

Analysis of factors impacting survivability of sustainable supply chain during COVID-19 pandemic: an empirical study in the context of SMEs

SUSSCs of
SMEs during
COVID-19

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Abstract

Purpose – Nowadays, many firms are finding ways to enhance the survivability of sustainable supply chains (SUSSCs). The present study aims to develop a model for the SUSSCs of small and medium enterprises (SMEs) during the COVID-19 pandemic.

Design/methodology/approach – With the help of exhaustive literature review, constructs and items are identified to collect the responses from different SMEs. A total of 278 complete responses are received and 6 hypotheses are developed. Hypotheses testing have been done using structural equation modeling (SEM).

Findings – Major constructs identified for the study are supply chain (SC) performance measurement under uncertainty (SPMU), supply chain cooperation (SCCO), supply chain positioning (SCP), supply chain administration (SCA), supply chain feasibility (SCF) and the SUSSCs. From statistical analysis of the data collected, it can be concluded that the considered latent variables contribute significantly towards the model fit.

Research limitations/implications – The present study contributes to the existing literature on disruptions and survivability. The study can be further carried out in context to different countries and sectors to generalize the findings.

Practical implications – The research findings will be fruitful for SMEs and other organizations in developing strategies to improve survivability during uncertain business environments.

Originality/value – The study has developed a model that shows that the identified latent variables and their indicators contribute significantly toward the dependent variable, i.e. survivability. It contributes significantly in bridging the research gaps existing in context to the survivability of SMEs.

Keywords Survivability, Sustainable supply chains, Dynamic capability view, Resilience, COVID-19, Structural equation modeling

Paper type Research paper

1. Introduction

Global supply chains are facing an interruption in demand and supply throughout the globe. Availability of supplies has been disrupted, and both local and global economies are affected severely by the coronavirus outbreak (Ivanov, 2020). About 94% of the Fortune 1,000 companies have got impacted due to COVID-19 (Ivanov, 2020; Fortune, 2020), which has



caused multiple risks to the SCs. The data during the COVID-19 pandemic have proven that most of the organizations are not yet ready for such a disruptive event and lack the planning to overcome such situation (Sarkis *et al.*, 2020). COVID-19 has more impact on SMEs as they face many operational challenges due to resource constraints. According to World Trade Organization (2020), micro, small and medium enterprise (MSME) is the backbone of many economies accounting for 60% employment from 95% of companies worldwide. According to Elkhairi *et al.* (2019), SMEs as the most essential and significant economic units in the world. In India, SMEs are the backbone of Indian economy, as it contributes to 29% toward the Gross Domestic Product (GDP) through the national and international trade. It has provided the group characteristics of SMEs. Characteristics of SMEs are the flexible structure, modest management skills and competency, centrality of decision-making; closer and informal working relationship, modest know-how with less expert professionals' resistance to change etc. and so (Singh *et al.*, 2010; Elkhairi *et al.*, 2019).

According to Singh and Kumar (2020), SMEs should develop a long-term strategic plan for being resilient during an uncertain business environment. According to Nurunnabi (2020), the recovery plan and resilience strategy for SMEs should include the business transformation/renewal strategy, cost-leadership strategy, financial management, crisis management (coming up with a contingency plan) and government support (in the form of a stimulus package). Aftab *et al.* (2021) have posited that SMEs have faced many unfavorable situations during the COVID-19 in the form of decline in profit or sales, shortage of goods, decrease in demand of products and services, lockdown and employees' layoff, limited operations and blockage of transportation. They have recommended retention of skilled staff, financial schemes, proactive planning for adverse future and youth entrepreneurship loans for the revival of the SME sector. The long-term effect of any external shocks due to COVID-19 on SMEs has resulted in massive layoffs and reduced labor costs, deferred investments, business closures and an increase in unseen expenses to the organization or limited cash flows (Thorgren and Williams, 2020; Bartik *et al.*, 2020; Baker and Kudge, 2020; Ivanov, 2020).

The organizations must learn how to operate in a highly unpredictable and unstable environment (Choi, 2020; Ivanov, 2020; Paul and Chowdhury, 2020; Singh *et al.*, 2020). Different sources of risks cannot be controlled completely. Therefore, the creation of a resilient SC system is a challenging task for SMEs. Sharma *et al.* (2021) emphasize that business strategies such as diversification, optimization, order fulfillment, digitalization and omni-channel marketing can help build a resilient SC for the "new normal" scenarios. COVID-19 cases had been increasing continuously since the beginning of February 2020 in Europe, the USA and Asia. National and international markets have been affected due to lockdowns, constraints in the border movement and quarantine of people and have resulted in a 13–32% downturn (WTO, 2020). According to Sharma *et al.* (2020), lack of information management and inefficient SC with many intermediaries are the main reasons for the failure to cope with disruption due to pandemics like COVID-19.

A large portion of the global supply chains has been influenced due to this pandemic situation (Araz *et al.*, 2020). The COVID-19 is a unique kind of disruption, disturbing the entire SC and changing the living conditions of people across the globe. This disruption is not only limited to the consumers but also has shattered the SC as a partner with sourcing, procurement, manufacturing and delivery systems (Sharma *et al.*, 2021). The COVID-19 has been tirelessly influencing the economies and their networks and threatening the resiliency of SCs (Guan *et al.*, 2020). Karmaker *et al.* (2021) studied the impact of COVID-19 on SC sustainability and provides measures to improve it. The study identifies that financial support from the Government and SC partners, policy development considering automation and health protocols are essential to attain the sustainability of SCs during the pandemic. SCs of the electronic products, jewelry, apparel, information technology (IT) and manufacturing segments had been significantly impacted by COVID-19 (McKinsey, 2020). It has been observed that effective collaboration

helps in mitigating disruption impact and enhances business efficiency (Dahlmann and Roehrich, 2019; Roggeveen and Sethuraman, 2020). The pandemic has drastically affected the supply and demand for most goods and services. Many researchers emphasize that such an effect can be handled by adopting advanced data analytics, information management and digital technologies (Cao and Duan, 2017; Lohmer and Lasch, 2020). Acioli *et al.* (2021) conducted a bibliometric analysis for the Industry 4.0 technologies to understand how these technologies are facilitating sustainable SC performance. The study focuses on the impact of these technologies during the COVID-19 pandemic. A drastic transformation has also taken place in the work culture of organizations due to the COVID-19 pandemic situation. Most firms are encouraging isolated working practices and flexibility in working time to make the earnings easier for the individuals (Hoang *et al.*, 2020).

Global sustainability includes economic, social and environmental concerns that require companies to redesign strategies to collaborate with the suppliers (Ni and Sun, 2018). Suppliers' collaboration ensures sustainable outputs (Badraoui *et al.*, 2020; Reuter *et al.*, 2010). The current pandemic is forcing specific tough guidelines, hard security controls, stock-out circumstances and limited working hours in various organizations (Sarkis *et al.*, 2020). Post the COVID-19 outbreak; the firms must have to fight for their survival despite many operational challenges (Alghababsheh and Gallear, 2020). Besides, suddenly, there is a huge demand for sanitizer, masks, disinfectants and gloves. The supply of these products has become unmanageable, and it has disturbed the SC's demand–supply function extensively. As a result, there is a huge struggle among firms for sustainability and survivability in the affected regions of COVID-19 (Cohen, 2020). If we look at India's GDP in the last six years, it is noted that during the third quarter of the financial year 2019–2020, it was the lowest and may reduce further with COVID-19 circumstances. Private consumption, external trade and investments are few major contributors to GDP, which have been badly affected by COVID-19 (MOSPI, 2020). If the current pandemic is not controlled and there is an extension in a complete national lockdown again, then about 18 lakh individuals may lose their employment and 30% of retail firms will stop their operations (RAI, 2020). Hence, it will be a very critical situation. The Indian Government has taken a tough call, i.e. the lockdown of all states and various other restrictions for controlling the spread of COVID-19. As a result, it has caused disruptions in all size organizations' SC operations and economic activities, including SMEs (KPMG, 2020).

Cohen (2020) highlights that changing customer preferences, new regulations and restricted workings have forced organizations to manage their SCs more efficiently and effectively. In the present scenario, traditional SCs are not resilient. Hence, transformation is required to survive, compete and sustain in the future (Albors-Garrigos, 2020; Choi, 2020; Kumar and Rahman, 2016). SCs should forecast the demand of the customers during this pandemic situation and aspire to provide better services with the help of local suppliers' collaboration. It has been observed that SCs of SMEs are the most affected business group during the COVID-19 crisis (Baker and Kudge, 2020; Eggers, 2020). The major reason behind this situation is the limited resources, poor business to client's relationships and vulnerable SCs of SMEs (Caballero-Morales, 2021). All organizations, including SMEs, must develop a strategic plan for developing resilience during such an uncertain business environment during the COVID-19 pandemic (Kumar and Singh, 2021).

Many components impact the relationship between suppliers and buyers, such as creating value and supplier networks and assessment of supplier's performance, data novelty, efficiency and collaboration with suppliers (Kumar, 2019; Saikouk *et al.*, 2021). Post COVID 19 outbreak, all organizations are facing different disruptions and their survival is getting difficult (Mishra *et al.*, 2021). Hence, firms should develop a plan for survival considering the prevailing market scenario. In view of existing research gaps, this study tries to answer the research questions as follows:

RQ1. Which critical constructs are impacting survivability of sustainable SC in SMEs?

RQ2. How these constructs are related with survivability of sustainable SC in SMEs?

The objective behind this research is to help SMEs in developing countries like India to improve survivability of SC particularly in post COVID-19 scenario. Findings of the study will contribute to strategy formulation by SMEs in improving their resilience. Rest of the paper is organized as follows: [Section 2](#) discusses the literature review; [section 3](#) discusses the research methodology, which includes sampling and demographics of respondents; [section 4](#) states the data analysis, which provides for EFA, CFA, construct validity and SEM approach for establishing the model fit; [section 5](#) contains discussion of this research and comparison with prior research, and finally [section 6](#) presents conclusion, implications and limitations of this research.

2. Literature review and development of hypothesis

This section discusses the theoretical frameworks and components that play a significant role in developing an understanding of essential factors to maintain a healthy supplier–buyer relation to enhance SUSSCs.

2.1 Theoretical underpinning

[Scuotto et al. \(2021\)](#) have studied beyond the Penrosian growth theory. The authors have examined the digital capabilities of a firm's growth with a sample of 2,156,360 European SMEs. Penrosian growth theory was introduced by [Penrose \(1959\)](#). This theory deals with the interpersonal relationship of the team members working together. This theory mainly relies on the identification, trust and mutual obligation that the members have on each other. Today, the organizations are going beyond this theory and are considering internal as well as external resources [known as resource-based theory (RBT)] and the internal capabilities of the firm (known as dynamic capability theory). The RBT proposed by [Grant \(1991\)](#) is utilized to finalize the conceptual framework in this study. According to RBT, tangible resources such as humans and financial resources improve the SUSSCs. Therefore, SMEs need to dedicate sufficient resources for improving their survivability ([Caballero-Morales, 2021](#)). The resources develop a firm's internal capabilities, which finally help to enhance the competitive advantage (CA) of a firm. Dynamic capabilities view (DCV) theory mean redesigning external and internal capabilities in the changing circumstances ([Prince et al., 2019](#)). Allocation of resources should be done to develop different process capabilities that help SMEs in becoming innovative. Innovative firms respond more promptly during uncertainty, as they can deal with volatility in demand ([Fisher, 1997](#)).

[Caballero-Morales \(2021\)](#) observed that innovation is the survival tool for SMEs during and after the COVID-19 contingency. The authors found this after studying about a new product for a family-owned SME in a high COVID-19 risk zone. The authors further highlighted that the use of digital resources is the main enabler for networking and the research-based design of innovative products under the “social distancing” norms. [Weaven et al. \(2021\)](#) examines the dynamic capabilities that are helping the survival and growth of SME during the economic downturn. From the study, the authors confirm that for survival of SMEs, the firm resources and the business owner characteristics plays huge importance. The authors have further elaborated the three dimensions of dynamic capability that are seizing (human resources, product portfolio decisions and making investments in technologies), sensing (collecting information and assessing businesses) and reconfiguring (decentralization, innovation and knowledge management).

2.2 Survivability of SMEs sustainable supply chains (SSCs)

SMEs have a huge contribution in the growth and development of an economy. The emergence of alliances and outsourcing has increased the importance of SMEs a lot. They

play a critical role in both developing and developed economies (Dangayach and Deshmukh, 2005). The major difference between SMEs and large organizations is that SMEs mainly focus on niche market and have limited number of products, whereas large organizations have more products and services (de Moura and Saroli, 2021). In India, SMEs are defined in terms of machinery and plant. There are various units like ancillaries, export-oriented units, tiny sector, village industries and others.

Indian SMEs face severe pressures in terms of quality, delivery speed, cost and flexibility (Singh *et al.*, 2019). Lack of advanced technologies and monetary constraints add to poor performance of SMEs. SMEs focus on short-term benefits and this is the reason they face problem of survivability during uncertain business environments like post-COVID scenario (Singh and Kumar, 2020). Due to increasing global competition there is a need to develop better performance in order to survive in the market place in terms of productivity, innovation of product, cost, quality and smooth operations flow (Hitt *et al.*, 2016).

Singh *et al.* (2010) have observed that small-scale enterprises face many challenges for surviving in the global market due to limited resources and other operational constraints. In spite of these challenges, SMEs should adopt sustainable measures in operational activities. Sustainability comprises social, economic and environmental factors (Wu *et al.*, 2017a, b; Dubey, 2017). After the outbreak of COVID-19, the firms are shifting toward a demand-driven model to control their SCs (Chi *et al.*, 2020). Current circumstances have developed a lot of pressure on the firms to provide technical and non-technical services (Yun *et al.*, 2019; Choi and Guo, 2020). Organizations should focus on collaboration with multiple suppliers to meet the market demands (Araz *et al.*, 2020; Zhang *et al.*, 2021). Green supply chains (GSCs) use a digitized setup to build their span for sustaining and surviving in the marketplace (Wilhelm *et al.*, 2016). SCs should focus on different networks, collaborations, co-creation, fulfilling order requests, controlling demand that is volatile, pick-up options, digital app adoption and management of people and resources (McKinsey, 2020). Sharing of information can only be done if the firm has collaborated with its suppliers (Asamoah *et al.*, 2021). The uncertain circumstances have accomplished SCs to work together with various firms to lessen uncertainty and risks (Madsen and Petermans, 2020). The supplier and retailer collaboration helps the SCs control the bullwhip effect (Dolgui *et al.*, 2020; Prince *et al.*, 2019). Assets shared between purchasers and suppliers typically incorporate physical assets where data sharing is the vital component for robust coordination in SCs (Ivanov, 2020; Roy *et al.*, 2020). The feasibility of SCs depends on its responsiveness to disruptions (Pankowska, 2019). However, it is observed that major focus of SC is on cost reduction and lead time deduction (Singh and Kumar, 2020).

By analyzing previous literatures, we identified that only theoretical frameworks had been developed in this area without any empirical support. Disruptions in SC disturb the flow of goods and services during the entire process (Craighead *et al.*, 2007; Blackhurst *et al.*, 2011). Resilience in SC helps to improve the function of the traditional risk-management process in many firms (Fiksel, 2015; de Moura and Saroli, 2021).

2.3 Factors enhancing the survivability of SSCs

Factors influencing the survivability of SSCs are identified from the exhaustive literature review. These factors are described in the following sections:

2.3.1 SC's performance measurement under uncertainty (SPMU). SC uncertainty is the mixture of exogenous turbulence that is not in any firm's control. As a result, SC faces many problems to function in uncertain situations like current the COVID-19 pandemic. Hence, uncertainty causes risks like gap in the smooth flow of materials or goods, and thus, it ultimately affects the overall efficiency of SMEs. The indicators that are identified under SPMU are as follows: performance of economy (PE), social performance (SP) and performance

of environmental practices (PEP). PE has been used as one of the indicators for measuring SPMU. It helps to measure economic performance and its development in post-COVID-19 circumstances for the SMEs. In prior research (Blome *et al.*, 2014; Gereffi and Lee, 2016; Leszczynska, 2018; Sharma *et al.*, 2020), it has been considered as a component but has not been discussed in detail. SP helps in measuring the performance of employees in any industry. SP has been discussed by many researchers in prior research (Ashby *et al.*, 2012; Harms *et al.*, 2013; Yawar and Seuring, 2017; Sharma *et al.*, 2020). PEP helps measure the performance of various environmental practices like waste management, recycling process and green technologies in the industry. This component has been talked about by many researchers in their research (Merminod and Paché, 2011; Lintukangas *et al.*, 2015; Tidy *et al.*, 2016; Ni and Sun, 2018; Sharma *et al.*, 2020).

It has been observed that usually the SMEs deal with high uncertainty (like COVID-19) and large economic burden (Caballero-Morales, 2021). During the pandemic, the SMEs face problems such as paying rent, retaining the workers and reinvesting in the infrastructure. Although the Government provides huge support to these firms by developing loan schemes to let these companies survive during the pandemic, sometimes even these schemes are also not sufficient (Caballero-Morales, 2021). To overcome such scenarios, SMEs should gather more knowledge regarding the strategic planning, business management, innovations and should formulate business models, which could work under different restrictions and markets (Caballero-Morales, 2021). To address the same, there are some literatures that have provided recommendations for the SMEs (He and Harris, 2020; Nah and Siau, 2020; Hamilton, 2020; Eggers, 2020; Kuckertz *et al.*, 2020). In the current study, we have identified SPMU as one of the critical components, which will impact the decision-making process of SMES, as there is an absence of sufficient information available for implementing various solutions. Here, we would like to propose hypothesis as follows:

H1a. SC's SPMU positively affects SUSSCs.

2.3.2 Supply chain cooperation (SCCO). SCCO helps to predict demand and collaborates with the suppliers to get the materials at the right time and of the right quality for timely manufacturing and distribution of final products. As SMEs procure the raw materials from various small vendors, it very important to have cooperation, understanding and trust among them. This helps in developing the good relation and results in good business outcome. It also helps in creating transparency among various players of SC processes. Cooperation among SC partners also helps in improving responsiveness (Kumar and Singh, 2017). Good relationship between a supplier and a manufacturer enhances cooperation and responsiveness (Iyer and Bergen, 1997). Landeros and Monczka (1989) studied cooperative relationships between the suppliers and the manufacturers. They stated that this collaborative relationship helps to work securely with the identified suppliers. SC is facing a lot of hurdles due to the COVID-19 pandemic. In such circumstances, SCCO plays an essential role because it helps to improve the SC process's overall efficiency. In the current study, we have identified this factor as one of the critical components that will impact the decision-making process.

The indicators identified under SCCO are supply chain planning and predictions (SCPP), supply chain association (SCAS), supply chain conception (SCC) and competitive advantage (CA). SCPP helps in predicting demand by planning with the help of suppliers. This component has been studied by many researchers (Hollmann *et al.*, 2015; Panahifar and Shokouhyar, 2019; Holgado *et al.*, 2020). SCAS helps in creating a CA for the industry to survive in the pandemic. CA means becoming superior compared to peer competitors in the same industry. Wu *et al.* (2017a, b) and Gligor *et al.* (2019) have also considered this component in their research. In the current study, we have identified SCCO as one of the critical components that impacts the decision-making process, as there is an absence of sufficient information available for implementing various solutions in SMEs.

Here, we would like to propose hypothesis as follows:

H1b. SCCO positively affects SUSSCs.

2.3.3 Supply chain positioning (SCP). The Indian SMEs face huge competition from China and other East Asian countries. Hence, there is a huge need to overcome the competition for surviving in the market place. [Bains et al. \(2005\)](#) stated that SCP includes all the elements in the internal and external manufacturing activities such as partners, customers, distributors and suppliers. Other researchers ([Hill, 1993](#); [Vallespir and Kleinhans, 2001](#); [Johansen and Riis, 2005](#)) have also stated the same internal and external manufacturing activities in their studies. In the current pandemic situation, it is essential to have a good relationship among all the SC players. As maintaining this relationship and positioning of all the SC partners improves the overall efficiency of the SC. The indicators identified under SCP are as follows: traditional supply chain (TSC), flexible supply chain (FSC) and closed supply chain (CSC). TSC connects the Tier-1 suppliers directly with the customers. Here, mutual benefits are achieved due to collaboration among the players in the SC processes ([Lado et al., 2011](#); [Chen and Kitsis, 2017](#)). FSC refers to adjusting the production quantity as per the demand. Earlier researchers ([Kudla and Klaas-Wissing, 2012](#); [Wilhelm et al., 2016](#); [Dania et al., 2019](#)) have considered this component in their studies. CSC is defined as reducing the number of raw materials, reusing the waste components and recycling them. But prior research done by [Wilhelm et al. \(2016\)](#), [Roy et al. \(2018\)](#), [Sharma et al. \(2020\)](#) lacks enough empirical evidences. All the three indicators, i.e. TSC, FSC and CSC, have been considered as indicators for SCP. Here, we would like to propose hypothesis as follows:

H1c. SCP positively affects the survivability of SMEs sustainable SCs.

2.3.4 Supply chain administration (SCA). It refers to the administration or management of the flow of goods and services and monitoring the whole movement process ([Srivastava et al., 1999](#)). Management plays a critical role in any organization. It is mainly responsible for accepting or rejecting any innovative ideas. It focuses on SC operations of the firm that threaten multiple issues related to SCM like infrastructure, expense, labor etc. During the current pandemic situation, it is very important to closely monitor these activities to ensure the smooth flow of SC. The indicators identified for SCA are improving vendors' supply capability (IVSC), multi-stakeholder initiative (MSI) and third party (TP). IVSC helps toward continuous improvement of SC by providing training to the vendors. IVSC is been considered by many prior researchers ([Busse, 2016](#); [Marques, 2019](#)), but it lacks the empirical evidences. MSI means collaborating with other suppliers and vendors. TP refers to collaborating with other suppliers in different industries or SMEs. The relationship of SCP with SUSSC has not been explored in past studies. As a result, this study will serve to have a unique contribution in research and practice. Therefore, we propose the hypothesis as follows;

H1d. SCA positively affects the survivability of SMEs sustainable SCs.

2.3.5 Supply chain feasibility (SCF). The indicators identified under SCF are flexibility of operations, durability and firmness. Flexibility refers to the ability for change. It may help in handling disruptions and also in recovery. It further gives an edge to the SMEs while competing with their competitors ([de Moura and Saroli, 2021](#)). As per prior research ([Carvalho et al., 2012](#); [Adobor, 2019](#); [Hosseini et al., 2019](#); [Simchi-Levi et al., 2018](#); [Sharma et al., 2020](#); [Demirel et al., 2019](#)), it has been considered as an essential component but lacks the empirical evidences. Here, we would like to propose the hypothesis as follows:

H1e. SCF positively affects the survivability of SMEs sustainable SCs.

2.3.6 Digitization in SC (DSC). It refers to digital SC, enabling transparency in the whole process. [Denicolai et al. \(2021\)](#) and [Singh et al. \(2019\)](#) have observed that digitization helps SMEs in their

sustainable growth. Digitization helps to change the business model and daily life (He *et al.*, 2014; Schallmo *et al.*, 2017). As the competition lies at every stage of SC, there is a requirement for intelligent solutions (Christopher, 2011). Denicolai *et al.* (2021) highlighted digital transformation as the center for business renewal and innovation for SMEs. The authors conducted an empirical study from the sample collected from 438 SMEs, consisting of both the domestic as well as the international organizations and found that artificial intelligence (AI) positively influences the international performance of the SMEs. Magistretti *et al.* (2019) revealed that AI will help the SMEs in decision-making. Many authors have confirmed that less amount of study is conducted in the Industry 4.0 and digitalization domain and very less amount of study is focused on the impact of these technologies on SMEs (Mittal *et al.*, 2018). Hence, there is a need to conduct study in this domain (Lee, 2019; Szalavetz, 2019; Quinton *et al.*, 2018).

Digitization plays a significant role in improving the efficiency of SCs, especially during the current pandemic situation. The relevance of digitalization varies from developing countries to developed countries. When we consider developing countries like India, there is a requirement to adopt new and advanced technologies to lead innovation in the marketplace. The indicators identified under DSC are just-in-time delivery systems (JITDS) and implementation of Industry 4.0 techniques (II4.0T). DSC means there is a need to localize the suppliers for fast delivery systems. II4.0T refers to better usage of information technology in SC. It covers advanced technologies like Internet of Things (IoT), cloud computing, AI, big data, etc. Hence, when the firms adopt these technologies, there will be more transparency and improvement in the efficiency of the whole process of SC. Prior research (Hofmann and Rutschmann, 2018; Ralston and Blackhurst, 2020; Iftikhar and Khan, 2020) have considered these factors in their study but have not analyzed the relationships between DSC and SUSSC. Hence, the proposed hypothesis is as follows:

H1f. DSC positively affects the survivability of SMEs sustainable SCs.

Constructs and items identified from the literature review have been summarized in Table 1. Proposed hypotheses are shown in the form of a model, as shown in Figure 1.

3. Research methodology

For this empirical study, we have followed approach adopted by Fawcett *et al.* (2014). Therefore, in this section, we would briefly discuss sampling technique utilized, data collection through structured questionnaire and respondents' profile. In this study, SEM has been utilized for analysis of data.

3.1 Sampling

Responses were collected through a structured questionnaire from plant managers, directors and owners of the organizations. The sample was selected from each stratum of SMEs through the simple random sampling method technique as it allows generation of results (Hair *et al.*, 2010). The questionnaires were sent to 650 respondents, but only 278 respondents returned useable questionnaires that were valid for analysis. Data were collected for a period of five months from June 2020 to November 2020. Sources of data bases were Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce and Industry (FICCI), Punjab Haryana & Delhi (PHD) Chamber of commerce and Industry, Automotive Component Manufacturers Association of India (ACMA) etc. A structured questionnaire was prepared using a seven-point Likert scale. A note was mentioned in the questionnaire that survey is intended for academic research and the confidentiality of data will be maintained.

In the gathered dataset, cleansing of data was done by case screening, which was trailed by factor screening to clarify variations in the information. There was a need to follow this cycle so that there could be no missing information in the dataset. After data were collected, for common method bias test, we applied Harman's single factor test.

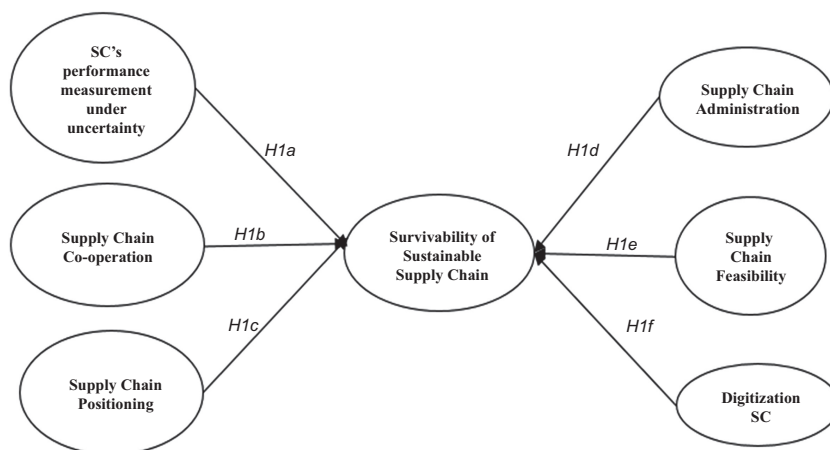
Components	Sub-factors	Definition	References
SC's performance measurement under uncertainty (SPMU)	Performance of economy (PE)	It measures the performance of the economy and its development in post-COVID-19 situation	Blome <i>et al.</i> (2014), Gereffi and Lee (2016), Leszczynska (2018), Sharma <i>et al.</i> (2020)
	Social performance (SP)	Measuring the performance of workers and laborers in the industry	Ashby <i>et al.</i> (2012), Harms <i>et al.</i> (2013), Yawar and Seuring (2017), Sharma <i>et al.</i> (2020)
	Performance of environmental practices (PEP)	Measuring the various environmental practices like waste management, recycling process and usage of green technologies in the industry	Merminod and Paché (2011), Lintukangas <i>et al.</i> (2015), Tidy <i>et al.</i> (2016), Ni and Sun (2018), Sharma <i>et al.</i> (2020)
Supply chain cooperation (SCCO)	Supply chain planning and predictions (SCPP)	Planning with the suppliers to predict the demands	Hollmann <i>et al.</i> (2015), Panahifar and Shokouhyar (2019), Holgado <i>et al.</i> (2020)
	Supply chain association (SCAS)	Better information sharing and communication between the suppliers and the organizations	Bodi-Schubert (2014), Touboulic and Walker (2015), Pakdeechoho and Sukhotu (2018), Kumar (2019)
	Supply chain conception (SCC)	Collaborative development for value creation	Chen <i>et al.</i> (2017), Eggers <i>et al.</i> (2017), Chakraborty <i>et al.</i> (2018)
Supply chain positioning (SCP)	Competitive advantage (CA)	Creating a competitive advantage for the industry to survive in the pandemic	Wu <i>et al.</i> (2017a, b), Feizabadi <i>et al.</i> (2019), Gligor <i>et al.</i> (2019)
	Traditional supply chain (TSC)	In these types of SC, Tier-1 suppliers are connected with the customers	Tachizawa and Wong (2014), Nakano and Matsuyama (2021)
	Flexible supply chain (FSC)	In these types of SC, customers have access to multi-tier SC	Kudla and Klaas-Wissing (2012), Wilhelm <i>et al.</i> (2016), Dania <i>et al.</i> (2019)
Supply chain administration (SCA)	Closed supply chain (CSC)	Customers access the SC through a third party	Wilhelm <i>et al.</i> (2016), Roy <i>et al.</i> (2018), Sharma <i>et al.</i> (2020)
	Improving vendors supply capability (IVSC)	Helping the vendors by providing training toward continuous improvement	Busse (2016)
	Multi-stakeholder initiative (MSI)	Collaborating with other suppliers and vendors	Abänder <i>et al.</i> (2016), Liu and Lee (2018), Sharma <i>et al.</i> (2020)
	Third party (TP)	Collaborating with other suppliers across others industries	Reinecke <i>et al.</i> (2012), Sharma <i>et al.</i> (2020)

(continued)

Table 1.
Summary of
components and sub-
components

Components	Sub-factors	Definition	References
Supply chain feasibility (SCF)	Flexibility (F)	SC should have the ability to handle disruption and recover its performance	Carvalho <i>et al.</i> (2012), Adobor (2019), Hosseini <i>et al.</i> (2019)
	Durability (D)	SC should have the ability to fulfill the current demand with the changing environment	Simchi-Levi <i>et al.</i> (2018), Sharma <i>et al.</i> (2020)
	Firmness (FS)	SC should have the ability to return and recover to its earlier performance	Demirel <i>et al.</i> (2019), Sharma <i>et al.</i> (2020)
Digitization in SC (DSC)	Just-in-time delivery systems (JITDS)	Need to localize the suppliers for fast delivery systems	Rao <i>et al.</i> (2011), Ishfaq and Raja (2018), Ishfaq and Bajwa (2019)
	Implementation of Industry 4.0 techniques (II4.0T)	Better usage of information technology in SC	Hofmann and Rutschmann (2018), Ralston and Blackhurst (2020), Iftikhar and Khan (2020)
Survivability of sustainable supply chains (SUSSC)	Survivability in production front (SUSSC1)	COVID-19 did not have a significant impact on production	Sharma <i>et al.</i> (2020)
	Survivability in societal front (SUSSC2)	Impact of COVID-19 on society	Sharma <i>et al.</i> (2020)
	Survivability in the economic front (SUSSC3)	Impact of COVID-19 on the economy	Sharma <i>et al.</i> (2020)
	Survivability in environment front (SUSSC4)	Impact of COVID-19 on environmental issues	Sharma <i>et al.</i> (2020)

Table 1.

Figure 1.
Proposed model
for study

SEM and exploratory factor analysis (EFA) method was adopted for data analysis. The data analysis was done in four stages: analysis of demographics, validity and reliability test, EFA and confirmatory factor analysis (CFA).

3.2 Demographics of the respondents

The current research utilizes an empirical paradigm using a cross-sectional design and quantitative analysis. Data were generated using the survey method. Leedy and Ormrod (2014) stated that a cross-sectional plan includes testing and looking at individuals from a few diverse segment gatherings. This methodology empowers the specialist to gather basic information simultaneously. Table 2 shows the demographics of the respondents. It is been observed that maximum firms have employees in the range of 101–150 and they constitute a total of 28% of respondents.

It is followed by organizations having employees in the range 10–25 and constituting 18%. The majority of respondents are plant managers, which includes 40% of total respondents. It is followed by directors (32%) and owners (28%). As far as categorization is concerned, small enterprises are 35%, followed by medium enterprises (33%) and micro enterprises (32%).

4. Results

In this section we have presented results of different statistical tests required for hypotheses testing. Results are given for reliability and validity, EFA, CFA, construct validity and hypotheses testing.

4.1 Reliability and validity

4.1.1 *Harman's single factor test.* To examine common method bias, Harman's single factor test was conducted. EFA was performed, and the results show that the first factor explains maximum variance (29.853%), which is lesser than the limiting value of 50% (Podsakoff et al., 2003).

4.1.2 *Cronbach's alpha.* The reliability test was performed for each factor based on Cronbach's alpha (α) value. The values of all indicators or dimensional scales should be above the recommended value of 0.70 (Nunnally and Bernstein, 1994). For analyzing the data collected, Statistical Package for the Social Sciences (SPSS) and analysis of a moment structures (AMOS) are used. The latent variable SPMU has three indicators, namely PE, SP, and PEP, and its α value is 0.780; SCCO has four indicators, namely SCCP, SCAS, ISC and CA,

S. No	Characteristics	Percentage
<i>I</i>	<i>Total number of employees</i>	
A	1–9 employees	12
B	10–25 employees	18
C	26–50 employees	14
D	51–100 employees	10
E	101–150 employees	28
F	151–250 employees	12
G	251 and above	6
<i>II</i>	<i>Respondents current position</i>	
A	Owner	28
B	Director	32
C	Plant manager	40
<i>III</i>	<i>Type of Firms</i>	
A	Micro enterprises	32
B	Small enterprises	35
C	Medium enterprises	33

Table 2.
Demographics of the
respondents

and its α value is 0.803; SCP has three indicators, namely CSC, FSC and TSC, and its α value is 0.857; SCA, has three indicators, namely IVSC, MSI and TP, and its α value is 0.730; SCF has three indicators, namely flexibility (F), durability (D), and firmness (FS), and its α value is 0.850; DSC has two indicators, namely JITDS and II4.0T, and its α value are 0.702. Also, the overall α value calculated was found to be 0.866. Hence, all the values are within the threshold.

4.1.3 Composite reliability. It is measured for internal consistency reliability (Henseler *et al.*, 2009). The construct SPMU has composite reliability (CR) value of 0.718; SCCO has CR value of 0.915; SCP has CR value of 0.793; SCA has CR value of 0.705 and SCF has CR value of 0.813. CR value for DSC was 0.518, which is < 0.7 , i.e. threshold level. Hence, DSC was not used in further analysis. Rest five constructs with CR values > 0.7 are found acceptable (Hair *et al.*, 2010).

4.2 Exploratory factor analysis

Principal axis factoring was performed to identify meaningful bias and express the same qualities. Promax rotation has been used to interpret initial results, as it had been assumed (based on the relevant literature) that its factors have been correlated (Tabachnick and Fidell, 2007). Table 3 shows the Kaiser-Meyer-Olkin (KMO) and Bartlett's test output.

KMO value for the current research is 0.838. The minimum level set for this statistic is 0.60 (Tabachnick and Fidell, 2007; Hair *et al.*, 2010). The significance value is 0.000, which is less than 0.05, i.e. the significance value is acceptable. For the components, the percentage of total variance explained by Component 1 is 15.547%, Component 2 is 12.839%, Component 3 is 12.725%, Component 4 is 10.783% and Component 5 is 9.985%. Total variance explained by all five components is 61.678%.

Table 4 displays the output of the rotated component matrix. There are 16 variables in total, which are grouped under 5 different components. SCCP, SCAS, ISC and CA are grouped under the first component with factors loading values 0.695, 0.794, 0.804 and 0.529, respectively. TSC, FSC2 and CSC are grouped under the second component having factors loading values 0.672, 0.846 and 0.724, respectively. F, D and FS are grouped under the third component with factors loading values 0.761, 0.865 and 0.674, respectively. PE, SP and PEP are grouped under the fourth component with factors loading values 0.672, 0.741 and 0.608, respectively. IVSC, MSI and TP are grouped under the fifth component with factors loading values of 0.726, 0.788 and 0.463, respectively.

CFA is performed in the next stage. SEM is used for testing the model fit of the proposed research framework (Byrne, 2010).

4.3 Confirmatory factor analysis for latent variables

To test the hypothesis, CFA is used (Byrne, 2010). AMOS 22.0 is utilized for this research because of its powerful graphic representations and user-friendly interfaces. The results of the model are shown in Table 5. Figure 2 shows the final model and the latent variables and their indicators. The five latent variables and their indicators are (1) SPMU: SC's performance measurement under uncertainty has three indicators, namely PE, SP and PEP; (2) SCCO: SCCO has four indicators, namely supply chain planning and predictions (SCPP), supply chain association (SCAS), supply chain conception (SCC), and competitive advantage (CA); (3) SCP: SCP has three indicators, namely CSC, FSC and TSC; (4) SCA: SCA has three indicators, namely IVSC, MSI and TP and (5) SCF: SCF has three indicators, namely F, D and FS.

Table 3.
KMO and
Bartlett's test

KMO measure of sampling adequacy		0.853
Bartlett's test of sphericity	Approx. chi-square	2185.776
	Df	120
	Sig	0.000

SUSSCs of
SMEs during
COVID-19

	Factors loading				
	1	2	3	4	5
Performance of economy				0.682	
Social performance				0.741	
Performance of environmental practices				0.608	
Traditional supply chain		0.672			
Flexible supply chain		0.846			
Closed supply chain		0.724			
Improving vendors supply capability					0.726
Multi-stakeholder initiative					0.788
Third party					0.463
Flexibility			0.761		
Durability			0.865		
Firmness			0.674		
Supply chain planning and predictions	0.695				
Supply chain association	0.794				
Supply chain conception	0.804				
Competitive advantage	0.529				

Table 4.
Rotated factor matrix

Goodness-of-fit indices	Default model	Benchmark
<i>Absolute goodness-of-fit measure</i>		
CMIN/Df	1.664	≤3
<i>Absolute badness of fit measure</i>		
RMSEA	0.049	≤0.08
<i>Incremental fit measure</i>		
CFI	0.970	≥0.90
IFI	0.971	≥0.90
TLI	0.962	≥0.90
<i>Parsimony fit measure</i>		
PCFI	0.760	≥0.50
PNFI	0.729	≥0.50

Table 5.
Model fit measures for
the confirmatory factor
analysis

4.3.1 Construct validity. Construct validity is performed to test and measure the theory and hypothesis. The primary goal is to analyze the structural components. Construct validity includes investigating the internal connections among items of a specific measure (DeVellis, 2003). Different tests for *composite reliability, convergent validity and divergent validity are performed. Results are shown in Table 6.* All the five constructs' CR values are >0.7, indicating that the composite reliability measures are reliable (Henseler et al., 2009). AVE values for all constructs are greater than 0.5, which satisfies convergent validity for all the constructs. Fornell and Larcker (1981) suggested that AVE of a construct must be more than square of correlation between that construct and other constructs. Table 6 represents the values for construct correlation and AVE. Further analysis is performed using the SEM approach. All path estimates of CFA are given in Table 7. The loadings are statistically significant. Hence, the conditions are satisfied, and we can go for building the final model. Hence, both the parameters have been established for excellent construct validity.

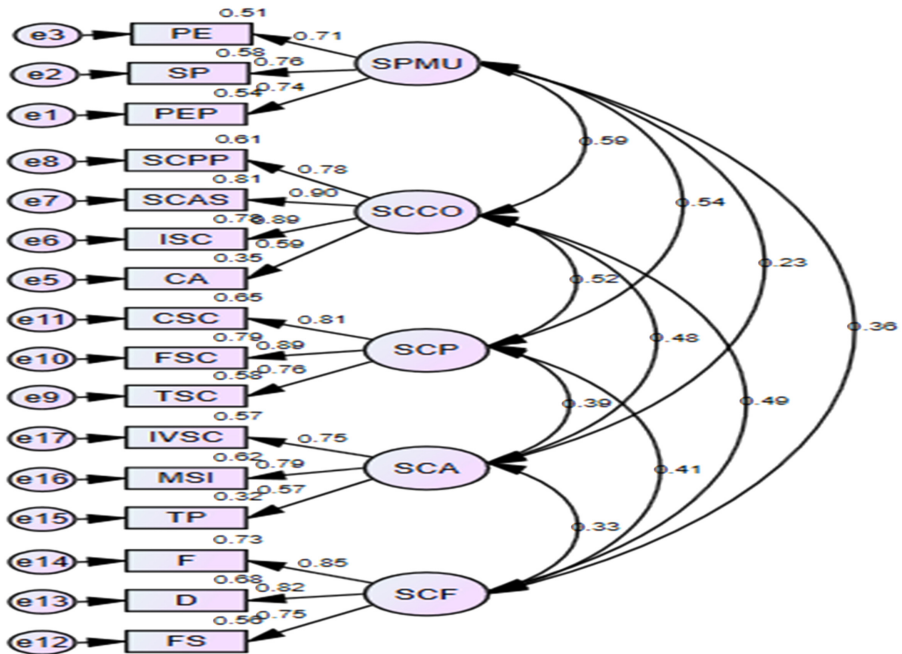


Figure 2. Confirmatory factor analysis for the latent variables

	CR	AVE	MSV	MaxR(H)	SPMU	SCCO	SCP	SCF	SCA
SPMU	0.781	0.544	0.343	0.783	0.737				
SCCO	0.874	0.64	0.343	0.91	0.586***	0.8			
SCP	0.861	0.675	0.292	0.875	0.541***	0.519***	0.822		
SCF	0.851	0.656	0.235	0.858	0.357***	0.485***	0.408***	0.81	
SCA	0.749	0.504	0.234	0.774	0.226**	0.483***	0.392***	0.328***	0.71

Note(s): Significance of correlations: ** $p < 0.010$ and *** $p < 0.001$

Table 6. CFA output

4.4 Structural model and testing of hypotheses

To test the hypothesis, SEM is used (Byrne, 2010). Results of the model are shown in Figure 3, which represents the final model, latent variables along with their indicators and dependent variable. The five latent variables and their respective indicators are (1) SPMU: SC’s performance measurement under uncertainty has three indicators, namely PE, SP and PEP; (2) SCCO: SC cooperation has four indicators, namely SCCP, SCAS, ISC and CA; (3) SCP: SC positioning has three indicators, namely CSC, FSC and TSC; (4) SCA: SCA has three indicators, namely IVSC, MSI and TP and (5) SCF: SCF has three indicators, namely F, D and FS. One dependent variable is SUSSC with four indicators, namely SUSSC1, SUSSC2, SUSSC3 and SUSSC4.

Table 8 displays the final goodness-of-fit indices for the structural model. The value of chi-square is 344.588 and the degree of freedom is 155. The estimations of absolute fit indices are CMIN/Df 2.223, where CMIN represents the chi-square value and Df represents the degree of freedom and the value is less than 3, which is the accepted threshold value. The root mean square approximation (RMSEA) is 0.044, comparative fit index (CFI) is 0.952, Tucker–Lewis

	Estimate	SE	CR	<i>p</i>	SUSSCs of SMEs during COVID-19
PEP ← SPMU	0.736				
SP ← SPMU	0.762	0.098	7.776	***	
PE ← SPMU	0.713	0.097	7.351	***	
CA ← SCCO	0.592				
ISC ← SCCO	0.885	0.156	5.673	***	
SCAS ← SCCO	0.902	0.171	5.275	***	
SCPP ← SCCO	0.781	0.17	4.594	***	
TSC ← SCP	0.764				
FSC ← SCP	0.887	0.084	10.560	***	
CSC ← SCP	0.809	0.074	10.932	***	
FS ← SCF	0.749				
D ← SCF	0.824	0.089	9.258	***	
F ← SCF	0.852	0.087	9.793	***	
TP ← SCA	0.568				
MSI ← SCA	0.787	0.15	5.247	***	
IVSC ← SCA	0.755	0.171	4.415	***	

Note(s): ****p* < 0.001

Table 7.
Path estimates for CFA

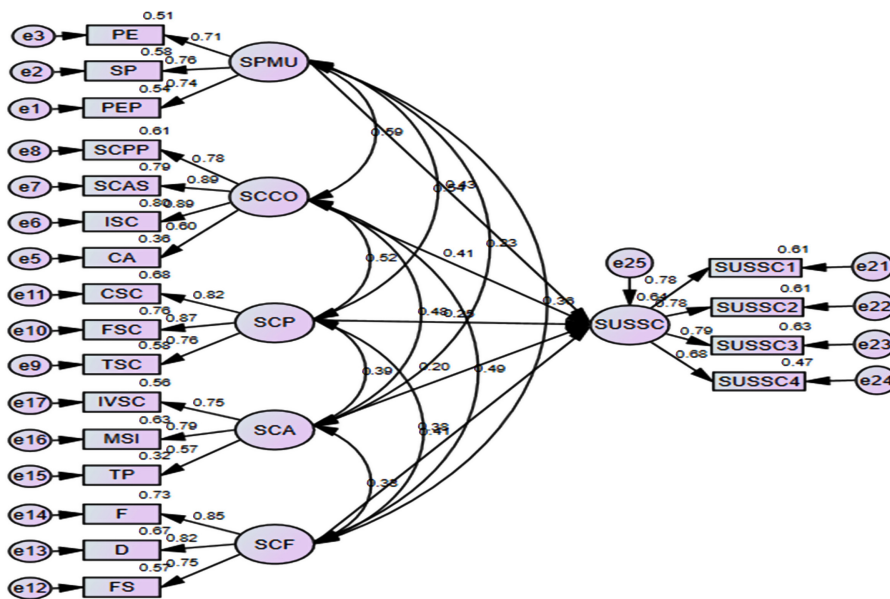


Figure 3.
Final structural model

coefficient (TLI) is 0.944, incremental fit index (IFI) is 0.935, parsimony comparative fit index (PCFI) is 0.762 and parsimony normed fit index (PNFI) is 0.724. These values are under the respective threshold level and are acceptable (Byrne, 2010).

Hence, the supported indicators for the four constructs are PE, SP, PEP, SCPP, SCAS, ISC, CA, CSC, FSC, TSC, IVSC, MSI, TP, F, D and FS. Table 9 shows the structural model results. The result demonstrates that the three hypotheses are supported by *p*-value (Hair et al., 2010). Hence, constructs SPMU, SCCO, SCP, SCA and SCF have a positive impact on SUSSC. The square multiple correlations (R^2) help to measure how well a regression line estimates the

IJLM	Goodness-of-fit Indices	Default model	Benchmark
	<i>Absolute goodness-of-fit measure</i>		
	CMIN/Df	2.223	≤3
	<i>Absolute badness-of-fit measure</i>		
	RMSEA	0.04	≤0.08
	<i>Incremental fit measure</i>		
	CFI	0.952	≥0.90
	IFI	0.935	≥0.90
	TLI	0.944	≥0.90
	<i>Parsimony fit measure</i>		
	PCFI	0.762	≥0.50
	PNFI	0.724	≥0.50

Table 8.
Final goodness-of-fit indices for the structural model

	Estimate	SE	CR	<i>p</i>	Hypotheses
SUSSC ← SPMU	0.431	0.092	4.685	***	Supported
SUSSC ← SCCO	0.409	0.099	4.131	***	Supported
SUSSC ← SCP	0.251	0.063	3.984	***	Supported
SUSSC ← SCA	0.204	0.082	2.488	0.003	Supported
SUSSC ← SCF	0.384	0.052	7.385	***	Supported

Table 9.
Structural model results

actual data points between 0 and 1, which states how well one variable predicts another (Hair *et al.*, 2010). More the value is closer to 1, better the model's ability to predict that technology (Kline, 2015). The proposed model can explain 64% of the variance of SUSSC. Hence, we can conclude that hypotheses H1a, H1b, H1c, H1d and H1e are being supported from our statistical analysis.

5. Discussion

The term survivability in SC means the ability to survive in disruptive situations. The COVID-19 pandemic has affected SMEs' survival in the market. SMEs need to formulate strategies to overcome disruptions in the SC (Ivanov, 2020). These disruptions may be either from the supply side or the demand side. The current research shows how to overcome these disruptions and to survive in the pandemic situation. Each latent variable has three or more indicators except DSC, which has only two indicators. As the composite reliability value for DSC was not within the threshold level, it was removed from the analysis. The rest five components' Cronbach's alpha and composite reliability values are found above 0.7, i.e. recommended level (Nunnally, 1978; Hair *et al.*, 2010). The KMO value is 0.838, which is also within the threshold of 0.6 (Hair *et al.*, 2010). The total variance explained is 61.878%, and in the rotated component matrix, the variables were grouped under six groups, but one component, i.e. DSC, was removed, so the final analysis is done with five components. Only the loadings above |0.50| are considered in this research (Hair *et al.*, 2010).

For further analysis in this research, five components are utilized. The component SPMU means how to manage the operations of SC in the situation of a pandemic. The hypothesis H1a states that SPMU influences SUSSC. SPMU comprises three sub-components PE, SP and PEP whose loadings are respectively 0.820, 0.810, and 0.716 (>|0.50|). The efficiencies of SCs are essential during this pandemic circumstance. It should be given high importance to make

the SCs run smoothly (Ivanov, 2020; Sharma *et al.*, 2020). Previous studies have not considered it a critical factor, but the latest studies found SPMU as a significant contributor to the CFA (Sharma *et al.*, 2020; Ivanov, 2020). This factor further gets fits in our model also.

The prior studies (Sharma *et al.*, 2020; Ivanov, 2020) have considered it as a factor and found that it is not the critical one, but the current study found that SPMU provides a significant contribution in the CFA and it further helps in the fit model as well. SEM approach provides empirical evidence from the data collected in the current study and differentiates it from the previous literatures (Sharma *et al.*, 2020; Ivanov, 2020). The possible reason may be that the Step-wise Weight Assessment Ratio Analysis (SWARA) technique has been used in the previous studies, which is based on a smaller sample size, and hence the chances of biasness are there.

SCCO component means to have a healthy relationship between the suppliers and the manufacturers. Sharma *et al.* (2020) found SCCO as a significant factor in their study. It has been observed that the SCCO components will help SMEs in overcoming the post-COVID-19 disruptions. Hypothesis H1b states that SCCO influences SUSSC. It comprises four sub-components. These are SCPP, SCAS, SCC and CA, whose loadings are 0.769, 0.795, 0.807 and 0.733 ($>|0.50|$) respectively. SCCO is a kind of business activity in SC, where the SMEs need to plan, forecast and manage the demand. At the same time, they also had to focus on improving the efficiency of the SC (Singhry and Rahman, 2019; Sharma *et al.*, 2020). The SCs should have a contingency plan and a backup plan in situation of disruptions. For example, during the COVID-19 pandemic, SCs need to plan for an additional inventory management with an accurate demand forecasting. Such forecasting needs the contingency and a backup plan. The SMEs further need to have a strategic plan in collaboration with the suppliers for executing smooth operations (Ivanov and Dolgui, 2020).

SCP explains managing a SC network during the pandemic. Hypothesis H1c states that SCP influences SUSSC. It comprises three sub-components: TSC, FSC and CSC and their loadings are 0.787, 0.856 and 0.816 respectively ($>|0.50|$). Although Sharma *et al.* (2020) did not find it as a critical component in their study but in a study by Ni and Sun (2018), SCP has found to have relevant importance during disruptions. The authors found that SCP helps in planning and predicting the SCs with the help of forecasting techniques during the COVID-19 pandemic. SCA helps in searching for alternate options to make the SC's operations smooth. For example, the availability of raw materials or any other resources that can be available locally and can be delivered faster for a SC. SCP comprises three sub-components: IVSC, MSI and TP and their loadings are 0.828, 0.852 and 0.636 ($>|0.50|$), respectively. This component helps to improve the suppliers' performance by proper training and collaborating with third party logistics (3PL) service providers during the COVID-19 situation (Singhry and Rahman, 2019).

SCF explains how the SMEs will plan to improve their performance to increase their profit sharing. Hypothesis H1e states that SCF influences SUSSC. It comprises three sub-components: F, D and FS, and their loadings are 0.826, 0.894 and 0.791 ($>|0.50|$), respectively. As observed in prior research, the sub-component FS is the most desirable SC network characteristic (Sharma *et al.*, 2020). The indicator FS is found as an essential factor by Ivanov and Dolgui (2019). In the present circumstances of COVID-19, SMEs need to plan so that they can survive, sustain and do not collapse in any disruptions. The survivability of SMEs' SCs needs to be connected with the individual systems (Aubin, 1991; Keogh, 2020).

5.1 Managerial implications

SMEs have faced heavy losses due to disruptions caused by COVID-19 pandemic. This study explains how SMEs should develop strategies for reviving their SCs to sustain the pandemic. There are many challenges faced by SMEs, for instance, labor shortage, unpredictable demand, etc. Social distancing, wearing masks and gloves and other COVID protocols are creating operational challenges for SMEs. Hence, SMEs should develop long-term strategies

to improve their survivability etc. The current study has precisely developed insights that will help in developing strategies to overcome current disruptions. As most of the prior studies have utilized MCDM techniques for their research to study survivability, their findings cannot be free from biasness, but the current study is based on data collected through survey. Findings of our study would help managers in identifying factors impacting survivability and in developing action plan for uncertain business environment.

6. Conclusion, limitations and future scope

Pandemics like COVID-19 have created a lot of disruptions across all sizes of organizations including SMEs. SMEs have got impacted more severely due to their limited resources. Firms require proper planning for handling issues of uncertainties and disruptions. Resilience, viability, real-time information, order fulfillment/just-in-time, stability, collaboration, integration and demand forecasting are the critical factors for organizations to survive and sustain in pre- and post-COVID-19 situation. There is a requirement to build proper demand planning, materials forecasting, network optimization and suppliers' collaboration for resilient SCs across all organizations.

We have identified significant components impacting the survivability of SMEs with the help of an exhaustive literature review. EFA is used to check the total variance explained and the grouping of the variables under different components. By doing CFA, the factors identified in EFA are confirmed for further analysis. Further, SEM is used to check the final model fit. This research has identified five components, and each component has at least two indicators. All these latent variables impact SUSSCs of SMEs, which has four items namely, SUSSC1, SUSSC2, SUSSC3 and SUSSC4. This research has tried to understand critical components essential to maintain a healthy supplier–buyer relationship to enhance SUSSCs. It will further help the firms to control their SCs and improve survivability also in the post-COVID-19 scenario. To survive in the long run in the volatile business environment, SMEs need to transform themselves. Problems like human resource shortage, uncertain demand, work hour extension of employees, compulsory use of masks and gloves and maintaining social distancing should be made standard practices.

This research has some limitations, as the study is concentrated only on Indian SMEs. Therefore, findings cannot be generalized for all-size organizations. Future studies can be done for comparing the findings across the different sizes of organizations and different sectors. Longitudinal research design will also help in validation of findings. The study can also be extended to conduct comparative analysis of findings across different sectors and countries. We may also consider mediating effect of survivability on other dimensions of performance such as sustainability and business performance as the future scope of the study. Although, we have not considered constructs related to digitization, but as a future scope, study can be done to analyze impact of process digitization through emerging technologies on survivability of SMEs.

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