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# Investigating the relationship between supply chain finance and supply chain collaborative factors<sup>1\*</sup>

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# **Investigating the relationship between supply chain finance and supply chain collaborative factors**

## **Abstract**

**Purpose** - It is important to understand the factors that are significant in supply chain (SC) collaboration decision-making and whether supply chain collaborative factors that are considered in the literature are still valid. To date, SC collaboration has not been extensively studied in the literature with supply chain finance factors to evaluate supply chain finance performance. Therefore, in this paper, we investigate the interrelationships between supply chain finance and supply chain collaborative factors for achieving supply chain finance performance. We identified the most important factors from the literature on SCF and SCC and with inputs from experts in the textile industry in Pakistan.

**Design/methodology/approach** - We employed the Grey-Decision Making Trial and Evaluation Laboratory approach to help examine the cause-and-effect relationship between the factors and identify the influence of each factor on the others.

**Findings** - The findings showed that the most prominent factors of the study are 'level of digitalization', 'information sharing', and 'collaborative communication', and 'most effect factors of this study are incentive alignment' and 'information quality'. Furthermore, the 'Level of digitalization' was identified as the factor with the central role and most significant correlation with other factors.

**Research limitations/implications** - The major implication of the study is that textile industries should effectively develop their supply chain decisions after analyzing their internal and external factors, which will help in developing strategies that will facilitate better management of supply chain finance relationships. The limitations of the study are that only fifteen supply chain finance and supply chain collaborative factors were considered, and time and scope are also limited. This study is only applied in the textile industry, so generalization may be limited.

**Originality/Value:** To date, this study is the only one that has taken into consideration supply chain collaboration with supply chain finance (SCF) factors to evaluate supply chain performance. This paper therefore makes this initial attempt and original contribution to this discussion, which can be helpful for those working to enhance supply chain performance, such as practitioners and policymakers.

**Keywords:** Supply chain finance, Supply chain collaboration, Relationship, Collaborative factors, Supply chain performance, Gray DEMATEL

## 1. Introduction

Supply chain finance (SCF) is defined as the optimum planning, controlling, and managing of the cash flows of the supply chain (SC) with the purpose of enhancing the efficiency of the material flows of the SC (L. M. Gelsomino, R. Mangiaracina, A. Perego, & A. Tumino, 2016; Xu et al., 2018). The emphasis of SCF is on cash flow coordination between supply chain entities to obtain efficiency and greater financial performance (Carnovale, Rogers, & Yenyurt, 2019; Wuttke, Blome, Foerstl, & Henke, 2013). In today's economic downturn, firms heavily depend upon borrowings and loans, and they are faced with huge liquidity pressures as well. In such a scenario, SCF is the most preferred solution that can be beneficial for SC partners by overcoming financial influence with additional working capital, making interest rates low and increasing payment terms (Benmelech, Meisenzahl, & Ramcharan, 2017; Wang, Wang, Lai, & Liang, 2020; Wuttke, Blome, Heese, & Protopappa-Sieke, 2016). SCF has gained attraction from institutions alongside industries. It plays an essential role in financial and operational performance. The objective of SCF is to develop monetary flow through the implementation of solutions by technological sources and financial organizations (Lamoureux & Evans, 2011; Xu et al., 2018; Yan, Sun, Zhang, & Liu, 2016). SCF comprises diverse perspectives and solutions, but all of the approaches have a common characteristic, such as the association among SC members and financial institutes, which is the feature that influences the prosperous adoption of SCF solutions (L. Gelsomino, R. Mangiaracina, A. Perego, & A. Tumino, 2016; Moretto, Grassi, Caniato, Giorgino, & Ronchi, 2019).

Supply chain collaboration (SCC) includes the combination of relationships and processes so that supply chain partners can work collaboratively in the planning and execution of operations to achieve mutual benefits and common goals (Cao & Zhang, 2011; Chi, Huang, & George, 2020). SCC includes mutual efforts between the associated vendors and customer organizations to deliver the goods and services while attaining the operational goals of the supply chain. Through this approach, customer and vendor firms are able to obtain a competitive advantage (Im, Rai, & Lambert, 2019; Simatupang & Sridharan, 2008). The purpose of SCC is to enhance the competitive advantage of a supply chain. SCC is an effective method for organizations to share data, create strategies for improving performance and reduce inventories throughout their supply chains (Chen et al., 2017; Soylu, Oruç, Turkay, Fujita, & Asakura, 2006). SCC helps members utilize business opportunities and enhance the competition of SC members. Members frequently focus on refining operational activities, such as their responsiveness in reacting to customers, improvement in product and service quality, and production planning. Changes in customer preferences can be met efficiently by using supply chain collaboration (Fisher, 1997; Simatupang & Sridharan, 2018).

Claudine Antoinette Soosay and Hyland (2015) suggested some collaborative factors based on earlier studies. The fundamental supply chain collaborative (SCC) factors are goal congruence, resource sharing and collaborative communication. Goal congruence contains two or more companies or institutions working mutually to accomplish a common objective (Lemaire, 2020; Provan & Kenis, 2008). The purpose of the goal congruence team is shared; it is an agreement by every member of a group (Kennedy & Widener, 2019; Lanen, Anderson, Maher, & Dearman, 2010). Similarly, resource sharing involves operations, activities and procedures that enable the sharing of tangible or intangible resources among supply chain partners (Govindarajan & Fisher, 1990; Im et al., 2019). Collaborative communication helps in effective collaboration between companies and helps in resolving disputes and finding new opportunities. Good communication practices can help companies increase the chances of their success and growth in their employees' performance (Joshi, 2009; Pan, Pan, Song, & Guo, 2020). These are some of the supply chain

collaborative factors that are necessary for SCF. Recent research has shown that SCF is viewed as a financial technique solely to obtain cash for optimizing the firm's working capital but that the long-term factors related to SCF, which are crucial to the survival of firms, are ignored. Therefore, more research is required to determine the factors that promote the implementation of SCF in the textile industry (Z. Ali, Gongbing, & Mehreen, 2019).

Supply chain performance (SCP) is the capability of SCs to provide consumer products according to their necessity, at the right location, within the required time and at an affordable cost (Leończuk, 2016; H. Zhang & Okoroafo, 2015). SCP is derived from the interaction between logistics and cross-functional drivers such as facilities, inventory, information, and pricing. Through these drivers, the level of performance of SC can be identified with respect to responsiveness and efficiency (Chopra & Meindl, 2007; Lima-Junior & Carpinetti, 2020). SCP can be enhanced by implementing continual improvement in process and perception organized throughout the supply chain links (Bastas & Liyanage, 2018; Lima-Junior & Carpinetti, 2019). There exists a relationship among SCC factors and SCP. When suppliers collaborate with companies, it generates competitive advantage and helps in achieving congruent goals. The sharing of resources in SC helps companies to be responsive to market demand (Simatupang & Sridharan, 2005; Um & Kim, 2019). To satisfy consumers, it is necessary to have collaborative communication with the supplier because suppliers generate opportunities to obtain market information and knowledge about the consumer's needs (Joshi, 2009; Pan et al., 2020). The execution of these factors is linked with supply chain performance.

The objective of this research is to discover the significance of SC collaborative factors that are essential for overall supply chain finance. The factors that are chosen to aid this investigation are goal congruence, resource sharing, and collaborative communication (Cao, Vonderembse, Zhang, & Ragu-Nathan, 2010; Claudine Antoinette Soosay & Hyland, 2015). In this research, we explain these collaborative factors and link them to the performance of SCF. From a financial perspective in the supply chain, collaborative factors have not been studied systematically until now. As a result, the purpose of this study was to assess to what extent these elements contribute to the success of financial management in the supply chain. Based on a comprehensive literature review and extensive interviews with experts in the Pakistani textile industry, we have determined the most crucial factors in effective supply chain collaboration. The collaborative factors that we used in this study are used for other purposes in earlier studies but never used to determine their impact on supply chain finance performance. This research utilizes the gray-DEMATEL approach for the purpose of finding an association between SCC factors and SCF. Strategies are proposed in this paper, which will help improve the performance of the identified factors on the supply chain. This research will be helpful in reducing barriers in SCF operations. This research will also be helpful for collaborative performance in the supply chain.

Considering the importance of the abovementioned subject, this research will attempt to answer the following research question:

RQ: What are the significant factors of SCC that influence SCF performance?

In answering the abovementioned research question, the specific objectives of this research are to:

i) Identify the most important SCC factor that influences overall SCF performance through a literature review.

ii) Validate the relationships among the identified factors of SCC and overall SCF performance using the gray-DEMATEL approach.

iii) Propose strategies by observing the identified critical factor results to improve overall supply chain finance performance.

To accomplish the aims and address the research question, the remainder of the study is organized as follows. Section 2 reviews the literature on supply chain collaboration and supply chain finance, discusses the processes involved in identifying the SCC and SCF factors, and concludes with a discussion of the review of the literature/gaps and the study's contributions. Section 3 discusses and presents the research methodology, results and sensitivity analysis, followed by Section 4's discussion and implications of the research. Section 5 concludes the study and discusses its shortcomings and potential directions for further research.

## **2. Literature review**

### **2.1 Supply Chain Finance**

Initially, supply chain finance was linked to accounts receivable in business finance and inventory financing in logistics. Since the onset of the global financial crisis in the early 2000s, the scope of SCF has expanded through the incorporation of various parties throughout the supply chain network, including financial institutions, core enterprises, and upstream and downstream enterprises (Kucukaltan, Kamasak, Yalcinkaya, & Irani, 2022). The term "supply chain finance" (SCF) refers to the microfinance concept of using financial instruments, practices, and technologies to optimize the management of working capital and liquidity tied to supply chain processes among collaborating business partners (Ioannou & Demirel, 2022). All supply chains inevitably require SCF. The primary goal of supply chain financing (SCF) is to lessen the financial burden placed on businesses by financing them and to lessen the risks associated with doing so (Zheng et al., 2022). Marak and Pillai (2018b) stated that SCF can be described as the optimal use of monetary flow and fiscal structure inside the supply chain. SCF helps increase the pace of monetary flow and diminish the cost of capital through optimization of finance across borders. Some researchers have proposed that SCF planning should be considered as the usage of the supply chain to fund companies and that companies are used to fund the supply chain. This analysis acts as support for organizations that want to influence their systems to increase financial performance and approach investment resources (Carnovale et al., 2019; Huff & Rogers, 2015). The objective of SCF is to offer benefits for the whole SC instead of particular organizations. To achieve the objective of developing and utilizing funds in the supply chain, SCF engages in combining the financial affairs of different organizations. Financial support is crucial for sustaining a favorable environment (Ma, Wang, & Chan, 2020; Pfohl & Gomm, 2009; Talapatra & Uddin, 2019). SCF solutions have brought positive results on the fiscal performance of supply chain participants, and those benefits of SCF solutions can be obtained by the management of variation in capital costs among the supply chain participants (Lamoureux & Evans, 2011; T. Zhang, Zhang, & Pei, 2019). Researchers have stated that SCF can be segregated into two prospects, SC-oriented and financially-oriented, and both have different concepts of what composes an SCF plan (Gelsomino, de Boer, Steeman, & Perego, 2019; Song, Yu, & Lu, 2018). The emphasis of SCF is on joint ventures and partnerships that help them gain reserves, generate revenues or manage assets for SC members (Huff & Rogers, 2015; Pellegrino, Costantino, & Tauro, 2019). SCF can enhance supply chain performance by providing extended terms of payments for buyers and makes suppliers gain

easily accessible finance (He & Tang, 2012; Talapatra, Santos, & Gaine, 2022; Tseng, Wu, Hu, & Wang, 2018).

In the entire SC, the ability of supply chain performance (SCP) is to fulfill consumers' needs by delivering products to consumers and guaranteeing accessibility of products by maintaining proper inventory levels (Harrison, Lee, & Neale, 2005; Leończuk, 2016). Appropriate and proper valuation of SC is considered a crucial part of the formulation of strategies and their execution; in the same way, supervision of performance helps in the successful operations of companies (Kamble & Gunasekaran, 2020; Mishra, Gunasekaran, Papadopoulos, & Dubey, 2018). SCM strives for better performance by proper utilization of capital by means of expanding the inner and outer relationships, therefore forming an organized supply chain (Ketchen Jr & Hult, 2007; Maestrini, Luzzini, Maccarrone, & Caniato, 2017). Improvement in information technology enhances the efficiency of the supply chain, such as managing data through online platforms (Shahriar, Parvez, Islam, & Talapatra, 2022). This results in effective supply chain management owing to less inventory and the ability to execute timely delivery of products (Lahkani, Wang, Urbański, & Egorova, 2020). When suppliers and buyers provide funds to their own supply chain, SCF services lessen the capital cost and risk involved with transactions, permitting consumers to develop their capability to raise investment and reduce their requirements for working capital (Gelsomino et al., 2019). Estimating the competence and success of SC includes benchmarks related to different performance goals such as sustainability, flexibility, responsiveness, agility and cost (Lima-Junior & Carpinetti, 2017; Webster, 2002). Pursuing supply chain management enables successful companies to attain higher performance. Through proper accessibility of the product and less delivery time, improved consumer services can be offered. In the same way, the quantity of resources required to fulfill consumer needs can be lowered as SCM works efficiently (Guersola, Lima, & Steiner, 2018; Potter, Childerhouse, Banomyong, & Supatn, 2011).

## **2.2 Supply Chain Collaboration**

Whipple, Lynch, and Nyaga (2010) have described SC collaboration as cooperation among two or more parties who jointly work together to enhance their performance by planning and transforming their business practices through information sharing or collaboration. In the end, these partnerships are expected to achieve more success than working individually (Crum, Poist, & Daugherty, 2011; Ralston, Richey, & Grawe, 2017). SCC plays a key role in gaining attraction from companies that want to establish a competitive edge over competitors (Chen et al., 2017; Rahman, Rahman, & Talapatra, 2020; Um & Kim, 2019). When discussing supply chain management, collaboration is a fundamental topic. When members of the supply chain work together, they are better able to adapt quickly to the ever-evolving demands of the marketplace (Al-Omoush, de Lucas, & del Val, 2023). Extensive studies have shown that there are a number of benefits to collaborating with other businesses in the supply chain, including increased knowledge sharing and broader access to products and expertise. Parties in the supply chain work together and coordinate their operations to ensure smooth operations (T. K. Agrawal, Angelis, Khilji, Kalaiarasan, & Wiktorsson, 2022). Supply chain collaboration, it is argued, allows for the sharing of risk and costs associated with R&D activities, as well as access to knowledge from both upstream and downstream sources, joint knowledge creation, and accelerated R&D cycle time (Solaimani & van der Veen, 2022). Collaboration among SC partners refers to joint activities that partners engage in to bring about substantial improvements over the long term. CC can improve supply chain (SC) performance and provide SC members with the greatest benefits (Chauhan, Kaur, Arrawatia, Ractham, & Dhir, 2022). Cooperation in SC partnerships helps members accomplish specific goals to fulfill the

expectations and needs of customers. In organizations, the major factor behind the success of SCM is SC collaborations, as they help achieve competitiveness in the financial system (Dung, 2015; Samaddar, Nargundkar, & Daley, 2006; Talapatra & Gaine, 2019). The conception of SCC was discussed as an inspiration for SCM, and many researchers have explored its attributes, obstacles and the consequences of collaborative and joint ventures among supply chain members (Ellram & Cooper, 1990). SCC makes it possible for organizations to achieve superior and higher performance because of financing on resources, procedures, abilities and schedules existing in participant organizations (Fawcett, Fawcett, Watson, & Magnan, 2012; Claudine Antoinette Soosay & Hyland, 2015). In the SC literature, SCC has gained huge attraction, yet more research is needed that specifies its significance in business cooperation (Ellinger & Richey Jr, 2013; Ralston et al., 2017).

SCP includes the valuation of SCM together with factors relating to flexibility, output and resources (Beamon, 1999; Lima-Junior & Carpinetti, 2020). The degree of end consumer demands that can be fulfilled in terms of accessibility and on-time shipment of product come under the domain of SCP (Chi et al., 2020; Lambert, Cooper, & Pagh, 1998). Instead of working separately to achieve less, SCC makes organizations adept at sharing rewards and risks to enhance their performance (Chi et al., 2020; Lambert et al., 1998; Talapatra, Uddin, Antony, Gupta, & Cudney, 2019). Past studies in the SCC domain have advocated that supply chain members must consider some mutually supportive collaborative factors to work together, which will significantly impact the entire SCP (Datta & Christopher, 2011; Simatupang & Sridharan, 2018). SCP evaluation is a critical activity because it includes a transversal process, which comprises supply chain members, impacting several obstacles, such as lack of communication between users and reporters, absence of unity among metrics and distribution of past information and data (Lima-Junior & Carpinetti, 2017; Naini, Aliahmadi, & Jafari-Eskandari, 2011). Effective communication in the supply chain affects the practices of SC sustainability through its impact on the transfer of knowledge and by solving various problems concerning supply chain members (Harms, 2011; Jadhav, Orr, & Malik, 2019). It is important to measure supply chain performance because it helps in distinguishing whether the company works to attain the objectives relating to the supply chain (Abidi, de Leeuw, & Klumpp, 2014; Guersola et al., 2018). Table 1 summarizes the recent closely related studies of consumer behavior.

**Insert Table 1 Closely related studies to consumer behavior in supplementary file here**

### **2.3 Selection and validation of proposed factors**

CSF theory was used to identify the factors of supply chain collaboration and supply chain finance. The CSF method is defined by Bullen and Rockart (1981) as a strategy for identifying the most essential influencing elements. The CSF method may be used to assess a product and service performance and attainment of its goals. First, the goal was to integrate supply chain collaboration with supply chain finance by focusing on specific areas where suitable results and optimum efficiency might be achieved to improve the performance of SCF. Textile industry professionals evaluated these key factors and contributed their insights in the survey questionnaire. First, 22 essential factors of supply chain cooperation and supply chain financing were identified from the literature. Next, we consulted industry professionals to narrow our focus to the most important aspects of supply chain collaboration and supply chain finance, ultimately settling on fifteen variables (See Table A1).



**Insert Table A1 in supplementary file here**

### **2.3.1 Supply chain integration**

Supply chain integration (SCI) refers to the degree to which organizations can critically connect themselves and arrange a supply chain with its members, up- and downstream (Schoenherr & Swink, 2012; Wiengarten, Humphreys, Gimenez, & McIvor, 2016).

### **2.3.2 Workforce**

The workforce is classified into groups of people who work jointly to attain a shared purpose or goal (Baum, Kralj, Robinson, & Solnet, 2016). Supply chain financing may be enhanced or improved by the ability, experience and skills of the workforce (Jiang, Jin, & Dong, 2016).

### **2.3.3 Joint decision making**

Joint decision making refers to the strong supply chain network that is necessary for the effective performance of the organization because improved performance is linked with a well-associated network of the supply chain (Carnovale & Yenyurt, 2015).

### **2.3.4 Level of digitalization**

The level of digitalization helps in finding innovative supply chain finance solutions and in SCC (Ageron, Lavastre, & Spalanzani, 2013). The level of digitalization in business permits the distribution of value-added services, such as the rapid and improved visibility of statements, which helps the supplier manage accounts receivable and accounts payable (Mora-Monge, Perego, & Salgaro, 2010).

### **2.3.5 Financial Attractiveness**

Financial attractiveness refers to the consumer's desire for products that will have an opportunity to market for suppliers. It can be calculated by the intensity of significance of financial appeal for successful implementation of SC finance resolution (Caniato, Gelsomino, Perego, & Ronchi, 2016).

### **2.3.6 Goal Congruence**

Goal congruence involves SC members who are more dedicated toward the network and work more willingly when goal consent is associated with it (Lemaire, 2020; Provan & Kenis, 2008).

### **2.3.7 Resource sharing**

Resource sharing is described as the relationship of SC where partners are allowed to organize activities and decisions that will help in value creation (Dyer & Singh, 1998; Im et al., 2019).

### **2.3.8 Collaborative Communication**

Collaborative communication is considered a channel that makes the supply chain member realize the importance of information sharing and capital (Pan et al., 2020).

### **2.3.9 Information technology**

Information technology provides allowances to supplier management that should be considered progress in dealings between members that involve accessible and improved databases. Stump and Sriram (1997) stated that information technology brought expansion in firm and supplier relations, but it also reduced the number of suppliers who are working with the companies (Dewhurst, Lorente, & Dale, 1999; Pérez-Aróstegui, Bustinza-Sánchez, & Barrales-Molina, 2015).

### **2.3.10 Information sharing**

Information sharing involves sharing information with suppliers as well as buyers. Information sharing usually entails the sharing of inventory, sales, etc., and depends on the way in which data are shared (Simatupang & Sridharan, 2005).

### **2.3.11 Decision Synchronization**

Decision synchronization is a characteristic that estimates the intensity of SCC (Tseng, Lim, & Wu, 2019).

### **2.3.12 Incentive alignment**

Incentive alignment is defined as the advantages that sellers and customers obtain jointly in transactions (Ma et al., 2020).

### **2.3.13 Trust**

Trust refers to the positive faith, attitude and anticipation of a supply chain member who believes that the opinion of one party will be satisfactory for the other party. Trust positively influences supply chain collaboration (Crook, Giunipero, Reus, Handfield, & Williams, 2008; Dung, 2015).

### **2.3.14 Competitive environment**

The competitive environment refers to gaining a competitive advantage by observing the atmosphere of competition in an organization. It also helps in making decisions and in practical judgment. It will only happen when organizations recognize their competitive environment (Amarouche, Benbrahim, & Kassou, 2015; Sahin & Bisson, 2020).

### **2.3.15 Information quality**

Information quality, defined as the certainty of the quality of data that is shared in the organization, illustrates the attainment of effectiveness in SCM, and information should circulate in the organization without deformation or interruption (S. Li & Lin, 2006). Information quality has a great impact on the SCM relationship, which is gaining attention in the academic literature (Obi, Dogbe, & Pomegbe, 2020).

## **2.4 Literature roundup and contribution**

SCF concentrates on financial problems (L. Gelsomino et al., 2016), and SCC is cooperation among two or more companies to overcome financial issues that are beneficial for supply chain members (Ma et al., 2020). The word collaboration is the mutual relationship between all the members of the organization who agreed with the sharing of capital and objectives and involve every member in the process of decision making and problem solving (Dung, 2015; Claudine A Soosay, Hyland, & Ferrer, 2008). In this paper, fifteen factors of SCC and SCF are chosen to investigate their interrelationship to enhance the performance of SCF. Previous studies have mostly used statistical methods such as partial least squares or regression, but there are very few papers that have used the gray-DEMATEL approach to comprehend the interrelationships between the factors. Previous studies have usually focused on supply chain collaborative factors for different purposes, and there is a lack of literature on SC collaborative factors in SC finance. Thus, the objective of the current study is to find the influence and interrelationships of SC collaborative factors on SCF and to develop SCF performance by identifying strategies through supply chain collaborative factors.

### 3. Methodology

It is complicated to examine the factors in actual situations because of their complex relationships. Most researchers use MCDM (multicriteria decision making) techniques in which ISM (interpretive structural modeling) and DEMATEL (decision making trial and evaluation laboratory) are widely employed in research. Many analysts use the DEMATEL method, which is considered more efficient in exploring cause and effect factors (Venkatesh et al., 2017). DEMATEL is considered an important technique compared to other approaches because it has the capability to help determine the overall impact of a factor within a system, as proposed in this study. The DEMATEL approach helps in establishing causal relationships of factors by dividing them into effect and cause groups (Bhatia & Srivastava, 2018; Liou, Tzeng, & Chang, 2007; Pillania, Wu, & Lin, 2008). For this research, the gray-DEMATEL method is applied to examine the impact of the proposed factors of SCF and SC collaboration (Bai & Sarkis, 2013). Hence, the gray approach is integrated with traditional DEMATEL because the traditional DEMATEL method is not sufficient to address those relationships (S. M. Ali, Ahmed, Ahmed, Sharmin, & Rahman, 2022; Xia, Govindan, & Zhu, 2015).

The first step of this paper is the Systematic Literature Review (SLR), which is the strategic planning of the search for significant publications, followed by efforts to determine the target journals, decide the inclusion and exclusion criteria, and conduct the review of the selected publications. The findings are then documented. This SLR investigation was conducted in two stages. In the initial phase, keywords and inclusion/exclusion criteria were selected. Afterward, relevant studies were identified by searching the databases. Applying the previously established criteria, a stringent evaluation of the papers' quality was conducted in succession. In addition, forward and backward citation chaining was utilized to ensure that every relevant work was included. The results of the SLR were then discussed in the following stage, providing the authors with an overview of the most significant literature on the topic. Articles published in English with a focus on supply chain finance (SCF) and supply chain collaboration meet the inclusion criteria. (SCC). In addition, the exclusion criteria include articles that mention strategic, tactical, or operational-level collaboration between entities but do not specifically address SCC. Editorials, brief surveys, reports, errata, book chapters, and notes. Articles that focused on chemical, biological, and biochemical processes. If not clearly centered on SCC, topics such as green transactions, knowledge sharing, and supply chain partner selection may be discussed. The methodology of the research is explained in Figure 1.

**Insert Figure 1 Framework of research/flow diagram in supplementary file here**

#### 3.1 DEMATEL Method

Battelle Memorial Institute Geneva Research proposed the DEMATEL technique (Gabus & Fontela, 1972). This method is very effective for exploring complicated structural models that involve a fundamental connection among complex factors (W.-W. Wu & Lee, 2007; Xia et al., 2015). The DEMATEL approach is considered a structural modeling approach that helps in evaluating interdependence, associations, and significant effect principles among appropriate factors through a causal diagram. Because of its intrinsic benefits, the DEMATEL procedure is used broadly by different researchers in the literature (Bhatia & Srivastava, 2018; Lin, 2013). By using a combination of matrices or graphs, the DEMATEL technique can structure and handle

complex causal relationships between variables (Jeng & Tzeng, 2012). A causal diagram can help in analyzing the interdependence among the essential criteria of a system, which can be found with the help of DEMATEL (Rajesh & Ravi, 2015; H.-H. Wu, Chen, & Shieh, 2010).

### **3.2 Grey relationship approach**

The gray relationship approach is applied in combination with the traditional decision-making procedure. This theory is used in many studies, such as the insurance industry, evaluation and selection of suppliers, automotive industry and selection of technology in information and outsourcing (Bhatia & Srivastava, 2018). The mathematical theory, which is called “gray” theory, is first proposed from a gray set. This theory helps in generating possible results with the help of a small amount of information, which can be considered the major benefit of the gray system over others (Xia et al., 2015).

### **3.3 Gray-DEMATEL approach**

The gray-DEMATEL technique is applied in the study to help evaluate the relationship between SCF and SCC. First, a significant literature review is performed to identify the appropriate factors of SCF and SCC. Most researchers have used those factors for different purposes, but none of them have focused on identifying their interrelationships. The factors were then discussed with the experts, and once evaluated, their inputs were considered in refining the list of factors for this study.

### **3.4 Data Collection**

The expert sample approach, a nonprobability sampling procedure, was used to choose experts. This kind of sampling is a subset of purposive sampling in which the sample unit is chosen by the researcher based on his or her own knowledge. It necessitates acquiring information from a representative sample of persons with demonstrable industry experience and skill. The definition of the expert's criteria is the first stage in expert sampling. An expert is defined as someone who has held the post of assistant manager or equivalent in the supply chain or similar subjects for at least three years. This method has been used in a number of studies (e.g., Mubarik, 2015; Mubarik et al., 2016). Because of the structure and design of systems for multiattribute data management, such as DEMATEL, a sample size of approximately 31 is considered perfectly adequate. The great majority of studies on multiattribute decision making use sample sizes ranging from ten to fifteen (Mujahid et al., 2019). A sample size of 29 is regarded as sufficient in this circumstance. We discussed with these experts to acquire their input with a direct relation matrix that seeks out relationships among factors.

The questionnaire was sent to 31 professionals from Pakistan's leading textile companies (see Table 2), of whom 29 were willing to take part in the research (see Table 3). Experts were selected based on their experience and expertise in decision-making processes in their respective enterprises. Each expert had a minimum qualification of a bachelor's degree and at least three years of experience. One of the researchers visited particular companies to obtain permission to participate in the study. Prior to data collection, the study's goal, purpose, and objective were communicated. The significance of the findings was also underlined to the specialists, and their initial concerns were allayed. Following a short discussion and clarification of a few points, all

experts received email questionnaires. They completed all surveys within the time range that had been assigned to them.

**Insert Table 2 Demographic of Confectionary Companies in supplementary file here**

**Insert Table 3 Demographic of Experts in supplementary file here**

The result will be analyzed through the Gray-DEMATEL approach. The framework used in our research study is below.

### 3.5 Case Study

Globally, Pakistan is considered one of the top textile producers. In the exports of the whole country, cotton textiles contribute more than 60%. It shared 46% in total industrialized products. The employment ratio that textiles provide to industrialized labor is 38%. The availability of raw cotton and cheap labor played a major role in the development of the textile industry of Pakistan. Its contribution to Pakistan's GDP is 8.5%, and it is ranked as the eighth largest exporter in Asia (Memon, Aziz, & Qayyum, 2020). Textile is considered the core manufacturing sector in Pakistan. In total production of cotton yarn, Pakistan shared 8% and was the fourth largest producer globally. Textile manufacturing incorporates cotton yarn, fabrics, hosiery, towels, cotton ginning, home textiles, knit wear and readymade garments. Textiles consist of both SMEs, including cottage units and large-scale organized sectors (A. Ali et al., 2020). Doshi, Kelley, and Simmons (2019) argued that growth was expected to decline in the last three years because of monetary policy. Therefore, there is a need for solutions and programs to help optimize the working capital among these supply chain members. One important way to achieve this is through supply chain finance. However, supply chain finance is built on strong supply chain collaboration. Thus, this study investigates how supply chain finance performance could be achieved considering the interrelationships among supply chain finance and supply chain collaboration factors aided by gray-DEMATEL methodology.

The process for gray-DEMATEL was taken from Wei, Liu, and Shi (2019) are below.

#### **Step 1:** Identification of gray-semantic scale.

This research uses five level gray semantic scale. The rating on scale is classified as '0' means no influence (NI) having gray values of (0, 0), '1' means very low influence (VLI) having gray values of (0, 0.25), '2' means low influence (LI) having gray values of (0.25, 0.5), '3' means high influence (HI) having gray values of (0.5, 0.75), '4' means very high influence (VHI) having gray values of (0.75, 1) (See Table A2).

#### **Step 2:** Generate gray direct-relation matrix X.

The experts selected are those who can understand those factors and relationship among SCF and SCC. The questionnaire was designed to include the definition of those factors and distributed to the experts to gather the needed information for this research. Based on the gray semantic scale, the direct relation linguistic matrices provided by the respondents were changed into gray direct-relation matrices. Table 4 illustrate an example of the completed direct relation linguistics matrix from Expert 1.

**Insert Table 4 Example of Expert 1 Linguistic Matrix in supplementary file here**

**Step 3:** Establish general crisp direct-relationship matrix Z.

A crisp direct relationship matrix was achieved by adapting the CFCS method using the equations below. Applying these equations and using the gray direct-relation matrix for Expert 1, the crisp direct-relation matrix C is achieved. The following steps are applied to obtain crisp values.

1. Normalization:

$$\underline{\otimes} \bar{X} \frac{k}{ij} = (\underline{\otimes} X \frac{k}{ij} - \frac{\min}{j} \underline{\otimes} X \frac{k}{ij}) / \Delta \frac{\max}{\min}$$

$$\otimes^- X \frac{k}{ij} = (\otimes X \frac{k}{ij} - \frac{\min}{j} \otimes X \frac{k}{ij}) / \Delta \frac{\max}{\min}$$

$$\text{where } \Delta \frac{\max}{\min} = \frac{\max}{j} - \otimes X \frac{k}{ij} - \frac{k}{ij} \otimes X \frac{k}{ij}$$

Total normalized crisp value calculated by:

$$Y_{ij}^k = \frac{\otimes^- X_{ij}^k * (1 - \otimes^- X_{ij}^k) + (\otimes^- X_{ij}^k * \otimes X_{ij}^k)}{1 - \otimes^- X_{ij}^k + \otimes X_{ij}^k}$$

2. Computation of final crisp values:

$$Z \frac{k}{ij} = \frac{\min}{j} \otimes X \frac{k}{ij} + Y \frac{k}{ij} \Delta \frac{\max}{\min}$$

The overall matrix Z was build by using Equation (1):

$$z_{ij} = \frac{1}{k} (z_{ij}^1 + z_{ij}^2 + \dots + z_{ij}^k) \quad (1)$$

**Insert Table 5 Average direct relation matrix in supplementary file here**

Applying Equation (1) and using all crisp direct- relation matrices, the general crisp direct-relationship matrix, Table 5 is achieved.

**Step 4:** Formation of normalized matrix N.

Equations (2) & (3) were applied for computation of normalized direct relation matrix N are:

$$N = sZ \quad (2)$$

$$s = \frac{1}{\max_{1 \leq i \leq n} \sum_{j=1}^n z_{ij}} \quad (3)$$

Applying Equation 2 and using Table 5, the normalized matrix Table 6, is obtained.

**Step 5:** Computation of total relation matrix (TRM)

Development of total relation matrix T through utilization of Equation (4), here identity matrix is represented by I:

$$T = N + N^2 + N^3 + \dots = \sum_{i=1}^{\infty} N^i = N (I - N)^{-1} \quad (4)$$

Applying Equation 4 and using Table 7, the total- relation matrix is obtained.

**Step 6:** Computation of factors' prominence & effect.

In this step, computation of factors prominence ( $P_i$ ) & effect ( $E_i$ ) by utilizing equations (5) to equation (8), as Table 7 shows:

$$R_i = \sum_{j=1}^n t_{ij}, \forall i \quad (5)$$

$$C_j = \sum_{i=1}^n t_{ij}, \forall j \quad (6)$$

$$P_i = \{R_i + C_j \mid i = j\} \quad (7)$$

$$E_i = \{R_i - C_j \mid i = j\} \quad (8)$$

Applying Equations 7,8 and using Table 7, the prominence and effect categorization of the factors, Table 8 is obtained.

**Insert Table 6 Crisp value matrix in supplementary file here**

**Insert Table 7 Normalized crisp value matrix in supplementary file here**

**Insert Table 8 TRM for factors supplementary in file here**

**Insert Table 9 The prominence & net effect of factors in supplementary file here**

**Insert Table 10 Identity Values in supplementary file here**

**Step 7:** Plotting the effect and causal graph.

Using the prominence ( $R_i + C_j$ ) to represent the horizontal axis and at the net effect ( $R_i - C_j$ ) to represent the vertical axis, the cause and effect plot are generated, as shown in Figure 2 below.

**Insert Figure 2 Overall DEMATEL Prominence–Causal diagram in supplementary file here**

### 3.6 Results

According to Table 9 and 10, level of digitalization (P4) > information sharing (P10) > trust (P13) > supply chain integration (P1) > resource sharing (P7) > competitive environment (P14) > information technology (P9) > goal congruence (P6) > decision synchronization (P11) > financial attractiveness (P5) > information quality (P15) > collaborative communication (P8) > incentive alignment (P12) > joint decision making (P3) > workforce (P2).

Factors that have greater (R+C) values influence and affect other factors. Factor Level of digitalization (P4) has the greatest (R+C) score, and this factors have the most significant correlation with the other elements. Information sharing (P10), trust (P13), supply chain integration (P1), resource sharing (P7) and competitive environment (P14) rank after level of digitalization (P4).

The study reveals that the factors that fall in the effect group are Workforce (P2), Level of digitalization (P4), Collaborative communication (P8), Information technology (P9), Information

sharing (P10), Incentive alignment (P12), Trust (P13) and Competitive environment (P14). These factors are affected by other factors since the value of (R-C) is negative. The factors that fall in the cause group are supply chain integration (P1), joint decision making (P3), financial attractiveness (P5), goal congruence (P6), resource sharing (P7), decision synchronization (P11) and information quality (P15). These factors influenced other factors. They had a more affected impact (C) and prominent impact (R). The larger the (R-C) is, the larger their effect. Supply chain integration (P1) in the cause group is important to a firm's performance because it is thought that supply chain integration is needed to reach economic and environmental goals, not just to improve business practices. The literature on supply chain integration shows that integration can affect performance outcomes in different ways (Mofokeng & Chinomona, 2019). Sharing resources (P7) is another important part of SC performance. Sharing resources goes beyond just sharing labor. As supply chain operations became more complicated, material resources were shared between departments to meet organizational goals. With the movement of material resources, information resources, and financial resources to improve the activities of organizations and business operation systems, supply chain operations make it easier to set goals and objectives (Mustapha, Agha, & Masood, 2022). Information sharing (P10) lies in the effect group with the highest R+C value. In the supply chain, the sharing of information facilitated end-to-end visibility throughout the chain's process. Although the application of recent information-sharing technologies such as blockchain and artificial intelligence has aided in the supply chain's recovery from disruptions, the design and operation of the supply chain will need to undergo a substantial transformation (Mustapha et al., 2022). The level of digitalization (P4) lies in the effect group having the second highest R+C value. Because of their ability to process large amounts of data and facilitate supply chain partners' mobility, collaboration, and communication across digital platforms, digital supply chains are becoming increasingly prevalent. A single person's efforts cannot be enough to bring about digital transformation; rather, it will take a collection of initiatives working in a team to make the desired changes (P. Agrawal & Narain, 2018).

#### **4.0 Discussion**

The factors are discussed by rank and identity in Table 8 in the prominence and net effect column as follows: Level of digitalization (P4) is ranked 1<sup>st</sup> and identified as an effect factor; it improved the visibility of statements, which helps suppliers manage account payables and receivables in organizations. Additionally, stated Z. Ali, Gongbing, and Mehreen (2018) that by using SCF to optimize working capital and digitizing processes, executives can raise transparency and efficiency in small and medium-sized enterprises. Information sharing (P10) is ranked 2<sup>nd</sup> and identified as an effect factor, which involves information sharing with buyers and suppliers in textile companies. It also aligns with previous research that states, no matter the analogy, it is clear that sharing information is crucial. While there are many other factors that contribute to the success or failure of collaboration, the author argues that sharing information is arguably the most critical. (Raweewan & Ferrell Jr, 2018). Trust (P13) ranked 3<sup>rd</sup>, and identified as effect factor, it is important for supply chain members of the textile sector who believe that the opinion of one member will be satisfactory for another. According to the literature, trust is defined as the degree to which participants in a supply chain view one another as trustworthy and benevolent. When two firms decide to work together, it is crucial that they can trust one another. The foundation of any successful working relationship is trust. Having trust in one another is crucial for maintaining and developing relationships (Salam, 2017). Supply chain integration (P1) is ranked 4<sup>th</sup> and identified as a cause factor, and it is significant for the textile sector because it helps connect companies with



their members for supply chain arrangement. Collaboration facilitates members to engage in joint planning, forecasting, resources, incentives, and information sharing. This collaborative effort is characterized by the exchange of information and resources, resulting in the formation of an integrated system. As networking is characterized by partnership, collaboration, and integration, their presence is required if SMEs are to improve supply chain performance, as implied by the relational view literature (Mofokeng & Chinomona, 2019). Resource sharing (P7), which is ranked 5<sup>th</sup> and identified as a cause factor, facilitates an SC relationship in which members organize decisions that create value in textile industries. Based on the relational perspective, we highlight governance and resource sharing as critical mechanisms for generating relationship benefits in supply chain partnerships (Im et al., 2019). Competitive environment (P14) is ranked 6<sup>th</sup> and it is an effect factor that helps in decision making for attaining competitive advantage by observing competition in other sectors. Information technology (P9) ranks 7<sup>th</sup> and it is an effect factor. Information technology is considered to progress commitment among members and involves an improved and accessible database. The development of cutting-edge IT has resulted in a virtual information superhighway that effectively eliminates physical distance. Through the use of enterprise IT, businesses are able to connect with their suppliers and customers across the entire supply chain. The ability of a supply chain to better collaborate through the use of e-solutions is crucial in today's competitive global market (L. Li, 2012).

Goal congruence (P6) ranked 8<sup>th</sup> and the cause factor is also important for the textile sector, as it helps SC members work more willingly as goal consent is associated with it. It refers to the extent to which all parties in a supply chain have similar objectives and can work together effectively. As the term "congruence" suggests, SCC necessitates a level of shared comprehension and agreement among all of an organization's characteristics, beliefs, values, and norms. Researchers have emphasized that it is important for all parties involved in a collaborative relationship to set clear goals and objectives (Cao et al., 2010). Decision synchronization (P11) ranked 9<sup>th</sup> and falls in the cause group. In the textile sector, it helps in estimating the intensity of supply chain collaboration. Collaboration among downstream, midstream, and upstream partners, exemplified by information sharing, decision synchronization, and incentive alignment, has the potential to enhance firm performance and innovation capacity. Members of the supply chain must coordinate crucial decisions to improve the overall performance of the chain (Nguyen, Lei, Vu, & Le, 2019). Financial attractiveness (P5) ranks 10<sup>th</sup> and is a cause factor that is an opportunity for the market supplier as its consumer's appeal toward the price of the product. When negotiating with financial institutions to improve the upstream/downstream supply chain's financial performance, a company's financial attractiveness indicates its negotiating strength. The ability to entice potential business partners and customers is directly proportional to the company's financial attractiveness (Zhou, Chen, & Li, 2018). Information quality (P15) ranks 11<sup>th</sup> and falls in the cause group, and the quality of information helps in gaining effectiveness in SCM. The quality of information plays a vital role in enhancing supply chain performance. Access to appropriate information would enable firms to minimize uncertainty and enhance their planning, thereby increasing their profitability. The quality of information would assist firms in enhancing information exchange between supply chain partners (Sheko & Braimllari, 2018). Collaborative communication (P8) is ranked 12<sup>th</sup> and included in the effect group; it is considered a strong channel that realizes the importance of information sharing among supply chain members of the textile sector. Collaborative communication emphasizes the significance of the content (e.g., data, information) and the frequency of sharing between partners, which is vital for improving the performance of the supply chain or supply chain network. Depending on the level of collaboration, the frequency

or nature of sharing will vary. Effective supply chain collaboration activities consist of collaborative communication (Huang, Han, & Macbeth, 2020). Incentive alignment (P12) is ranked 13<sup>th</sup> and is an effect factor; it aids in the benefits that both the buyer and seller in textile companies obtain in committing any transaction. Responses to disruptions have also made use of incentive alignment. It is the process by which participants in a supply chain agree to divide up the costs, gains, and losses of their partnership so that everyone involved can benefit equally (Duong & Chong, 2020). Joint decision making (P3) ranks 14<sup>th</sup>; it is the cause factor that is considered most important because it refers to an effective supply chain network that is necessary for efficient industry performance. Under a highly collaborative culture, firms are more inclined to deploy interorganizational systems for supply chain partners' process integration, joint knowledge discovery, and joint decision-making and thus achieve a higher level of collaboration (Q. Zhang & Cao, 2018). Workforce (P2) ranks 15<sup>th</sup>, and it is an effect factor. SCF can be improved by the skills and abilities of the workforce involved in the textile sector. To some extent, supply chain funding may also be influenced by the talent, skill, and expertise of the workforce (Marak & Pillai, 2018a).

#### **4.1 Contribution to the theory**

Our empirical study contributes to the literature on SCF. It is new for Pakistan's emerging economy, and we work on the identification of SCF and SCC factors and their effect on SCP. We identify the relationship among those factors and check it through the Gray-DEMATEL approach. Previous studies used different methods for their research, but there are very few papers in which this approach is used. Therefore, we determine the efficiency of our variables through this method. We identified factors that have been discussed in previous literature. We also discussed cause and effect factors. This research contributes to the SCF and SCC literature by discussing their relationship with SCP through the Gray-DEMATEL approach. Previous studies have usually focused on supply chain collaborative factor usage for different purposes, and there is a lack of literature on SC collaborative factors in SCF. A framework is developed to recognize the relationship among supply chain finance and supply chain collaboration factors to analyze the impact on supply chain performance. This study is new for a developing country such as Pakistan that applied the gray DEMATEL method in the textile industry. It attempts to construct a broad understanding of SCF and SCC collaboration on SCP. This study can help in developing a long-term strategy for SCP in the textile sector.

#### **4.2 Practical and Managerial Implication**

The managerial implications are numerous. The first benefit of the accepted research model is that it serves as a road map for the executives of textile companies as they initiate, cultivate, and finalize the SCF process by incorporating SC collaboration to boost company performance and foster lasting relationships with SC players. Second, in accordance with the findings of the present study, the owners or managers of the company obtain credits to meet their daily financial needs and reduce the risk of default. In addition, the current investigation makes significant contributions because it enables SC officials to advance an improved understanding of currently investigated phenomena, as well as their prospects, requirements, and shortcomings; this, in turn, enables improved knowledge and supports decision making (Z. Ali et al., 2019). Third, the perfect identification of factors leading to the adoption of SCF and SCC is of incredible attraction for SC officials eager to discover the potential use of SCF and SCC to improve SC performance. The proposed measurable model will also be used as a diagnostic tool by SC managers to identify areas

where there is room for improvement. The fourth step is for SC managers to assess the strength of the connection between SCF, SCC, and the factors that affect SCP. Based on the results of this analysis, SC managers can then decide whether to develop a tailored set of processes, assets, and competency standards.

SCF emphasizes increasing the supply chain's overall credibility through an interorganizational solution approach. Companies must collaborate to achieve this objective. In the literature, supply chain collaboration and supply chain finance have been extensively studied, and numerous crucial factors have been identified. In Pakistan, however, the significance of these factors to supply chain performance, particularly in the textile industry, has not been studied. SCF is more concerned with the supply chain as a whole than with individual companies. It entails integrating the financial activities of different companies with the objective of optimizing the use of capital in the supply chain. Consequently, the efficiency of the flow of products, information, cash, etc., can be optimized. (Ma et al., 2020). In the final objective of firm performance, SC collaboration is the guiding principle for developing flexible and effective supply chains. As partners in the supply chain become increasingly satisfied with their collaborative behaviors, they will effectively eliminate waste (time and materials), both internally and externally, and can concentrate on their core competencies. Consequently, financial as well as nonfinancial advantages are anticipated from the collaborative effort (L. Wu & Chiu, 2018).

### **4.3 Social Implications**

This study has numerous social implications that will have a positive and visible impact on society. Supply chains are both economic and social entities in which groups of people collaborate and share information. Consequently, the findings of this study may also have a positive effect on society through enhancements to the overall working environment. (Panahifar, Byrne, Salam, & Heavey, 2018). SCF emphasizes increasing the supply chain's overall credibility through an interorganizational solution approach (Ma et al., 2020).

### **5. Conclusion**

This research helps make some distinctive contributions, as this paper helps in analyzing internal and external factors to the textile sector in Pakistan. Thus, the objective of the current study is to determine the influence of SC collaborative factors on SCF and to develop SC performance by identifying the significance of the implementation of identified factors in decision making. We employed the Gray-DEMATEL method, which helps in finding cause and effect relationships between the factors considered in this paper and recognizing the degree of influence of one factor on another factor. Additionally, incorporation of the DEMATEL approach with gray theory helps in capturing uncertainty and vagueness in responses from experts. That is why we conducted this literature review and then identified fifteen important factors of SCF and SCC: supply chain integration, workforce, joint decision making, level of digitalization, financial attractiveness, goal congruence, resource sharing, collaborative communication, information technology, information sharing, decision synchronization, incentive alignment, trust, competitive environment and information quality. Previous research on these factors in textiles in Pakistan has not yet worked with this approach. SCF and SCC emphasized increasing the overall creditability of SCP through their relationship and impact on organizations. However, for this, collaboration between organizations is important. SCF and SCC have been considered extensively in the literature, and researchers have worked on many factors of SCF and SCC, but the relationship between both has

not been studied in Pakistan. We develop a graph through effect and causal relationships. The study uses primary data to find results. Further research can be done to expand the application of these results. This study helps the textile industry of Pakistan by evaluating which area is more important and which area needs to be focused on more to make the industry more efficient. Our results help provide insights to both practitioners and academics.

### **5.1 Limitation & Future direction**

While our study made considerable contributions in practice and research, there are some limitations that must be considered when interpreting the findings of this study. In this paper, we only considered the fifteen most important SCF and SC collaborative factors and only the textile industry. Many other factors can be used to identify the importance of the relationship between SCF and SCC. To enhance the reliability of the results, it can be further implemented in multiple industries of different countries. Through this, we will be able to gain more insights by collecting data from many experts related to different fields. We obtain the results from the Gray DEMATEL approach, but future research may apply multiple other approaches and techniques to acquire data. Another limitation is that this research only focuses on limited keywords in SCF and SCC. SCF can be collaborated with other keywords, and many other keywords can be used. As we are working in a limited scope, limited time and data collection from experts is also an important issue, as we can also conduct interviews, but because of the pandemic, we are unable to do so. The current study was conducted in the textile industry by focusing on a large district in Pakistan, which may pose a generalizability problem in other contexts. To enhance the generalizability of the results, future research may be conducted in alternative settings. Second, the present study collected data using a cross-sectional and self-reported design. However, in the future, researchers can verify the findings over time by using a longitudinal data collection design. Third, the research model can be applied to large-scale organizations in future research. Research models can be evaluated for their efficacy by comparing small and medium-sized enterprises (SMEs) to large-scale companies. Researchers in related fields may use this study's findings as a jumping-off point for their own studies.

In addition to addressing these restrictions, future research may investigate the ways in which SC agility and reputation, as well as commitment and behavioral uncertainty, influence SC performance. As such, future studies should focus on determining the moderating role of trade process automation and adaptations in the association between SCF and SSC in SC performance. To further investigate how SCF and SSC can be used to boost SC performance, researchers can incorporate moderating and mediating variables into their future studies. The SC may benefit from the adoption of SCF if future studies are conducted to determine the antecedents (personal relationship and cooperation) of collaboration. Further research can be done by finding the impact of SCF and SCC on SCP in different sectors, public or private organizations. The textile sector is multifaceted, so it is not possible to generalize the findings, and more research is needed. Data can be gathered from both supplier and buyer sides, and interviews can be conducted to obtain more authentic results.

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**Table 1 Closely related studies to consumer behavior**

Reference	Contribution	Methodology	Theory	Context	Findings
(Al-Omoush et al., 2023)	The present study examines the relationships between e-supply chain collaboration, collaborative innovation, supply chain agility, and value co-creation.	Smart-PLS-SEM approach	The study used resource-based view (RBV) and dynamic capabilities.	e-supply chain collaboration	The study found that e-supply chain collaboration has a significant impact on collaborative innovation, supply chain agility, and value co-creation. They also show that collaborative innovation and corporate sustainability significantly impact value co-creation.
(Lixu Li, Wang, Chen, Zhao, & Yang, 2023)	This study aims to explore how two dimensions of information transparency (i.e. information quantity and information quality) and two types of transaction dependence (i.e. dependence on suppliers and dependence on customers) influence the relationship between SCC and SCF adoption.	This study then performs the logistic regression analysis to test the hypotheses.	Information processing theory	Supply chain collaboration and supply chain finance	This study empirically confirms that SCC shows a positive relationship with SCF adoption. More interestingly, information quantity negatively moderates this positive relationship, whereas information quality positively moderates this positive relationship. Most surprisingly, dependence on customers rather than dependence on suppliers strengthens this positive relationship.
(Marak & Pillai, 2018a)	This paper reviews the articles on supply chain finance based on three themes—factors, outcomes, and solutions—while at the same time providing directions for future research on supply chain finance.	The study did not use any methodology.	The study did not use any theory	Supply Chain Finance	This article is unique, as it investigates the factors affecting supply chains according to the existing literature. It also sheds light on the outcome of the supply chain without limiting the discussion only to the benefits. Further, it addresses the question: what are the solutions constituting supply chain finance?
(Ma et al., 2020)	So far, the supply chain collaborative factors have not been studied scientifically from the point of view of financial service providers. Therefore, in this work, we	interpretive structural modelling	The study did not use any theory.	Supply chain collaborative factors in supply chain finance	The results revealed that top management support, trust, and IT infrastructure are the factors considered the most important by financial service providers.

	investigated how important these factors are for financial service providers.				
(Alzoubi, Ahmed, Al-Gasaymeh, & Kurdi, 2020)	This study aims to investigate the relationship between sustainable supply chain strategies and supply chain collaboration and its effect on competitive priorities. The study investigates whether Jordanian Pharmaceutical companies incorporate the sustainability strategy into supply chain strategy, and whether that may impact its competitive priorities	Structural Equation Modeling and Smart PLS	The study did not use any theory for the conceptual framework	Sustainable Supply Chain Strategies	The study proves the relationship between sustainable supply chain strategies and supply chain collaboration, where companies are interested in attaining some achievements in the area of social and environmental to gain some collaborative strategies with their partners in the supply chain
(X. Li, Jiang, & Li, 2021)	Supply chain finance (SCF) is a promising financing solution for small and medium enterprises (SMEs). The study aims to highlight the determinants of the adoption of SCF and the theoretical implications for SCF in SMEs.	Partial least squares (PLS)	Theory of planned behaviour (TPB)	Supply chain finance (SCF)	The study indicate that attitude toward SCF and SI positively affect AI towards SCF, whereas AI positively affects the AA of SCF. Specifically, the authors also found that AI plays a mediating role in the relationship between SE and AA of SCF, whereas attitude toward SCF plays a mediating role between SI and AI.
(Baah, Acquah, & Ofori, 2022)	The study explores the predictive relevance of supply chain collaboration and the extent to which it influences supply chain visibility, stakeholder trust, environmental and financial performances. This	PLS	The study did not use any theory for the conceptual framework	Supply chain collaboration	The study results confirmed supply chain collaboration as a significant, positive and a robust influence on supply chain visibility, stakeholder trust, environmental and financial performances thereby projecting win-win scenarios for firms that engage in collaborative supply chain practices.

	study focused on manufacturing firms due to their supplier relationships, consumption of resources, energy and emissions of greenhouse gasses.				
(Z. Ali et al., 2019)	<p>The purpose of this paper is to investigate the effect of supply chain (SC) finance, a risk-free financing solution, on SC effectiveness (SCE) in the context of textile SMEs by employing transaction cost (TC) approach.</p>	AMOS 24.0	The study did not use any theory for the conceptual framework	supply chain (SC) finance,	The results of this paper indicate that supply chain finance (SCF) has a significant effect on SCE. Furthermore, all proposed factors of SCF adoption have a positive and significant effect on SCF.
(Tseng, Bui, Lim, Tsai, & Tan, 2021)	This study proposes a bibliometric data-driven from the literature to illustrate a clear overall concept of sustainable supply chain finance that reveals hidden indicators for further improvement.	Fuzzy Delphi method, entropy weight method and fuzzy decision-making trial and evaluation laboratory.	Fuzzy set theory	Sustainable supply chain finance.	The results show that blockchain, cash flow shortage, reverse factoring, risk assessment, and triple bottom line play significant roles in SSCF.
(Huang, Han, & Macbeth, 2020)	The study investigated the complexity of collaborations in supply chain networks, particularly, the influence of horizontal collaborations (e.g., international joint ventures) on vertical collaborations (e.g., supplier-manufacturer partnering relationships).	This study did not use any methodology.	The study did not use any theory for the conceptual framework	complexity of collaborations in supply chain networks.	A rare empirical study captures the complexity of supply chain collaboration including the interaction between different forms. A dynamic collaboration approach recognizes the changing process, varying cooperation behaviors as well as characteristics of partners which have not been sufficiently reflected in the literature.

Source: Author

**Table 2 Demographic of Confectionary Companies**

<b>S. No.</b>	<b>Company Name</b>	<b>Specialized Product</b>	<b>No. of Employees</b>
1	Lucky Textile Mills	Men's Clothing's, Towels	4800
2	Star Textile Mills	Denim, Beddings	4300
3	Idrees Textile Mills	Bedsheets, Comforters	3800
4	Bari Textile Mills	Cotton, Lawn, Fabrics	3600
5	Al Karam Textile Mills	Women Clothing, Embroidery	2700
6	Liberty Mills Limited	Fabrics, Printed, Socks	2200
7	Ebrahim Textile Mills	Fabrics, Bedsheets	1800

Source: Author

**Table 3 Demographic of Experts**

<b>S. No.</b>	<b>Education</b>	<b>Number of Respondents</b>	<b>Department</b>
1	BE	8	HSE
2	BS	5	Human Resource
3	ME	2	Supply Chain
4	MS	3	Production
5	CA	3	Compliance
6	MBA	5	Operations
7	PhD	3	Planning

Source: Author



**Table 4 Example of Expert 1 Linguistic Matrix**

<i>i/j</i>	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15
<b>P1</b>	0	HI	LI	VHI	LI	HI	VLI	LI	VHI	HI	HI	HI	LI	VHI	VLI
<b>P2</b>	LI	0	LI	LI	HI	NI	VLI	VLI	LI	VHI	LI	LI	VLI	NI	LI
<b>P3</b>	LI	HI	0	HI	VHI	HI	LI	HI	LI	HI	VLI	NI	HI	LI	NI
<b>P4</b>	HI	LI	HI	0	LI	HI	HI	VHI	LI	LI	HI	HI	HI	HI	LI
<b>P5</b>	LI	HI	HI	LI	0	VHI	LI	HI	LI	HI	NI	LI	HI	VHI	LI
<b>P6</b>	LI	NI	LI	VHI	VLI	0	HI	LI	HI	HI	LI	HI	VHI	VLI	LI
<b>P7</b>	VLI	HI	VHI	HI	LI	LI	0	HI	VHI	LI	VHI	LI	VLI	HI	LI
<b>P8</b>	HI	VLI	LI	VHI	LI	VLI	LI	0	LI	HI	VLI	VLI	LI	VHI	LI
<b>P9</b>	LI	LI	NI	HI	VLI	VLI	LI	VHI	0	VHI	VLI	HI	HI	HI	LI
<b>P10</b>	LI	VLI	NI	LI	VLI	HI	HI	VHI	LI	0	LI	LI	VHI	LI	HI
<b>P11</b>	HI	HI	VLI	HI	VHI	HI	VLI	VLI	HI	LI	0	VLI	VHI	HI	VHI
<b>P12</b>	LI	VLI	NI	LI	LI	LI	LI	VLI	VHI	HI	LI	0	VHI	NI	LI
<b>P13</b>	HI	HI	VLI	HI	HI	HI	HI	VLI	VLI	VHI	LI	HI	0	VHI	NI
<b>P14</b>	HI	NI	LI	HI	VHI	LI	HI	LI	HI	VLI	LI	NI	HI	0	NI
<b>P15</b>	HI	LI	HI	VHI	VLI	LI	VHI	LI	LI	HI	HI	HI	HI	HI	0

Source: Author

**Table 5 Average direct relation matrix in appendix**

IDRM	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	Sum of rows
P1	0	0.7	0.39	0.99	0.39	0.7	0.05	0.388	0.99	0.7	0.7	0.7	0.388	0.99	0.05	8.11
P2	0.388	0	0.39	0.39	0.7	0	0.05	0.05	0.39	0.99	0.388	0.388	0.05	0	0.3875	4.55
P3	0.388	0.7	0	0.7	0.99	0.7	0.388	0.7	0.39	0.7	0.05	0	0.333	0.39	0	6.42
P4	0.7	0.39	0.7	0	0.39	0.7	0.988	0.988	0.39	0.39	0.7	0.7	0.333	0.7	0.3875	8.45
P5	0.388	0.7	0.7	0.39	0	0.99	0.388	0.7	0.39	0.7	0	0.388	0.333	0.99	0.3875	7.43
P6	0.388	0	0.39	0.99	0.05	0	0.7	0.388	0.7	0.7	0.388	0.7	0.988	0.05	0.3875	6.81
P7	0.05	0.7	0.99	0.7	0.39	0.39	0	0.7	0.99	0.39	0.988	0.388	0.05	0.7	0.3875	7.8
P8	0.7	0.05	0.39	0.99	0.39	0.05	0.388	0	0.39	0.7	0.05	0.05	0.388	0.99	0.3875	5.9
P9	0.388	0.39	0	0.7	0.05	0.05	0.388	0.988	0	0.99	0.05	0.7	0.7	0.7	0.3875	6.48
P10	0.388	0.05	0	0.39	0.05	0.7	0.7	0.988	0.39	0	0.388	0.388	0.988	0.39	0.7	6.5
P11	0.7	0.7	0.05	0.7	0.99	0.7	0.05	0.05	0.7	0.39	0	0.05	0.988	0.7	0.9875	7.75
P12	0.388	0.05	0	0.39	0.39	0.39	0.388	0.05	0.99	0.7	0.388	0	0.988	0	0.3875	5.49
P13	0.7	0.7	0.05	0.7	0.7	0.7	0.7	0.05	0.05	0.99	0.388	0.7	0	0.99	0	7.41
P14	0.7	0	0.39	0.7	0.99	0.39	0.7	0.388	0.7	0.05	0.388	0	0.7	0	0	6.09
P15	0.7	0.39	0.7	0.99	0.05	0.39	0.988	0.388	0.39	0.7	0.7	0.7	0.7	0.7	0	8.48

Source: Author

**Table 6 Crisp value matrix in appendix**

IDRM	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15
P1	0	0.7	0.388	0.988	0.388	0.7	0.05	0.388	0.988	0.7	0.7	0.7	0.388	0.988	0.05
P2	0.388	0	0.388	0.388	0.7	0	0.05	0.05	0.388	0.988	0.388	0.388	0.05	0	0.388
P3	0.388	0.7	0	0.7	0.988	0.7	0.388	0.7	0.388	0.7	0.05	0	0.333	0.388	0
P4	0.7	0.388	0.7	0	0.388	0.7	0.988	0.988	0.388	0.388	0.7	0.7	0.333	0.7	0.388
P5	0.388	0.7	0.7	0.388	0	0.988	0.388	0.7	0.388	0.7	0	0.388	0.333	0.988	0.388
P6	0.388	0	0.388	0.988	0.05	0	0.7	0.388	0.7	0.7	0.388	0.7	0.988	0.05	0.388
P7	0.05	0.7	0.988	0.7	0.388	0.388	0	0.7	0.988	0.388	0.988	0.388	0.05	0.7	0.388
P8	0.7	0.05	0.388	0.988	0.388	0.05	0.388	0	0.388	0.7	0.05	0.05	0.388	0.988	0.388
P9	0.388	0.388	0	0.7	0.05	0.05	0.388	0.988	0	0.988	0.05	0.7	0.7	0.7	0.388
P10	0.388	0.05	0	0.388	0.05	0.7	0.7	0.988	0.388	0	0.388	0.388	0.988	0.388	0.7
P11	0.7	0.7	0.05	0.7	0.988	0.7	0.05	0.05	0.7	0.388	0	0.05	0.988	0.7	0.988
P12	0.388	0.05	0	0.388	0.388	0.388	0.388	0.05	0.988	0.7	0.388	0	0.988	0	0.388
P13	0.7	0.7	0.05	0.7	0.7	0.7	0.7	0.05	0.05	0.988	0.388	0.7	0	0.988	0
P14	0.7	0	0.388	0.7	0.988	0.388	0.7	0.388	0.7	0.05	0.388	0	0.7	0	0
P15	0.7	0.388	0.7	0.988	0.05	0.388	0.988	0.388	0.388	0.7	0.7	0.7	0.7	0.7	0

Source: Author

**Table 7 Normalized crisp value matrix in appendix**

Y	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15
P1	0	0.7	0.388	0.988	0.388	0.7	0.05	0.388	0.988	0.7	0.7	0.7	0.388	0.988	0.05
P2	0.388	0	0.388	0.388	0.7	0	0.05	0.05	0.388	0.988	0.388	0.388	0.05	0	0.388
P3	0.388	0.7	0	0.7	0.988	0.7	0.388	0.7	0.388	0.7	0.05	0	0.333	0.388	0
P4	0.7	0.388	0.7	0	0.388	0.7	0.988	0.988	0.388	0.388	0.7	0.7	0.333	0.7	0.388
P5	0.388	0.7	0.7	0.388	0	0.988	0.388	0.7	0.388	0.7	0	0.388	0.333	0.988	0.388
P6	0.388	0	0.388	0.988	0.05	0	0.7	0.388	0.7	0.7	0.388	0.7	0.988	0.05	0.388
P7	0.05	0.7	0.988	0.7	0.388	0.388	0	0.7	0.988	0.388	0.988	0.388	0.05	0.7	0.388
P8	0.7	0.05	0.388	0.988	0.388	0.05	0.388	0	0.388	0.7	0.05	0.05	0.388	0.988	0.388
P9	0.388	0.388	0	0.7	0.05	0.05	0.388	0.988	0	0.988	0.05	0.7	0.7	0.7	0.388
P10	0.388	0.05	0	0.388	0.05	0.7	0.7	0.988	0.388	0	0.388	0.388	0.988	0.388	0.7
P11	0.7	0.7	0.05	0.7	0.988	0.7	0.05	0.05	0.7	0.388	0	0.05	0.988	0.7	0.988
P12	0.388	0.05	0	0.388	0.388	0.388	0.388	0.05	0.988	0.7	0.388	0	0.988	0	0.388
P13	0.7	0.7	0.05	0.7	0.7	0.7	0.7	0.05	0.05	0.988	0.388	0.7	0	0.988	0
P14	0.7	0	0.388	0.7	0.988	0.388	0.7	0.388	0.7	0.05	0.388	0	0.7	0	0
P15	0.7	0.388	0.7	0.988	0.05	0.388	0.988	0.388	0.388	0.7	0.7	0.7	0.7	0.7	0

Source: Author

**Table 8 TRM for factors in appendix**

TRM	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	Ri
P1	0.29	0.291	0.247	0.491	0.305	0.358	0.301	0.34	0.423	0.433	0.307	0.324	0.374	0.445	0.209	5.13702
P2	0.212	0.13	0.165	0.267	0.226	0.174	0.179	0.187	0.228	0.321	0.179	0.19	0.202	0.204	0.167	3.03078
P3	0.272	0.252	0.174	0.386	0.314	0.305	0.279	0.321	0.293	0.365	0.19	0.199	0.291	0.32	0.161	4.12408
P4	0.379	0.276	0.303	0.413	0.322	0.374	0.414	0.418	0.383	0.419	0.325	0.333	0.379	0.44	0.255	5.43364
P5	0.304	0.27	0.271	0.398	0.236	0.362	0.313	0.348	0.33	0.402	0.212	0.266	0.332	0.413	0.221	4.67813
P6	0.299	0.198	0.227	0.451	0.233	0.253	0.343	0.309	0.356	0.396	0.256	0.303	0.398	0.315	0.222	4.55725
P7	0.286	0.29	0.311	0.449	0.301	0.312	0.279	0.365	0.41	0.388	0.327	0.274	0.319	0.405	0.24	4.9562
P8	0.303	0.177	0.212	0.409	0.247	0.23	0.277	0.238	0.288	0.347	0.191	0.198	0.291	0.381	0.193	3.98088
P9	0.28	0.214	0.169	0.39	0.215	0.232	0.286	0.348	0.254	0.395	0.199	0.277	0.341	0.358	0.205	4.16221
P10	0.29	0.191	0.18	0.378	0.223	0.313	0.331	0.353	0.31	0.302	0.246	0.256	0.384	0.34	0.246	4.34303
P11	0.368	0.3	0.22	0.465	0.366	0.364	0.306	0.3	0.387	0.405	0.235	0.264	0.432	0.425	0.305	5.14345
P12	0.251	0.168	0.147	0.323	0.223	0.25	0.259	0.223	0.333	0.341	0.214	0.188	0.348	0.254	0.19	3.70942
P13	0.341	0.278	0.204	0.431	0.32	0.344	0.349	0.28	0.306	0.434	0.266	0.307	0.303	0.42	0.188	4.77065
P14	0.307	0.186	0.218	0.389	0.319	0.276	0.311	0.286	0.33	0.295	0.229	0.202	0.33	0.287	0.158	4.1234
P15	0.387	0.284	0.306	0.525	0.293	0.351	0.425	0.362	0.388	0.458	0.337	0.343	0.426	0.447	0.215	5.54695
Ci	4.568	3.504	3.351	6.164	4.146	4.5	4.651	4.68	5.018	5.701	3.715	3.923	5.149	5.454	3.174	

Source: Author

**Table 9 The prominence & net effect of factors**

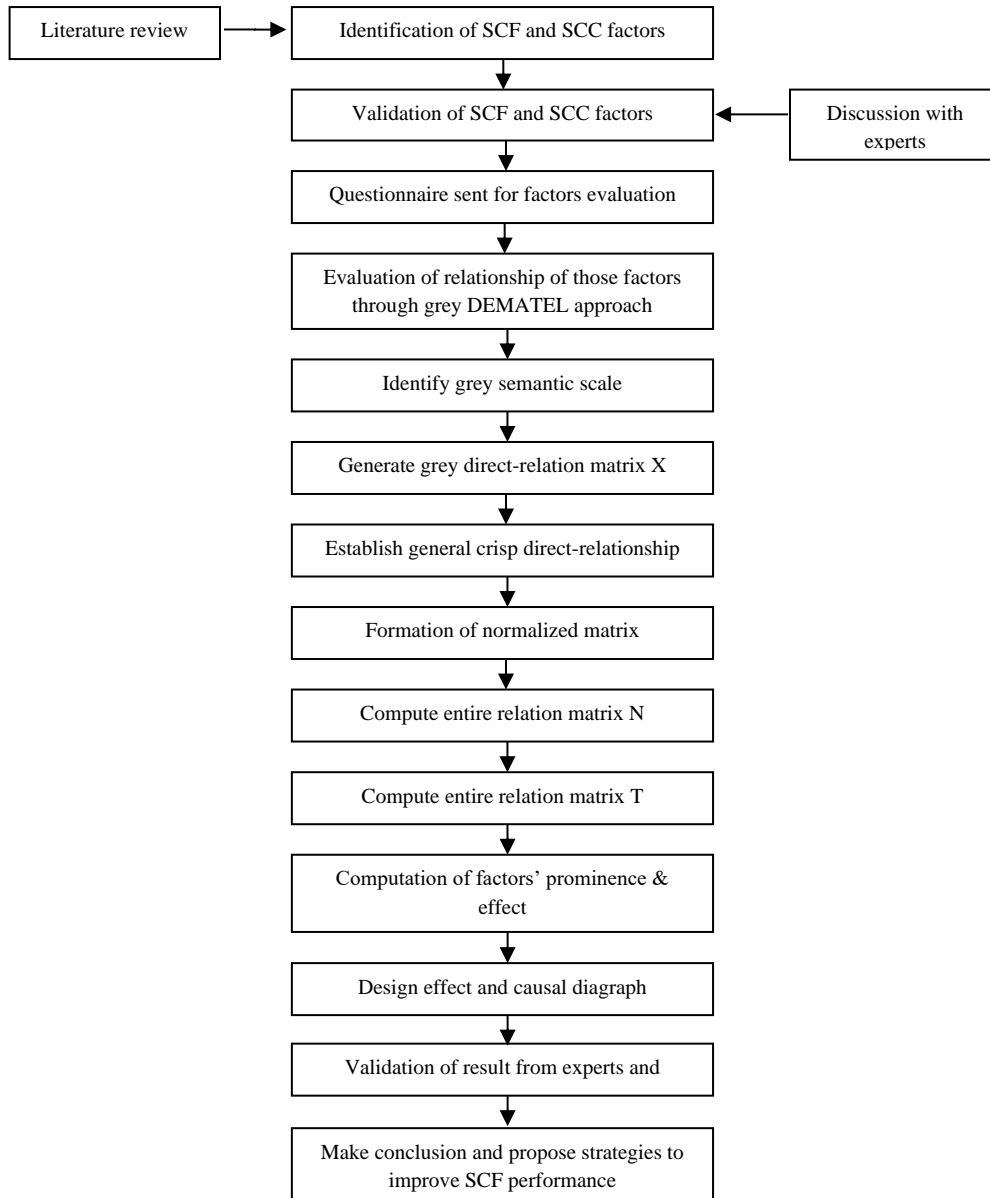
			<b>Prominence</b>		<b>Net effect</b>	
<b>Factors</b>	<b>R</b>	<b>C</b>	<b>R+C</b>	<b>Ranks</b>	<b>R-C</b>	<b>Identity</b>
Level of digitalization (P4)	5.43364	6.164	11.6	1	-0.73	Effect
Information sharing (P10)	4.34303	5.701	10.04	2	-1.358	Effect
Trust (P13)	4.77065	5.149	9.92	3	-0.378	Effect
Supply chain integration (P1)	5.13702	4.568	9.705	4	0.569	Cause
Resource sharing (P7)	4.9562	4.651	9.607	5	0.305	Cause
Competitive environment (P14)	4.1234	5.454	9.578	6	-1.331	Effect
Information technology (P9)	4.16221	5.018	9.181	7	-0.856	Effect
Goal Congruence (P6)	4.55725	4.5	9.057	8	0.058	Cause
Decision Synchronization (P11)	5.14345	3.715	8.858	9	1.429	Cause
Financial Attractiveness (P5)	4.67813	4.146	8.824	10	0.533	Cause
Information quality (P15)	5.54695	3.174	8.721	11	2.373	Cause
Collaborative Communication (P8)	3.98088	4.68	8.661	12	-0.699	Effect
Incentive alignment (P12)	3.70942	3.923	7.632	13	-0.213	Effect
Joint decision making (P3)	4.12408	3.351	7.475	14	0.773	Cause
Workforce (P2)	3.03078	3.504	6.535	15	-0.473	Effect

Source: Author

**Table 10 Identity Values**

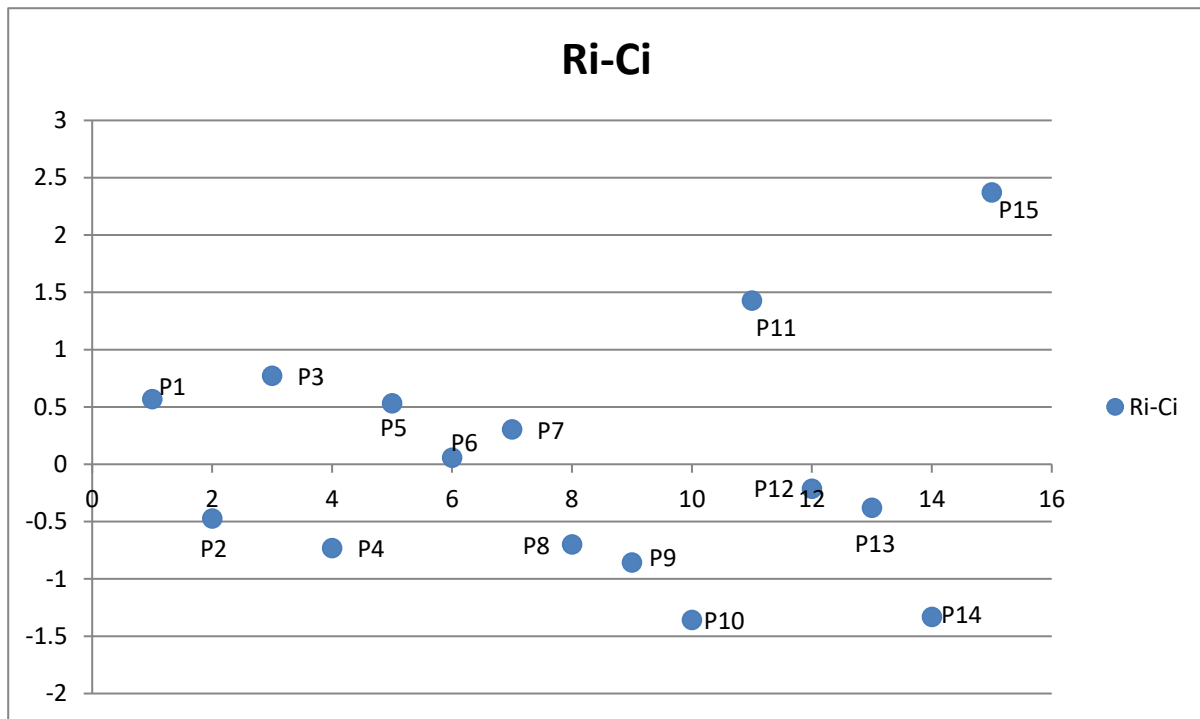
			<b>Prominence</b>		<b>Net effect</b>	
<b>Factors</b>	<b>R</b>	<b>C</b>	<b>R+C</b>	<b>Ranks</b>	<b>R-C</b>	<b>Identity</b>
Supply chain integration (P1)	5.13702	4.568	9.705	4	0.569	Cause
Resource sharing (P7)	4.9562	4.651	9.607	5	0.305	Cause
Goal Congruence (P6)	4.55725	4.5	9.057	8	0.058	Cause
Decision Synchronization (P11)	5.14345	3.715	8.858	9	1.429	Cause
Financial Attractiveness (P5)	4.67813	4.146	8.824	10	0.533	Cause
Information quality (P15)	5.54695	3.174	8.721	11	2.373	Cause
Joint decision making (P3)	4.12408	3.351	7.475	14	0.773	Cause
Level of digitalization (P4)	5.43364	6.164	11.6	1	-0.73	Effect
Information sharing (P10)	4.34303	5.701	10.04	2	-1.358	Effect
Trust (P13)	4.77065	5.149	9.92	3	-0.378	Effect
Competitive environment (P14)	4.1234	5.454	9.578	6	-1.331	Effect
Information technology (P9)	4.16221	5.018	9.181	7	-0.856	Effect
Collaborative Communication (P8)	3.98088	4.68	8.661	12	-0.699	Effect
Incentive alignment (P12)	3.70942	3.923	7.632	13	-0.213	Effect
Workforce (P2)	3.03078	3.504	6.535	15	-0.473	Effect

Source: Author



Source: Author

**Figure 1 Framework of research / flow diagram**



Source: Author

**Figure 2 Overall DEMATEL Prominence–Causal diagram**

**Table A1 Number of Factors**

S.NO	Factors	Description
P1	Supply chain integration	SCI refers to degree through which organization can critically connect itself and do arrangement of supply chain with its members, up and down stream.
P2	Workforce	Workforce is classified into group of people who works jointly to attain a mutual purpose or goal. Supply chain financing may be enhanced or improved by the ability, experience and skills of the workforce.
P3	Joint decision making	Joint decision making refers to the strong supply chain network that is necessary for the effective performance of the organization because improved performance is linked with the well associated network of supply chain.
P4	Level of digitalization	Level of digitalization in business permits the distribution of value-added services, like rapid and improved visibility of statement which helps the supplier in managing accounts receivable/payable.
P5	Financial Attractiveness	Financial attractiveness refers to the consumer's appeal toward product which will become an opportunity of market for supplier.
P6	Goal Congruence	Goal congruence involves SC members who are more dedicated toward the network and works more willingly when goal consent is associated with it.
P7	Resource sharing	Resource sharing describe as relationship of SC where partners are allowed to organize activities and decisions which helps in value creation.
P8	Collaborative Communication	Collaborative communication is considered as a channel that make the supply chain member realize about importance of information sharing and capital.
P9	Information technology	Information technology provides allowances to supplier management that should be considered as a progress in dealings between members which involves accessible and improved data base.
P10	Information sharing	Information sharing involves sharing of information with suppliers as well as buyers. Information sharing usually entails the sharing of inventory, sales, etc., and depends on the way in which data is shared.
P11	Decision Synchronization	Decision synchronization is a characteristic that estimate the intensity of SCC.
P12	Incentive alignment	Incentive alignment defined as advantages that the seller and customer get jointly in transactions.
P13	Trust	Trust refers to positive faith, attitude, and anticipation of supply chain member who belief that the opinion of one party will be satisfactory for the other party.
P14	Competitive environment	Competitive environment refers to the gaining of competitive advantage by observing the atmosphere of competition in organization and it also helps in making decisions or in practical judgment. It will only happen when organization recognize its competitive environment
P15	Information quality	Information quality define as certainty of quality of data that is shared in the organization illustrates the attaining of effectiveness in SCM, information should circulate in the organization without deformation or interruption.

Source: Author

**Table A2 Comparison Scale**

<b>Numeral</b>	<b>Definition</b>
0	No influence (NI)
1	Very low influence (VLI)
2	Low influence (LI)
3	High influence (HI)
4	Very high influence (VHI)

Source: Author