

LITERATURE REVIEW

Enhancing SMEs Performance through Supply Chain Collaboration and moderation of Supply Chain Technology Implementation

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ABSTRACT

Goal: The minimal inter-firm resource sharing has raised problems for small and medium-sized enterprises (SMEs). There has been little focus on a thorough understanding of supply chain collaboration in the context of SMEs in Pakistan. This research looks into the antecedent impact of governance mechanisms and collaborative culture on supply chain collaboration (SCC), as well as the direct influence of supply chain collaboration on SMEs' performance in developing countries.

Design/Methodology/Approach: The data was collected using a closed-ended questionnaire from randomly selected respondents from Pakistani SMEs. SMART PLS 3.0 software is utilized for statistical analysis.

Results: The findings showed a significant positive link between SCC and the performance of small businesses. Moderation was investigated between the variables. This means that supply chain technology Implementation (as moderator) is a process that provides SMEs to improve collaboration between partners through information and advanced manufacturing technology and provide suitable solutions to achieve performance.

Limitations of the investigation: It is a cross sectional study and front line managers are eliminated from the study, however they are also the key respondents of supply chain (SC) implementation.

Implications: The implications of this research for SC managers and researchers involved in supply chain collaboration adoption in SMEs are important.

Originality/ Value: Findings supported the concept that if the organization has a supportive culture towards supply chain collaboration adoption then SMEs will improve their performance.

Keywords: Supply Chain Collaboration, Governance Mechanism, Collaborative Culture, Supply Chain Technology Implementation, Firm Performance.

1. INTRODUCTION

A considerable proportion of manufacturing SMEs has encountered performance disruption since the industries were captured by globalisation. Inadequate raw materials, corporate ethics problems, and supply chain management disturbances have all affected SMEs (Dar et al., 2017; Irjayanti et al., 2018) funds are minimal (Ahmad & Mansur, 2019) suppliers do not deliver on time to consumers, suppliers do not receive payments on time (Ali Akhtiar, 2018), and there are high technology-related issues (Samiusllah & Afaq, 2019).

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Pakistan's manufacturing SMEs are on the verge of collapsing. Small and medium companies are rising at 8% in the manufacturing sector, 10% in exports, and 10% in the service sector, all of which need to be boosted (Mirza Ikhtiar Baig, 2019). Their success is being hampered by the issues listed above. One of them is a lack of adequate funds, while another is a lack of confidence among financial institutions to advance loans. Furthermore, there is a lack of supply chain management and support (government support) resulting in the inability to obtain high-quality raw materials (Dar et al., 2017). Low quality and non-standardization of production were caused by a lack of high technology (Chaudhry, Khalid and Farooq, 2018; Samiusllah & Afaq, 2019). Uncooperative behaviour and a lack of business ethics, on the other hand, have a negative impact on supply chain management efficiency (Ali Akhtiar, 2018). All of these problems also can be found in SMEs around the world. One of the current problems in Nigeria (Ahmad & Mansur, 2019) and Indonesia (Irljayanti et al., 2018) is a lack of capital. In addition, poor supply chain management, a lack of high-tech for efficiency and collaboration, and corporate ethics-related problems in supplier partnerships are adversely impacting the firm performance (Irljayanti et al., 2018; Rahman & Mendy, 2019). A report by Canadian Centre for Data Development and Economic Research's study (CDER), shown in Figure 1 below "The business survival rate for the goods-producing sector was 47.8 percent in 2018". According to this report, More than fifty present of small-medium enterprises shutdown within ten years.

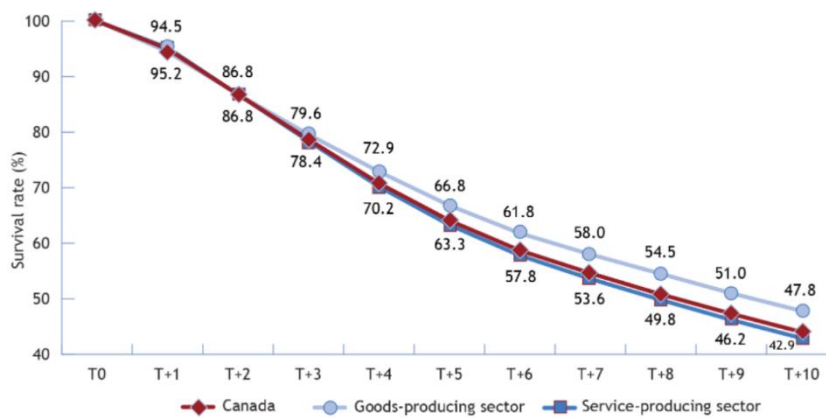


Figure 1 - SMEs Survival Rate
Source: ("SME Statistics," 2020).

Supply chain cooperation enables organizations to combine their resources and skills (inter and intra-organizationally) to achieve shared goals objectives (Ramjaun et al., 2022). Organizations can transfer raw materials, logistics, enhance intermediary cooperation, and address other supply chain-related issues by supply chain collaboration. The previous study laid the groundwork for addressing supply chain and firm performance problems by establishing a basis and a formal framework (Um & Kim, 2018). They offered a research gap in order to better understand the connection between supply chain cooperation and firm success in the future.

First, this research looks at how well a company does when it comes to forming partnerships with partners. Any business strategy, including supply chain management, should strive to raise profits (Ho, 2018). Financial items are important for deciding whether organizational improvements strengthen a company's financial position, but they fall short of capturing supply chain performance. These are not suitable for firm's objectives based on non-financial outcomes (Wu & Chiu, 2018). Moreover, studies produced mixed results about its efficacy in generating little or no change in firm performance (Devaraj & Kohli, 2003). Such consequences may be caused by the use of insufficient instruments to evaluate firm success, such as financial indicators. As a result, this research incorporates both financial and non-financial firm performance indicators in order to evaluate the construct SCC.

Second, numerous variables are provided in the analysis of the antecedent of SCC. Based on past research and theoretical gaps, these antecedents were chosen. Institutional theory is used to define the relationship between collaborative culture (CC) and supply chain partner collaboration in the current research. Firms under a strong collaborative culture focus on confidence, goodwill, and social norms in SCC rather than organizational policies and fixed strategies, findings by (Rojas Palacios et al., 2022; Zhang & Mei, 2018) also align with this argument. Contrarily, sometimes CC encourage or discourage partners relationship (Boddy et al., 2000; Gopal & Gosain, 2010). Based on future direction by Singh et al. (2018) the current study has proposed CC as one antecedent to SCC, he proposed that "there must be an appropriate collaborative culture which will provide the collaborative friendly environment, for achieving effective supply chain collaboration"

In addition to collaborative culture, governance mechanism is proposed as another antecedent

to SCC. It is indicated from the research model of the base study by Um and Kim (2018). He noted that the risk of fluctuation from expected firm performance always exists which is caused by disturbed exchange relationship between partners. These risks belonged to non-cooperation in partners in SCC (Langfield-Smith, 2008). Two methodological perspectives on governance structures have been explored. 1) relational mechanism and 2) contractual mechanism (Wang & Ran, 2018; Yang & Suyuan, 2018; Zheng et al., 2008; Zhou & Zheng, 2012). There are mixed results, but a few findings suggest that for SCC, relational mechanisms are more important than contractual/transactional mechanisms (Poppo & Todd, 2002; Um & Kim, 2018; Zheng et al., 2008; Zhou & Zheng, 2012; Zhou & Zhuang, 2015). In the current study, relational and contractual governances are equally considered important for strengthen the implementation of supply chain collaboration.

Third, In Pakistan based on managerial current need and issue; the absence of advanced hi-technology is hampering the SME's performance. Therefore through task-technology fit theory (TTF) supply chain technology implementation (SCTI) is synthesized in two relationships. First as the independent variable for firm performance and second to enhance the agility in SCC it is proposed as a moderator between Supply chain collaboration and firm performance. Moderation effect of SCTI add's novelty to the current research.

2. LITERATURE REVIEW

1.1 Collaborative culture

Culture is not an entrepreneurship characteristic, but rather a holistic firm approach (Porter, 2016). In an organizational sense, the study has highlighted comprehensive cultural relationships. Regardless, it does not seem to have a major positive relationship with SCC (Segil, 1998). In contrast, literature reported a significant positive relationship between collaborative cultures (CC) and SSC (Groysberg et al., 2018; Kumar et al., 2021). Due to the variety of dimensions of CC in the organizational literature, it is difficult to find a comprehensive definition. However, Cao and Mei (2007) define it as "The norms, beliefs and underlying values with relationship orientation shared in a firm regarding appropriate business practices in the supply chain". Based on his views, collaborative culture support long-term connectivity among isolated firms which provide inter and intra elasticity of decisions for the betterment of partnership (Rojas Palacios et al., 2022). For an in-depth understanding of CC in the context of supply chain collaboration, it is studied under four dimensions "collectivism, long-term orientation, power symmetry, and uncertainty avoidance". In literature culture has studied in many dimensions, however, these four are most suitable for collaboration in the supply chain (Cao & Mei, 2007).

Collaborative culture through Institution theory is synthesized as an institutional force that supports supply chain connectivity (Meihua, 2016). Individually, four aspects of collaborative culture have constructive interaction with SCC. Collectivism would first promote common interests, then the goals of isolated partner. Similarly, it promotes information exchange and provides solutions to shared problems through fair interaction (Pian, Jin and Li, 2019). Second, through engaging in partnership growth, long-term orientation assists in the development of future partnerships (Li et al., 2019). Uncertainty avoidance encourages supply chain members to work together to reduce risk and share costs and benefits (Cao & Mei, 2007). Lastly, the division of power between a firm in supply chain (SC) divided into two parts, symmetrical or asymmetrical) (Kaya & Caner, 2018). Power symmetry (low power gap between firms) facilitates two-way contact between firms, which decreases uncertainties and strengthens teamwork (Kaya & Caner, 2018). Businesses with a limited power gap are more likely to embrace visibility, shared planning, and benefit-sharing, and power symmetry may make SC partners work more efficiently. As a result, this research proposes that:

Hypothesis 1: Collaborative culture has a significant positive effect on supply chain collaboration.

1.2 Governance Mechanism

Exchange risk due to the absence of cooperation hampers the firm performance in Supply chain collaboration (Langfield-Smith, 2008). Researchers have been focusing on supply chain collaboration contract structure and social regulation mechanisms to control risk and positively change the direction of inter-firm partnerships. Minnaar et al. (2016) also believe that aligning partners' interests, contracts and relational management mechanisms will minimize this risk. Governance mechanism (GM) provides a platform for supply chain members collaboration where they can practice risk-free exchange based on contracts and relational set of rules (Faruquee et al., 2021; Um & Kim, 2018). As the current research focuses on the SCC and firm performance model

suggested by Um and Kim (2018) so GM is adopted and examined as one of the supply chain collaboration antecedents.

Governance mechanism (GM) refers to “the official and unofficial principles ruling an exchange between supply chain members” (Cao Zhi & Lumineau, 2015). The notion of supply chain collaboration is supported by institutional theory (IT) through governance mechanisms and collaborative culture. Institutions comply with all formal and informal rules, constitutions, as well as unofficial barriers, such as behavioural norms, traditions, and self-imposed codes of ethics (North, 2003). According to Scott (2005), culture as an organizational force shapes the organizational structure and partners' success behaviour. Furthermore, institutional synchronization leads to communication techniques dependent on culture and formal and informal rules (Rossiaud & Locatelli, 2010). Meanwhile, in the current study, GM is considered as an institutional force that strengthens the SCC.

Governance mechanisms entertain SC members with a win-win scenario, particularly when an individual firm chooses its interests (Cai et al., 2022). The firm is concerned in a win-win scenario about whether its partners behave as intended. When supply chain firms face a difficult challenge, they deviate from the goal and prefer opportunistic conduct (Um & Kim, 2018). The correct governance system controls partner disputes and opportunistic conduct (Howard et al., 2019). In previous literature, GM is studying under two aspects relational and transactional governance. In the supply chain partnership, transactional governance entails legal contracts and the creation of a predetermined series of behaviors (Um & Kim, 2018). On the other side transactional governance refers to “the extent to which exchange parties are governed by social relations, shared norms, and trust” (Zhou Kevin & Dean, 2012). Few studies asserted that the transactional governance yield more significant results in SC firms relationship (Cao Zhi & Lumineau, 2015; Krishnan, Geyskens and Steenkamp, 2016; Liu, Li, Shi and Liu, 2017; Zhou & Zheng, 2012). In contrast, other studies investigated the positive more positive impact of relational governance. (Wang et al., 2015; Zhou & Zhuang, 2015). Although most of the findings show that relational governance is preferable to contractual governance in SCC relationships, others favour contractual governance. As a result of these considerations, the following hypothesis is proposed:

Hypothesis 2: There is a significant relationship between governance mechanism (relational and contractual) and supply chain collaboration.

1.3 Overview of supply chain management & collaboration

A supply chain is an integrated group of independent businesses that cooperate to generate and deliver value in their products. Supply chain management (SCM) improves company profitability by keeping costs and finances under check (Reis et al., 2021). Collaboration, as a new term, refers to the sharing of resources such as equipment, manpower, money, and even knowledge. Small and medium-sized businesses (SMEs) must collaborate in their respective SCs.

1.4 Scope of collaboration for SMEs

Supply chain collaboration can be categorized in two different ways: vertically and Horizontal (Unhale, 2014). Collaboration with vendors and consumers is referred to as vertical collaboration. Horizontal collaboration, on the other hand, leads to cooperation with competitors and other businesses that aren't part of your supply chain (Singh et al., 2018). Similarly, companies can improve their financial and non-financial performance (Wu & Chiu, 2018) as well as operational (Bae, 2014; Um & Kim, 2018) with more versatility than the conventional SCC view, by implementing the holistic view of SCC (horizontal and vertical collaboration). As a result, the scope of collaboration for SMEs in this research is dependent on Barratt (2004)'s results, as seen in figure 2. Since SMEs lack adequate funds, strategy, hi-tech, risk resistance, and experience, they must cooperate vertically (with vendors and customers) and horizontally (with other organizations and competitors) with other companies (Unhale, 2014).

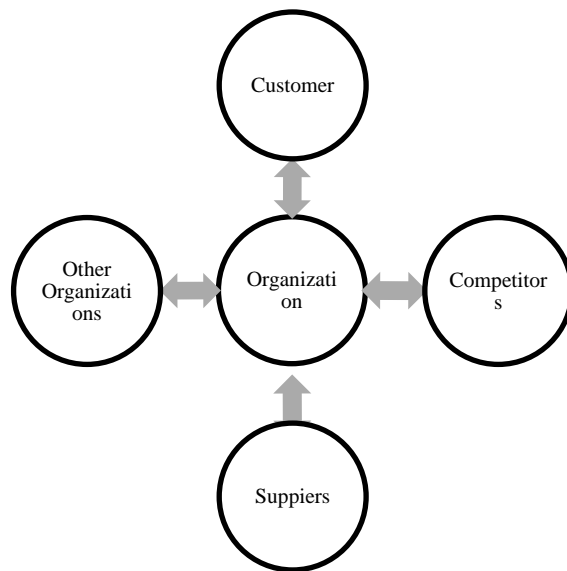


Figure 2 - Scope of collaboration adopted from (Barratt, 2004).
Source: (Barratt, 2004).

1.5 Supply chain collaboration

While SCC is a modern phenomenon, two researchers (Mariti & Smiley) studied cooperative arrangements focused on inter-firm relationships in 1996 and found promising results. Likewise, researchers looked at SCC in a variety of aspects for example “Joint ownership of decisions and decision outcomes among interdependent parties (Stank et al., 2001). The present research suggests that “SCC is a long-term partnership in which supply chain partners with common goals work together to achieve an advantage greater than the firms would achieve individually”. Based on the constraints of limited literature and analysis, findings by various researchers reveal that SCC improves firm performance (Mofokeng & Richard, 2019; Zaridis et al., 2021).

Transparent communication required a long-term supply chain partnership (Cao & Mei, 2007; Imtiaz & Pervaiz, 2020). Communication sources should be updated and monitored since different protocols appear in the hierarchical association between firms in SC (Lee, 2001). People are more likely to share constructive feelings in a successful relationship where there is open and interdepartmental communication. The communication orientation was supported by Prahinski and Benton (2004) in the selection of a rite partner in SC. Collaborative communication in the supply chain can work as the source used to “share information, goal congruence, decision synchronization, incentive alignment, resource sharing and knowledge creation”. The frequency at which supply chain (SC) partners interact increases the supply chain's overall efficiency (Cao & Mei, 2007). In this research, it is suggested that collaborative communication (CC) encourages sharing of resources, goal and incentive alignment and high-tech use for overall firm performance.

1.6 Firm performance

Globally the measurement of performance is not easy through solely supply chain, therefore; collaboration is a vital success factor for SC partnership. A large number of studies have measured the financial and non-financial firm performance (FM) of small-medium enterprises (Haroon & Shariff, 2016; Hassan, Nawaz, Shaukat and Hassan, 2014). Furthermore, Sheikh, Hasnu, and Khan (2016) found a significant positive relationship between HR strategies and SMEs financial and non-financial firm performance in Pakistan. Similarly, Zaridis et al. (2021) found a positive relationship between SCC and FP. In the early 1990s, researchers developed an SC measurement system that includes three types of key elements: resource, output, and flexibility. Afterwards, different studies utilized it to measure the relationship between SCC and firm performances (Um & Kim, 2018; Wu & Chiu, 2018). Here resources mean financial elements which refer to the vigorous organization of resources in a firm for the attainment of its objectives. Similarly, output and flexibility are non-financial indicators. Output leads to measure customer needs, on-time delivery, and product quality. The ability of a system to react to changes in consumer demand and vendor supply is referred to as flexibility (Wu & Chiu, 2018). SC partnerships aim to meet future demand, meet potential demands, and save costs by collaborating with partners (Chopra & Meindl, 2001).

The association between SCC and firm performance is supported by the resource-based view theory. Isolated organizations in an industry can improve their performance by sharing their VIRM resources which refers to Valued, Rare, Inimitability, and Non-substitutability (Jun, 2017; Um & Kim,

2018). Via partnership among the firm, VIRN resources generate value and partners perform well (Cao & Zhang, 2011; Serrat, 2017). It is recommended that VIRN-based resources be used to increase performance by fostering close supply chain cooperation.

Previous studies found a significant relationship between collaboration and performance (Ho, 2018). Supply chain collaboration through collaborative communication promotes the collective utilization of resources and knowledge which further encourage response to consumers needs, reduce costs and create swiftness in the movement of material along with SC (Simatupang & Sridharan, 2005; Um & Kim, 2018). Similarly, through Collaborative communication, decision synchronization and task congruence improve the use of idiosyncratic assets and give organizational objectives first priority, respectively (Simatupang & Sridharan, 2005). Under above discussion, the current study has measured both financial (return on investment, return on assets, sales growth and production & inventory cost) and non-financial (customer requirements, market change, product development, product design and delivery on time) performance of SMEs.

Literature supported the significant and positive relationship between SCC and firm performance. Therefore, the researcher investigated the positive impact of collaboration on individual and firm performance (Barratt, 2004); Um and Kim (2018). Another study found the significant and positive impact of SCC on both financial and non-financial firm performance (Cao & Mei, 2007).

Similarly, Shahbaz and Rasi (2019) investigated the potential benefits of SCC and found a direct positive relationship between SCC and firm performance. However, In contrast, literature found an insignificant and non-positive impact of SCC on FP. The association between SCC and logistic firm performance was found to be negligible in both customer and competitor contexts (Sinkovics & Roath, 2004). Similarly, another study has supported the said relationship (Mofokeng & Richard, 2019). The supply chain collaboration and firm performance partnership were dominated by mixed analytical results. Few studies have found a significant and clear link between SCC and firm performance, while others have found no such link. As a result of the mixed findings, further research into this partnership is warranted, and a testable hypothesis is established.

Hypothesis 3: There is a significant relationship between supply chain collaboration and SMEs firm performance.

1.7 Supply Chain Technology Implementation

No doubt SCC is a broad practice for performance nonetheless, few issues hampering the partner's abilities toward efficient delivery in SC. The managerial gap proposed the utilization of hi-manufacturing technology and communication in information technologies which will overcome on delivery and data sharing problems in SC. Hong et al. (2010) identify the need for utilization of technologies between SC and firm performance relationship. Technologies directly support the movement of inventory and data and improve firm performance (João Pedro Soares Machado, 2019). Singhry (2015) suggested Supply chain technologies (SCT) as a critical component in supply chain efficiency and as a way to increase the performance of SMEs firms in the literature.

Singhry (2015) define SCT as "a dynamic capability that firms must build, integrate, and reconfigure to enhance performance". Literature categorized these technologies into three types, Advance manufacturing technologies, information technologies and procurement technologies (Handfield et al., 2019). however current study is focused on information and advanced manufacturing technologies (Singhry, 2015). Sid et al. (2021) proposed the implementation of manufacturing and information technology to improve supply chain and distribution-related issues. Manufacturing technologies consist of computer-aided design (CAD) / computer-aided engineering (CAE), computer numeric controlled machine tool (CNC), computer-aided inspection (CAI), automated guided vehicles (AGV), automated materials handling systems and automated storage (AS). Similarly, information technologies comprise electronic information system connected with intra and inter-firm relationship (Hong et al., 2010). These technologies affect manufacturing and the flow of inventory. It facilitates connectivity, lowers processing costs, allows for real-time data, standardises product consistency, and guarantees on-time delivery (Das & Nair, 2010). Meanwhile, SCT helps firms to improve supply chain collaboration and performance (Kamariah Kamaruddin & Mohamed Udin, 2009; Singhry, 2015).

Um and Kim (2018) asserted and investigated the significant positive relationship between SCC and firm performance. Similarly, Singhry (2015) investigated and proved the positive effect of Supply chain technologies implementation (Advanced manufacturing technologies (AMT) and information technologies IT) on performance and collaboration. On the other side, Fawcett et al. (2015) have not reported significant findings and proposed that Collaboration in the supply chain does not result in a consistently positive effect on a company's performance. A collaborative mechanism has no impact on product production time and quality specifically when there are risks or when a company is seeking disruptive activity (Sandra & Bustelo Daniel, 2009). Similarly, in the

said relationship despite benefits, results showed disappointment with the outcomes of their IT investment due to the productivity paradox (Ye & Wang, 2013). Meanwhile, Cai Zhao et al. (2016) unable to implement the moderation impact of IT capability in the relationship between supply chain collaboration and performance and proposed future researchers for further investigation in this relationship.

Inconsistent outcomes between SCC and firm performance as well as IT and firm performance and current managerial issue warrant the need for more investigation, therefore this study offers the supply chain technologies implementation as a moderator between SCC and firm performance and as an independent variable for firm performances to improve the SMEs firm performance in Pakistan. Based on the above discussion the following testable hypothesis are developed:

Hypothesis 4a: supply chain technologies implementation positively moderate the relationship between SCC and SMEs firm performance.

Hypothesis 4b: supply chain technologies implementation has significant positive effect on SMEs firm performance.

Generally, this research objectives to learn more about the antecedents, existence, characteristics, and implications of supply chain collaboration from a variety of theoretical perspectives in order to enhance firm performance. Specifically, 1) to examine the relationship between supply chain collaboration and firm performance. 2) to examine the relationship between collaborative culture and supply chain collaboration. 3) To examine the relationship between governance mechanism and supply chain collaboration. 4) To examine the relationship between supply chain technology implementation and firm performance. 5) To examine the moderating role of supply chain technology implementation in the relationship between supply chain collaboration and firm performance.

3. RESEARCH METHODOLOGY

This study with a positivist paradigm prefers the quantitative research approach that is based on the ideology that there is a hidden reality that can be revealed through precise empirical study (Creswell, 2009). A self-reported survey is used to collect the data as it is more effective and influences the level of satisfactory responses from the respondents. Moreover, completed questionnaires can be collected in a short period (Dillman, 1978). Furthermore, structural equation modelling is used because it is the most comprehensive and convenient technique to utilize multiple latent and predictor variables and moreover, most marketing researchers prefer this approach (Ganjouei et al., 2018). Below Figure 3 is representing the research model of this study.

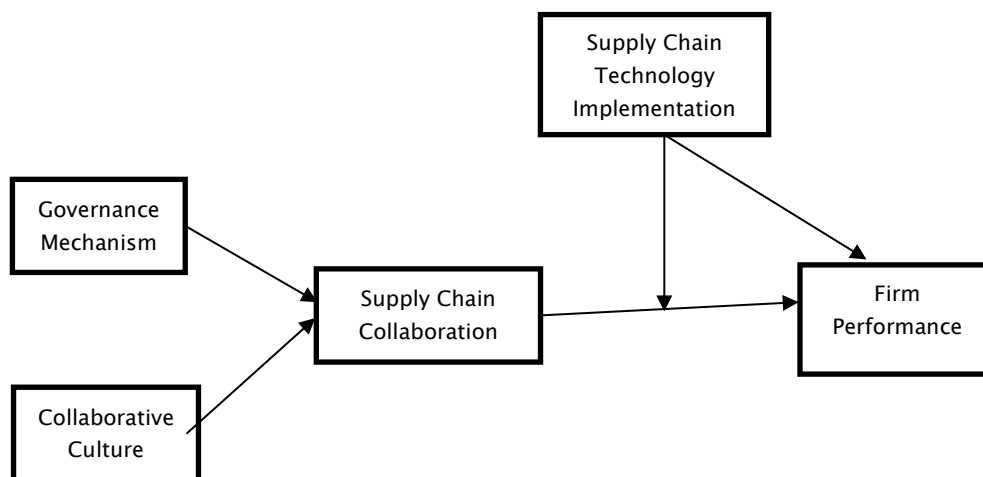


Figure 3 - The research framework

4. EMPIRICAL VALIDATION

4.1 Item Generation and Specification of the Constructs

The current study's survey instrument has 51 items on a 5-point Likert scale ranging from 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. Five constructs are proposed in this study: governance mechanism, collaborative culture, supply chain collaboration, supply chain technologies implementation, and firm performance. Table 1 is

depicted in the detail.

Table 1 - Component of the research instrument

Section	Elements		Number of items	Source
	Variable	Elements/Factors		
A	Governance mechanism	Relational governance	5	(Um & Kim, 2018)
		Contractual governance	4	
B	Collaborative culture	Collectivism	4	(Cao Mei, 2007)
		Long Term Orientation	4	
		Power Symmetry	4	
C	SCC	Collaborative communication	5	(Wu & Chiu, 2018)
		SCT implementation	7	
D	Advanced manufacturing technology	Information technology	5	(Singhry, 2015)
		Financial performance	4	
E	Firm performance	Non-financial performance	5	(Wu & Chiu, 2018)
		Total	51	

4.2 Population and Sample

The target population of the current study is consisting of manufacturing SMEs in Pakistan. According to the Pakistan Bureau of Statistics (2005) total manufacturing SME's in Pakistan are 583329 but the growth of manufacturing SMEs is only 8% which is less than the export and service sector by 2% (Mirza Ikhtiar Baig, 2019). The CEOs and managers of manufacturing SMEs are selected as a unit of analysis except for front-line managers and workers as they are not directly connected with the supply chain management. For sample size, it is mentioned earlier that these are 583329 manufacturing SMEs. Therefore, based on the mentioned criteria in table 2 at a 5% margin of error 384 is the suggested sample size for the current study.

Table 2 - Sample Size

Population (N)	Margin of Error (5%)	Margin of Error (1%)
	Sample Size (s)	Sample Size (s)
1000	278	906
2000	322	1655
5000	357	3288
10000	370	4899
100000	383	8762
1000000	384	9513

Source: Saunders, Lewis, and Thornhill (2012).

Data collection from the individual firm on their performance is a tough process. Most companies are reluctant to provide details. In the meanwhile, this procedure was rendered more difficult by the Covid-19 epidemic. Consequently, it has not been possible to maintain the specified sample size. In addition to it, based on the suggestion by Memon et al. (2020) G*power software produced 85 sample size. It is a minimum sample size. Anwar et al. (2018) measured SMEs firm performance, they distributed 600 questionnaires and received a 37.8% response rate. Similarly in current research 600 questionnaires have been distributed through online surveys and physical questionnaires. Meanwhile, based on the Anwar et al. (2018) response rate 227 sample size has been utilized.

The sample frame does not provide the necessary contact information of the respondents to use probability sampling. The data and city-wise lists of manufacturing SMEs were not available (see Appendix 1). As a result, the current study was not unable to adopt probability sampling. As a result, a non-probability sampling technique has been adopted in this investigation. Snowball sampling was utilised to collect data and perform this study because it was difficult to gain authorization to enter a corporation during the Covid-19 pandemic. Meanwhile, snowball sampling is better suited to dealing with low response rate difficulties. Kureshi, Mann, Khan, and Qureshi (2009) also proposed snowball sampling to assess the performance of manufacturing SMEs. Based on references by using snowball sampling, researcher got entered in firms and collected data from managers and CEOs through convenient sampling (Preacher & Hayes, 2004).

4.3 Pre-Test, Pilot Study and Demographic Profile

Two important steps were carried out to assure the effectiveness of the study. The first step was pre-testing the instrument, in which the questionnaire was shared with two marketing experts from academia and two from industry to check the validity of the scale. The experts concluded that the questionnaire is simple to read and does not have any problems in responding to the research purpose. Based on the feedback of experts pre-testing results were significant.

4.4 Reliability Testing

Furthermore, in the second step, Questionnaires were distributed to potential respondents. In this phase, questionnaires were delivered to thirty respondents to assess reliability. The reliability test results based on the pilot study proved that variables have an internal consistency of 0.70 Cronbach Alpha. Table 3 displays the reliability values for all variables.

Table 3 - Results of the Pilot Study

Variable	Cronbach Alpha
Collaborative Culture	0.941
Firm Performance	0.922
Governance Mechanism	0.884
Supply Chain Collaboration	0.841
SC Technology Implementation	0.907

4.5 Data Collection

In the below Table 4, the demographic characteristics of the respondents are mentioned. It reveals that respondents with a bachelor's degree are greater in strenght. They are 48% of the whole data set. Similarly, other characteristics are listed below.

Table 4 - Respondents' Profile

Demographics	Frequencies (n)	Percentage (%)
Education		
Intermediate and blow	26	11.5
Bachelors	109	48.0
Master/ M.Phil	90	39.6
PhD	2	.9
Total	227	100.0
working experience		
<1	14	6.1
1-5 year	85	37.4

6-10 years	104	45.8
11-15 years	7	3.0
15 and above years	17	7.5
Total	227	100
Respondent current Position		
Production managers	64	28.2
Sale and marketing managers	83	36.6
Supply chain managers	44	19.4
Outbound and inbound Logistics managers	2	.9
Distribution managers	2	.9
Finance manager	12	5.3
General manager	4	1.8
CEO (Chief executive officer)	16	7.0
Total	227	100.0
Age		
20-30	127	55.9
31-40	82	36.1
41-50	18	7.9
Total	227	100.0
No. of employees		
1-50	107	47.1
101-150	71	31.3
151-200	19	8.4
201-250	30	13.2
Total	227	100.0
No. of suppliers		
1-50	227	100.0
51-100	0	0.0
Total	227	100.0
Industry Sector		
Plastic & Rubber	45	19.8
Textile	47	20.7
Pharmaceutical and medical		
Ceramics	30	13.2
Electronics & Electrical	39	17.2
Hardware	21	9.3
Beverage	6	2.6
Chemicals	2	.9
Sports Goods	31	13.7
Manufacturing		
Surgical	4	1.8
Total	2	.9
	227	100.0

5. HYPOTHESIS TESTING AND RESULTS

5.1 Descriptive Statistics

Table 5 shows distinct values for the five constructs. All constructs are measured using a five-point Likert scale, and the mean value for each is not less than 3.0.

Table 5 - Descriptive Statistics for All Constructs (n=227)

Constructs	Mean	Std. Deviation
Governance Mechanism	3.86	.84
Collaborative Culture	3.01	.70
Supply Chain Collaboration	4.28	.57
Supply Chain Technology Implementation	3.55	.98
Firm Performance	4.26	.69

5.2 Common Method Variance

CMV refers to the variation that may be attributed to the measuring procedure rather than the constructs that the measures are supposed to reflect (Lindell & Whitney, 2001). In this study, the Harman Single factor test was used to examine if a single factor surfaced. The Harman single factor analysis revealed that one dominant factor only explained 42.26 % of the variation which is successfully less than the requirement of 50%.

Table 6 - Harman Single Factor Result

Component	Total Variance Explained			Extraction Sums of Squared Loadings		
	Total	Initial Eigenvalues		Total	% of Variance	Cumulative %
		% of Variance	Cumulative %			
1	2.536	42.269	42.269	2.536	42.269	42.269
2	1.439	23.983	66.252			
3	.881	14.681	80.934			
4	.537	8.942	89.876			
5	.275	4.575	100.000			
Extraction Method: Principal Component Analysis.						

5.3 Measurement Model Analysis

Structural equation modelling is analyzed into two parts, measurement and structural model analysis.

5.4 Measurement Assessment

The most frequent elements of a measurement model are internal consistency, convergent validity, and discriminant validity.

5.5 Construct Reliability

It measures the internal consistency in scale items. Internal consistency refers to how

better a survey is at measuring what researcher want it to measure. Cronbach's alpha values are used to calculate it, values between 0.70 and 0.90 are deemed adequate in research (Nunnally, 1978). All the values of the four constructs in the below table are well above 0.70.

5.6 Convergent Validity

Convergent validity shows the correlation between indicators under a construct (J. Hair et al., 2010). The average variance and outer loadings can be used to assess convergent validity. If the AVE is more than 0.5 and meanwhile, outer loading equal to and greater than 0.4 are acceptable (Hulland, 1999). Table 7 depicts AVE value for all constructs. Higher loadings were produced by a large number of items from various constructs. To improve AVE, a few items with loading values less than 0.40 were deleted.

Table 7 - Results Summary for Constructs

Construct	Items	Loadings	Cronbach's Alpha	rho_A	CR	(AVE)	Convergent Validity (AVE>0.5)	Discriminant Validity
GM	GMCG1	0.664	0.854	0.803	0.882	0.523	Yes	Yes
	GMCG2	0.810						
	GMCG3	0.854						
	GMCG4	0.836						
	GMRG1	0.594						
	GMRG2	0.664						
	GMRG3	0.581						
	CC	CCC1						
CCC2		0.737						
CCLTO1		0.788						
CCLTO2		0.869						
CCLTO3		0.846						
CCLTO4		0.849						
CCPS1		0.579						
CCPS2		0.564						
CCPS3		0.542						
CCUA1		0.763						
CCUA2		0.705						
CCUA3		0.698						
CCUA4		0.665						
SCC		SCC1	0.790	0.859	0.886	0.900	0.649	Yes
	SCC2	0.928						
	SCC3	0.783						
	SCC4	0.892						
	SCC5	0.591						
SCTI	SCTIAM T1	0.853	0.908	1.045	0.912	0.515	Yes	Yes
	SCTIAM T2	0.69						
	SCTIAM T3	0.837						
	SCTIAM	0.84						

T4								
SCTIAM								
T5		0.504						
SCTIIT1		0.537						
SCTIIT2		0.687						
SCTIIT3		0.613						
SCTIIT4		0.791						
SCTIIT5		0.726						
FP	FPP1	0.768	0.917	0.926	0.932	0.606	Yes	Yes
FPP2		0.831						
FPP3		0.719						
FPP4		0.743						
FPNFP1		0.875						
FPNFP2		0.664						
FPNFP3		0.876						
FPNFP4		0.688						
FPNFP5		0.809						

Note: Item GMRG4, GMRG5, CCC3, CCC4, CCPS4, SCTIAMT6 and SCTIAMT7 were deleted due to low loading

5.7 Discriminant Validity

Discriminant validity refers to “the extent to which a construct is truly distinct from other constructs by empirical standards” (Hair et al., 2016). The first way involves examining item cross-loadings. An indication's outer loadings on a construct should be greater than the loadings on all other unobserved variables. Table 8 is depicting the cross-loadings and as a result, ensures the discriminant validity.

Table 8 - Cross Loading

	CC	FP	GM	SCC	SCTI
CCC1	0.833	0.249	0.052	0.258	0.259
CCC2	0.74	0.222	-0.029	0.161	0.203
CCLTO1	0.788	0.203	0.032	0.219	0.221
CCLTO2	0.869	0.239	0.013	0.254	0.227
CCLTO3	0.845	0.198	-0.041	0.255	0.204
CCLTO4	0.849	0.216	-0.012	0.232	0.193
CCPS1	0.576	0.182	0.034	0.232	0.319
CCPS2	0.561	0.147	0.047	0.229	0.291
CCPS3	0.539	0.135	0.046	0.224	0.311
CCUA1	0.766	0.185	-0.037	0.183	0.173
CCUA2	0.707	0.149	-0.046	0.156	0.157
CCUA3	0.7	0.167	-0.049	0.187	0.1
CCUA4	0.669	0.066	-0.089	0.104	0.07
FPP1	0.147	0.768	0.598	0.471	0.383
FPP2	0.223	0.831	0.221	0.439	0.365
FPP3	0.095	0.719	0.238	0.458	0.39
FPP4	0.453	0.743	0.062	0.539	0.367
FPNFP1	0.334	0.875	0.109	0.729	0.443
FPNFP2	-0.047	0.664	0.404	0.423	0.161

FPNFP3	0.23	0.876	0.108	0.514	0.222
FPNFP4	0.292	0.688	-0.004	0.402	0.317
FPNFP5	0.101	0.809	0.293	0.581	0.474
GMCG1	-0.048	0.216	0.657	0.156	0.446
GMCG2	0.043	0.17	0.809	0.039	0.54
GMCG3	0.058	0.216	0.858	0.149	0.498
GMCG4	-0.025	0.162	0.831	0.122	0.395
GMRG1	0.067	0.164	0.591	0.107	0.276
GMRG2	-0.023	0.299	0.673	0.13	0.071
GMRG3	0.104	-0.025	0.567	-0.033	-0.05
SCC1	0.175	0.483	0.169	0.795	0.213
SCC2	0.261	0.558	0.133	0.925	0.28
SCC3	0.281	0.419	0.182	0.736	0.227
SCC4	0.264	0.62	0.2	0.891	0.394
SCC5	0.2	0.557	0.062	0.648	0.21
SCTIAMT1	0.282	0.428	0.431	0.325	0.853
SCTIAMT2	0.017	0.114	0.34	0.114	0.69
SCTIAMT3	0.415	0.601	0.304	0.404	0.837
SCTIAMT4	0.235	0.317	0.406	0.252	0.84
SCTIAMT5	0.356	0.073	0.269	0.129	0.504
SCTIIT1	0.174	0.016	0.473	-0.01	0.537
SCTIIT2	0.134	0.143	0.522	0.154	0.687
SCTIIT3	0.083	0.085	0.517	0.025	0.613
SCTIIT4	-0.007	0.268	0.612	0.198	0.791
SCTIIT5	0.13	0.129	0.252	0.137	0.726

Similarly, Table 9 depicts the results of discriminant validity suggested by Fornell and Larcker (1981). The square root of AVE values for the respective constructs is greater than the correlation value with other construct in the study, which ensured the discriminant validity.

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Validity

Based on third method of discriminant validity, Table 10 depicts the Hetero-trait and Mono-trait values for Collaborative Culture, Firm Performance, Governance Mechanism and Supply Chain Technologies Implementation (0.682 and 0.713) are between -1 and 1, suggesting that discriminant validity for these constructs has been proven.

Table 9 - Heterotrait-Monotrait Ratio of Correlations (HTMT) Criterion Analysis for Discriminant Validity

	1	2	3	4	5
CC					
FP	0.305				
GM	0.138	0.326			
SCC	0.318	0.731	0.183		
SCTI	0.294	0.351	0.618	0.274	

Tables 7, 8, 9, and 10 reveal that all constructs used in this study had appropriate levels of

reliability and validity.

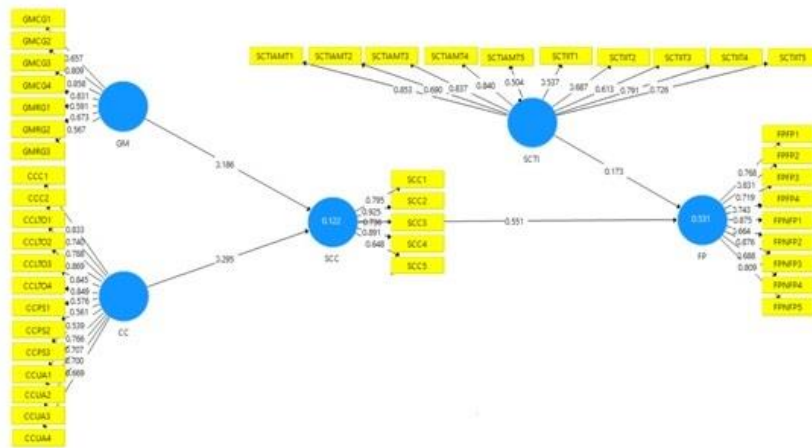


Figure 4 - Measurement Model

5.8 Structural Model Analysis

Structural model analysis provides the ability to predict outcomes as well as the connections between the variables. It is divided into two parts (Model 1 & Model 2) depending on the nature of the relationships in the model and for smooth statistical calculations (see Figures 5 and 6). Meanwhile, all of the results are summarised in the separate tables.

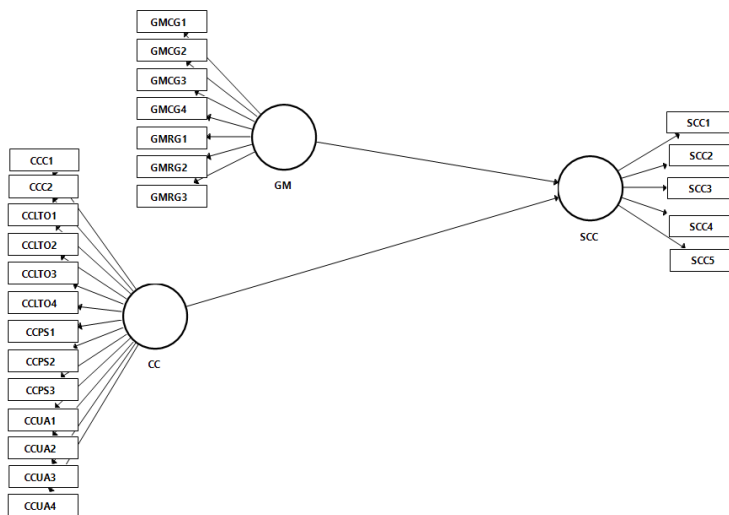


Figure 5 - Path model 1

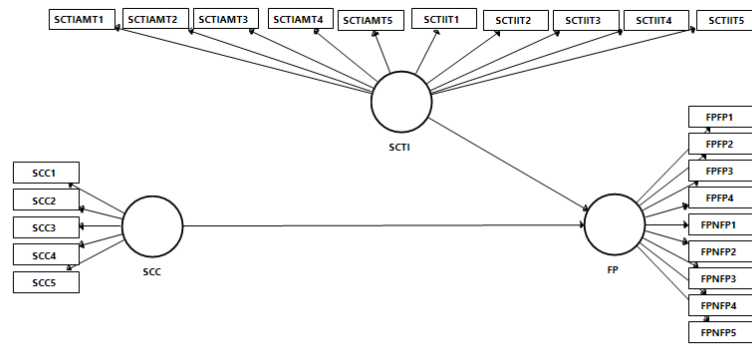


Figure 6 - Path model 2

5.9 Collinearity Analysis

It is crucial to confirm that there are no collinearity issues before analysing the structural model. Table 11 and Table 12 depicts that value of all constructs is less than the bench mark value 3.3, which means there is no collinearity issue in the model (Diamantopoulos, 2008).

Table 10 - Collinearity Results (Model 1)

	CC	GM	SCC
CC			1
GM			1
SCC			

Table 11 - Collinearity Results (Model 2)

	FP	SCC	SCTI
FP			
SCC	1.149		
SCTI	1.382		

5.10 Hypotheses Testing for Direct Relationship

The path coefficient was calculated to determine the significance of the hypothesised link between the variables. To examine the relationships between the variables, four hypotheses were constructed from five latent constructs: Governance mechanism, Collaborative culture, Supply chain collaboration, Supply chain technologies implementation and firm performance. The following are the hypotheses that have been established:

Direct Relationships

Hypothesis 1:	There is a significant relationship between governance mechanism (relational and contractual) and supply chain collaboration.
Hypothesis 2:	Collaborative culture has a significant positive effect on supply chain collaboration.
Hypothesis 3:	There is a significant relationship between supply chain collaboration and SMEs firm performance.
Hypothesis 5:	supply chain technologies implementation has significant positive effect on SMEs firm performance.

The output for path co-efficient assessment for all hypothesis are significant except hypothesis 1 (GM=>SCC) with p-values greater than 0.05, as depicted in Tables 13 and 14: GM->SCC ($\beta=0.188$, t-value=1.787, p-value=0.074); CC->SCC ($\beta=0.299$, t-value=6.045, p-value=0.000); SCC->FP ($\beta=0.557$, tvalue=10.475, p-value=0.000); SCTI->FP ($\beta=0.175$, t-value=2.356, p-value= 0.019). As a result of these findings, H2, H3, and H5b were found to be

supported in this study.

Table 12 - Path Co-efficient Assessment Model A (N=227)

Hypothesis	Relationship	Direct Effect, β	SD (STD EV)	T Statistics	P Values	LL	UL	Results
H1	GM -> SCC	0.188	0.105	1.787	0.074	-0.24	0.332	Not Supported
H2	CC -> SCC	0.299	0.05	6.045	0.000	0.216	0.41	Supported

Table 13 - Path Co-efficient Assessment Model B (N=227)

Hypothesis	Relationship	Direct Effect, β	SD	T Statistics	P Values	LL	UL	Results
H3	SCC -> FP	0.557	0.053	10.475	0.000	0.439	0.645	Supported
H5b	SCTI -> FP	0.175	0.074	2.356	0.019	0.051	0.339	Supported

"Note: ** $p < 0.01$, * $p < 0.05$ "

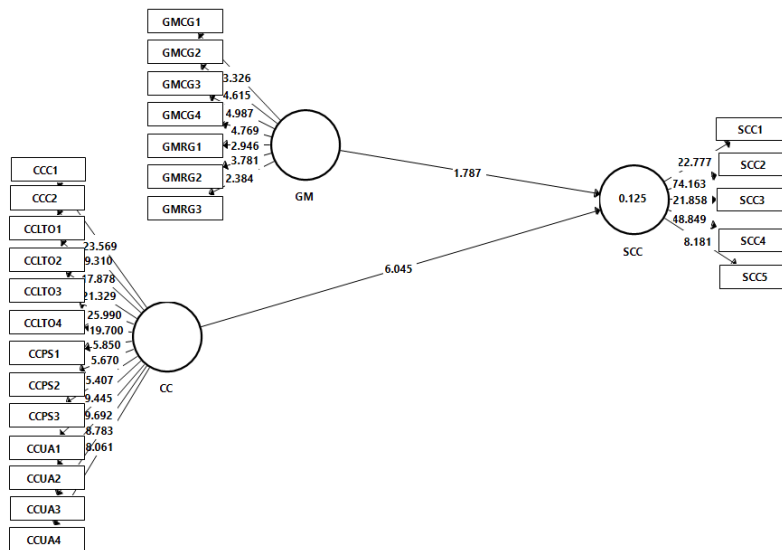


Figure 7 - Path Coefficient Result Model A

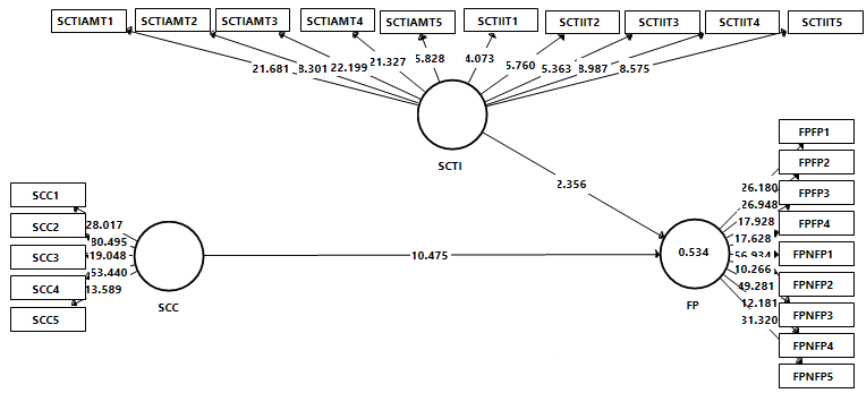


Figure 8 - Path Coefficient Result Model B

5.11 The Coefficient of Determination (R2)

According to the Table 15 R2 values of 0.02, 0.13, or 0.26 are considered weak, moderate, and substantial, respectively for dependent variables. Figures 7 and 8 is showing the dependent variables used in this study. According to the threshold values in table 15, this study's model was predicted as substantial and moderate with the values of .534 and .125 respectively. (Model A, R2=.125 and Model 2, R2=.534).

Table 14 - R2 Value (Borenstein & Cohen, 1988)

R2 Score	Level of Model fitness
0.26	Substantial
0.13	Moderate
0.02	Weak

5.12 Effect Size

The f2 value, like the path coefficient, help in ranking the importance of the independent variable in explaining the dependent variable in the structural model (Hair et al., 2019). In Table: 16 and 17 small, medium, and large f2 effect size, respectively, are represented by values greater than 0.02, 0.15, and 0.35 (Borenstein & Cohen, 1988).

Table 15 - Effect Size (f 2) Model A

	CC	GM	SCC
CC	NA	NA	0.102
GM	NA	NA	0.04
SCC	NA	NA	NA

Table 16 - Effect Size (f 2) Model B

	FP	SCC	SCTI
FP	NA	NA	NA
SCC	0.574	NA	NA
SCTI	0.046	NA	NA

5.13 Predictive Relevance (Q2)

In addition to examining the strength of R2 values as a prediction criterion, researchers

may choose to look at Q2 as a criterion of predictive significance. An external construct has predictive relevance on dependent variable, if Q2 value is greater than 0. As shown in Table 18 the Q2 values in this study suggest that all dependent variables have sufficient predictive significance concerning their independent variables.

Table 17 - Predictive Relevance

	Q2	Stone-Geisser Relevance
Supply Chain Collaboration	0.074	Yes
Firm Performance	0.312	Yes

5.14 IPM Analysis

IPM analysis demonstrates the high-low importance and high-low performance of specific constructs toward certain dependent variable. IPM analysis allows practitioners to focus on independent variables which have high level of importance but low level of performance.

Table 18 - IPMA Score (Model A)

	Importance	Performances
CC	0.299	47.764
GM	0.188	74.922

Table 19 - IPMA Score (Model B)

	Importance	Performances
SCC	0.609	81.978
SCTI	0.175	65.939

Figure 9 representing that CC has a high level of importance in relationship with SCC but low in performance. Similarly, Figure 10 SCC showing a high level of importance with a high level of performance. On the other sides, CRM is relatively important but showing lesser performance. As a result, managers should focus on CC and SCC to improve Supply chain collaboration and Firm Performance.

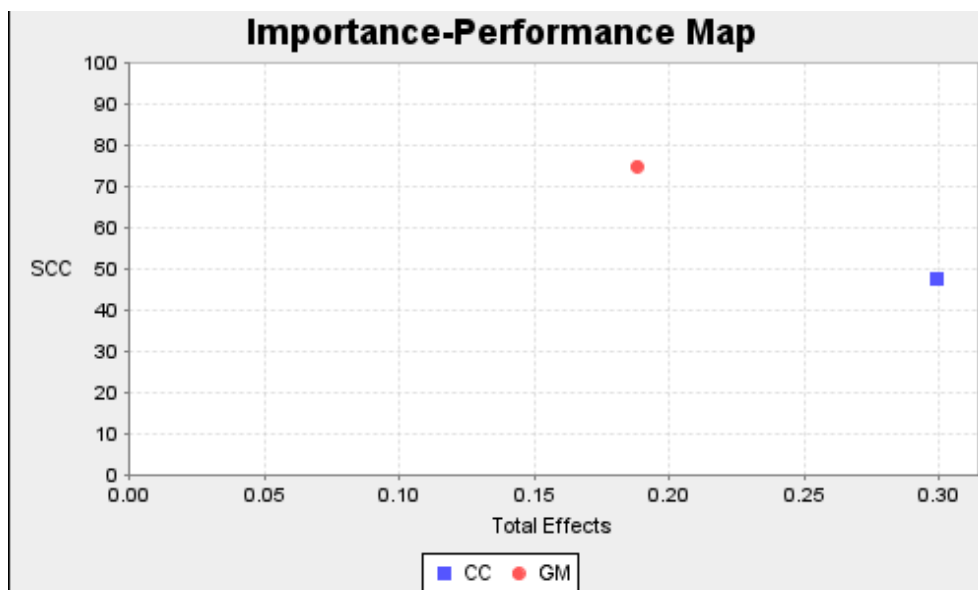


Figure 9 - IPMA Chart Model A

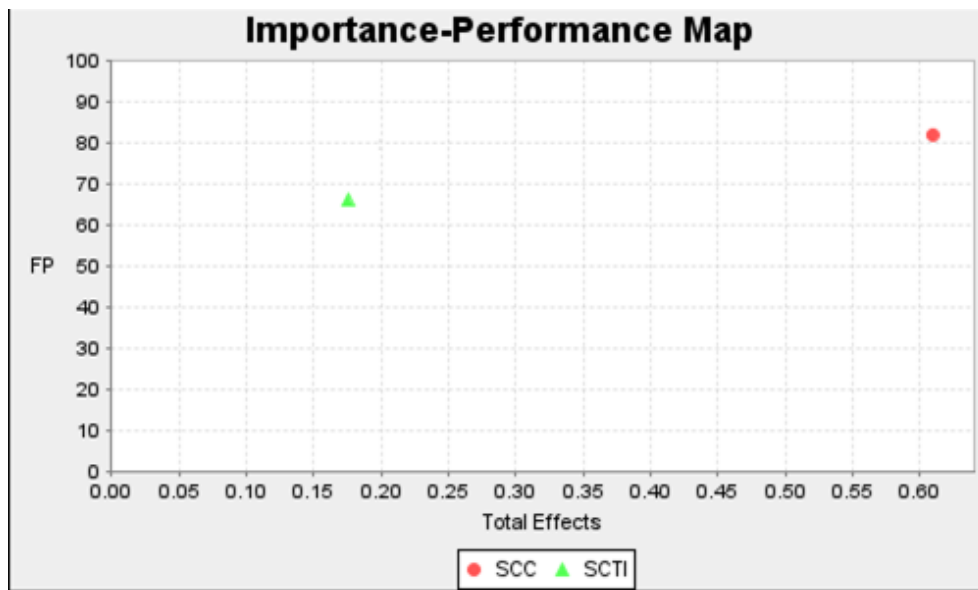


Figure 10 - IPMA Chart Model B

5.15 Moderation Effect Assessment

In this study, the product indicator approach has been used as it is suitable for a model having reflective indicators (Chin et al., 2013). The effect size f^2 was calculated using R^2 values before and after the interaction effect. The impact size of the change in R^2 was 0.240, which is a medium effect size (Borenstein & Cohen, 1988).

$$\begin{aligned} \text{Effect size} &= (R^2 \text{ Included} - R^2 \text{ Excluded}) / (1 - R^2 \text{ Excluded}) \\ &= (.574 - .451) / (1 - .451) \\ &= 0.2240 \end{aligned}$$

Note: "Effect Size f^2 interpretation: Cohen (1988) suggested 0.02 as a small effect, 0.15 as a medium effect and 0.35 as large effect"

Table 20 - Hypothesis of Moderation

	Beta	SD	T Statistics	P Values	Results
SCC * SCTI -> FP	0.304	0.042	6.015	0.000	Supported

Note: "Sig < 0.05"

The interaction between SCC and SCTI was positive, as shown in Table 21. The positive relationship between SCC and FP was stronger when SCTI was higher. To properly comprehend a moderating impact, Dawson proposed charting a two-way interaction. In Figure 11 the two-way interaction plot was created using the standardised beta values of the moderator, independent variable and interaction variables (as given in Table 22).

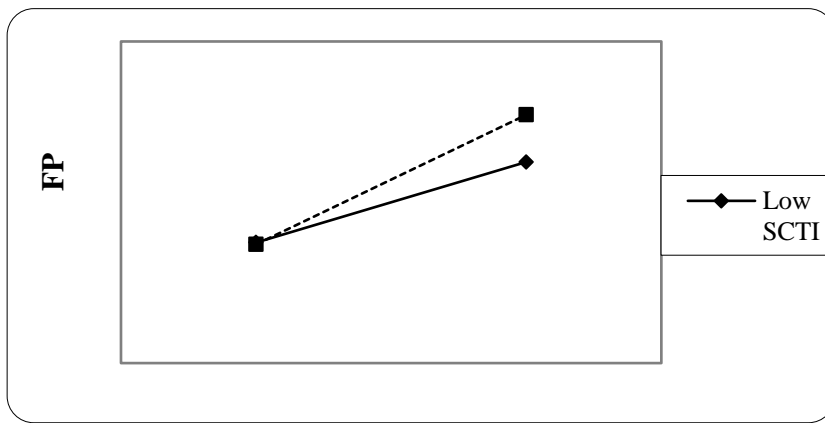


Figure 11 - Two-Way Interaction Plot

The plot depicted that SCC and Firm Performance have a positive relationship and the involvement of the moderator (SCTI) improved their relationship. The dotted line represented that higher the SCTI (moderator) improve the positive relationship and vice versa. Below Table 5.24 is depicting the overall results of hypothesis.

6. FINDINGS OF EMPIRICAL SURVEY

Hypothesis 1:	There is a significant relationship between governance mechanism (relational and contractual) and supply chain collaboration.	Rejected
Hypothesis 2:	Collaborative culture has a significant positive effect on supply chain collaboration.	Supported
Hypothesis 3:	There is a significant relationship between supply chain collaboration and SMEs firm performance.	Supported
Hypothesis 4:	supply chain technologies implementation positively moderate the relationship between SCC and SMEs firm performance.	Supported
Hypothesis 5:	supply chain technologies implementation has significant positive effect on SMEs firm performance.	Supported

7. CONCLUSION

Based on the literature reviewed, governance mechanism and collaborative culture were studied as independent variables to supply chain collaboration (SCC). Supply chain collaboration and supply chain technologies implementation were posited as an independent variable to small and medium enterprises firm performance. Similarly, supply chain technologies implementation studied as moderator between SCC and firm performance. The current study developed five research questions and hypotheses to achieve the research objectives.

7.1 Findings and validated model

The research question ‘Is there a significant relationship between Governance mechanism and supply chain collaboration?’ was answered by hypothesis H1. The finding is inconsistent

with previous literature and adds novelty to it. Contrarily, Um Hyun and Jae Young (2020) investigated the combined effect of governance mechanisms on collaborative activities and firm performance and found significant positive relationships. These inconsistent results show that the relational and contractual governance mechanisms do not reinforce the supply chain collaboration among small and medium enterprises in Pakistan. The majority of SMEs owners in Pakistan are uneducated (Chachar, 2013). Most of them take governance as a formality and neglect the proper mechanism. Furthermore, few of them are deprived of required communication and management skills. Holistically, this destructive approach takes them away from governance mechanism in Supply chain (SC) relationships and is becoming the cause of the lack of fair implementation of governance mechanism practices.

The research question 'Is there a significant relationship between collaborative culture and supply chain collaboration?' was answered by hypothesis H2. Two variables were implied in this research questionnaire, which were collaborative culture and supply chain collaboration. The result was significant, indicating the evidence that collaborative culture has a significant relationship with supply chain collaboration. This study's findings are consistent with prior research (Zhang & Mei, 2018). It shows that companies with a collaborative culture (collectivism, long-term orientation, power symmetry, and uncertainty avoidance) are more likely to encourage communication. In the current study, communication is the unique dimension used under supply chain collaboration that promoted the SMEs firm performance. Collaborative culture fosters common goals, information sharing, and open communication chain (Cannon et al., 2010) Cao and Mei (2007). The collaborative culture among small and medium enterprises in Pakistan will reduce individual conflicts and strengthen the relationship for the smooth flow of the supply chain. As a result, the holistic and individual performance will be uplifted.

The research question 'Does supply chain collaboration affect firm performance' was answered by hypothesis H3. The result was significant and supported, showing proof that supply chain collaboration has a significant relationship with firm performance. SCC enable an individual firm to share its limited resources with other firms and in return enjoy the rest of the resources they do not have. It overall positively affect the supply chain performance and meanwhile, improve the individual firm performance (Mofokeng & Richard, 2019). Similarly, in align with previous results where availability of needful resources help them to achieve desired performance easily (Zhang & Mei, 2018). Contrarily, the current results are not aligned with the previous study where relationship between supply chain collaboration and SMEs performance is insignificant (Mofokeng & Richard, 2019). All firms in the supply chain initially follow the collaborative communication with SC partners which enable them to set up further communication plans, develop new market and cope-up with customer responses, design the processes or products, implement the operational activities and frequent interactions when problems occur (Wu & Chiu, 2018). Later, it leads to long term relationships in the attainment of common goals and objectives which they can not achieve in isolation (Um & Kim, 2018). This finding is consistent with the extended theoretical model on firm performance by Um and Kim (2018). Small and medium enterprises in Pakistan having high potential however, lack of access to needful resources limits their abilities and lead to ultimately low level of performance. Thus, the SCC overcome their shortfalls and improve firm performance.

The research question 'Does supply chain technology implementation moderate the relationship between supply chain collaboration and firm performance?' was answered by hypothesis H4. Three variables were implied in this research questionnaire, which were supply chain collaboration, firm performance, and the moderator of supply chain technologies implementation. The study's findings address the question of whether SCC may be beneficial under certain situations. This study specifically examined the important role of supply chain technology implementation in interacting with the relationship between supply chain collaboration and firm performance. These findings support the grounded theory and add novelty to the literature. Previous literature proposed a two-way relationship between supply chain technologies implementation and firm performance but did not conceptualize this as a moderation relationship (Singhry, 2015). Similarly, Patterson (2002) projected that firms that have implemented supply chain technologies implementation, significantly improved their supply chain relationship. Moreover, this research also empirically supported the hypothesis that supply chain collaboration (SCC) has a stronger positive relationship with firm performance when supply chain technologies implementation (SCTI) is high as compared to having low levels of supply chain technologies implementation. This finding is important because it suggests a variation in the relationship between SCC and FP when the level of SCTI changes. The results are aligned with the Task-technology Fit (TTF) theory, such that when the firms individually establish task-technology fit by introducing those technologies and machineries which are suitable with their issues and needs, they utilization this TTF

synchronization in supply chain collaborative activities. Meanwhile, this task-technology fit (TTF) enhance firm performance through partner collaboration. (Goodhue, 1995).

The research question 'Is there a significant relationship between supply chain technology implementation and firm performance?' was answered by hypothesis H5. The results showed that SCTI had a positive relation with Firm performance. These findings are consistent with earlier studies, which found that firms with the implementation of SCTI trigger improvement in their performance (Patterson, 2002). Similarly, Singhry (2015) found a significant relationship between SCTI and performance. The current finding supports the Task-Technology Fit (TTF) theory, such that when a firm matches its task characteristics with technologies characteristics it create task-technology fit, which directly improves the firm performance. An efficient fit between tasks and technologies will enhance quality, reduce production and inventory costs, improve sales and growth. Similarly, it will help them in quick customer response, market change, product specifications and product deliveries.

7.2 Implication

Theoretically, there are two ways that this study adds to the corpus of literature. First, explained the comprehensive concept of supply chain collaboration and then its embeddedness into firm performance. This study also demonstrated supply chain technologies implementation (SCTI) moderating function in the relationship between SCC and firm performance. TTF theory has shown that when SMEs in SCC suitably implemented advanced manufacturing and information technologies, it positively and significantly improved their collaboration and performance. In contrast, the absence or lack of SC technologies implementation will lead to the compromised performance of SEMs in Pakistan. Researcher can take this extended research model as valuable base for further related studies. Moreover, they can take it as a source of contextual contribution in another country.

The current study gave the platform to managers to implement the adoption of SCC in SMEs. Previous research on supply chain collaboration has mostly focused on large-scale enterprises (Cao & Zhang, 2011; Pradabwong et al., 2017; Um & Kim, 2018). The current research looks at supply chain collaboration in the context of SMEs. SCC helped SMEs to enhance their performance and survive in a competitive market for the long run.

7.3 Limitation of the study

First, a key responder in an organisation, namely the first-line manager, was eliminated to reply to a series of complicated issues on supply chain collaboration, CC, CRM, SCTI, and firm performance, because the first-line management is also likely the most potential individual about those concerns. This may induce bias due to common-method bias. The results stability must be tested by collecting data from various respondents within the organization.

This study has given a helpful beginning point for further investigation into the functions of SCTI in supply chain collaboration, as well as highlighted numerous variables of significant research and management importance. As a result, there are several intriguing areas where further study may be beneficial.

This study has given the directions to use this comprehensive set of the variable in a small context of SMEs. Further research should test these relationships in the micro-level firm in Pakistan. it will help to further improve the overall GDP of the country and uplift these firms performance.

7.4 Direction of future works

Future research may investigate the hypothesised correlations further by integrating certain contextual variables into the model, such as Supply chain resilience (a most suitable alternative). It will be interesting to see if supply chain resilience moderates the relationship between supply chain collaboration and firm performance.

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