term success and growth.

5.1 Conclusion

This research is to assess the impact of supply chain integration on operational, environmental, and economic performance. The unit of research was the agricultural food supply chain in the Asian region, especially in Pakistan. The supplier and farmers were the main participants in the supply chain of materials. Findings are found to be beneficial and significant for managerial and theoretical contributions. There are three limitations to taking the research one step ahead. First, this research is specifically about agricultural food. Which agricultural food? It’s not specified. Secondly, it’s related to agriculture, so, in this criterion, the government plays an important part; its influence can be measured by adding another construct related to the government. Third, the location at which the research is taking place is important because there are more continents and every continent has its own infrastructure. Last but not least, sample size. It plays an important role in analyzing the results of the suggested tests.

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