



Creating Competitive Advantage through Sustainable Supply Chains: A Theoretical Framework for the Assessment of Practices, Dynamic Capabilities, and Enterprise Performance of Manufacturing Firms

Gunjan Tripathi, Sudhanshu Joshi

Abstract: *The continuous enhancement and network complexity of Global supply Chains (G-SC) are accentuating the need of incorporating social, economic and ecological dimension (Also known as Triple- Bottom Line (TBL)) in strategic planning. Therefore, the blending business aims with Sustainable Supply Chain Management (S-SCM) practices and dynamic capabilities has steadily increased in improving the firm's performance. In this paper an attempt is made to conceptualize a scale for measuring the Sustainable- supply chain management (S-SCM) practices, development of sustainable capabilities of manufacturing firms while evaluating the performance of the organization on TBL. Based on systematic review, the researchers as identified five major determinants of S-SCM practices, namely Supply-Chain Coordination & Trust (S-CCT); Supply-Chain Learning (S-CL); Supply-Chain Continuity(S-CC); Supply-Chain Orientation(S-CO) and Supply -Chain Risk Management(S-CRM) and further additional five determinants were identified as Supply-Chain Dynamic Capabilities (S-CDC): Knowledge generation and absorptive capacity of the firm (KG-AC); Demand-Oriented(D-O), Innovative-Ability(I-A), Renovation Ability(R-A) and Social Network enhancement-Ability (SNE-A). Further three determinants of S-SCM performance namely Environmental-Performance (E-P); Social-Performance (S-P) and Economic- Performance(E-P) are identified. In order to collect data from 172 automobile and electronic goods companies in India, a research survey was being carried out. The SEM measurement and Structural Model Analysis was carried to find the association between the three determinants. The result of the analysis makes a significant contribution to SCM literature. The research outcomes of this research aim to enable practitioners to design execute and monitor the different elements of S-SCM firm level activities, its dynamic capabilities and assess the effect of these activities on the firms' operational efficiency.*

Keywords: *Sustainable- supply chain management(S-SCM), Supply Chain- Dynamic Capabilities(S-CDC), Supply Chain Risk*

Management (S-CRM), Sustainable -Performance(S-P), Social-Performance (S-P), Environmental-Performance(E-P); Triple- Bottom Line (TBL).

I. INTRODUCTION

The present day organisations due to globalization and increased competitiveness have become dependent on others and acknowledge the importance of supply chain management (S-CM) in achieving quality, operational efficiency and reduced costs. The significance of S-CM is further accentuated by Masteika and Cepinskis (2015) who state that the higher order existence and increased competitiveness of the company is highly dependent on effective functioning of various element of supply chain as the SC's irrespective of their length and location have the ability to severely affect the firm's business. The supply chains which are long and complex are under constant pressure to deliver goods cost efficiently as well as expediently. Thus they are inevitably exposed to many uncertainties. Many factors like supply uncertainties, demand fluctuations, transportation, dynamic market conditions, can disrupt operation in supply chain and can lead to significant adverse impacts. The probable risks intrinsic to supply chain are capable of hampering the growth and performance of organizations as they threaten the effectiveness and delivery of the supply- chain. The companies with extended supply chains are exposed to a higher likelihood of disruption of the material flows (Blackhurst *et al.*, 2011); It is impertinent for the industries to detect, forecast, mitigate or avoid the effects of the supply chain risks so as to maximize profit or prevent potential losses. Thus it is increasingly growing as a priority practice for the companies operating in global markets and facing the inevitable supply chain risks to manage their supply chain risks. Conventionally, supply-chain risk management(S-CRM) simply attempted to eliminate the possible costs of the supply-chain risks consequences. Drumwright (1994) points out firms should not entirely focus only on maximizing profits or reducing costs rather should also embrace social responsibilities.

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The integration of social and environmental context into the designing and functioning of global supply chains has extended the conventional economic objective of supply-chain management to consider sustainability of environment and society. (Gold *et al.*, 2010; Sarkis, 2010; Dubey *et al.*, 2016). Thus sustainable-supply chain management practices have been conceptualized to manage risks with an objective to create and enhance value to customers. The confluence of Supply-chain management (SCM) and sustainability can be termed as Sustainable- supply chain management (S-SCM). Due to rampant exploitation of natural environment and violation of human rights the need of hour is that every organization must have duty towards protection of environment and has to act in best interest of the society as a whole. The increasing awareness amongst the academicians and Practitioners to include the triple bottom line impact (planet, people, profit) in their actions has steered development and adoption of many sustainable management practices. This research study aims to identify and understand the development of sustainable- supply chain management practices and dynamic capabilities. The study further explores the impact/effect of these S-SCM practices and capabilities on the firm's performance on TBL

II. LITERATURE -REVIEW

The literature on S-SCM is growing and abundant. In the last decade there have been several researches published on the topic of development of theoretical or conceptual framework of S-SCM (Saenz *et al.*, 2015; Joshi *et al.*, 2017; Ciccullo *et al.*, 2018; Mathivathanan *et al.*, 2018; Montabon *et al.*, 2016; Bubicz *et al.*, 2019). Later few researches also included case study analysis to test their proposed framework/model (Joshi and Sharma, 2018; Kamble *et al.*, 2019; Sharma and Joshi, 2019). Literature further became replete with many empirical studies conducted on S-SCM. Mostly these researches either had single focus on environment /Green initiative or corporate-social Responsibility (CSR) or they had dual focus on combination of economical and environmental aspect or the economic and social aspect.

A. Sustainable- Supply Chain Management (S-SCM)

With increasing market competitiveness Supply-chain management (SCM) has evolved as important means to achieve cost reduction and maximization of profits. However, a transformation in traditional supply chain models is required to address the upcoming concerns such as environment, transparency, benefits of employees and security issues. Sustainable -supply chain management practices comprise of both internal and external practices of the firm to build up supply chains more sustainable in terms of people, profit and planet (Ahi and Searcy, 2015; Paulraj *et al.*, 2015). The most common definition of S-SCM proposed by researchers is the SCM with long term objective of sustainable growth with focus on TBL (Ahi and Searcy, 2015; Sharma and Joshi, 2019). According to Seuring and Müller (2008), "S-SCM is the integration of management of flows of material, information and finances along the supply- chain and the cooperation amongst participating firms along the chain with objective to meet the three criteria of economic, environment and financial goals.". Sustainable- supply chain management (S-SCM) comprises of organization's external (collaboration with upstream and downstream partners) and internal practices(sustainable processes and production) carried out

by the firm to gain sustainability in all three dimensions of performance (Bubicz *et al.*, 2019; Kamble *et al.*, 2019).

B. Sustainable-supply chain management in practices

Sustainable -supply chain management (S-SCM) is said to be a synergy between supply -chain management (SCM) and sustainable -theory (Joshi *et al.*, 2017; Burkiel *et al.*, 2018; Cilloet *et al.*, 2019; Muñoz-Pascualet *et al.*, 2019). The most common definition of Sustainable -supply chain management (S-SCM) proposed by researchers is that it is the supply-chain management with long term objective of sustainable growth focusing on three dimensions of sustainability that is, economic ,social and environmental concerns (Dubey *et al.*, 2016). According to Seuring and Müller (2008) S-SCM is the integration of management of flows of information, materials/goods and finances along the supply chain and the cooperation amongst participating firms along the chain with objective to meet the three criteria of economic, environment and financial goals.

C. Supply Chain Dynamic Capabilities

Dynamic capability is defined by Teece *et al.* (1997) as the ability of the firm to adjust to the constantly changing market ecosystems by building, integrating and reconfiguring the firms' competences. Supply chain dynamism can be referred to the rate at which the company is able to bring changes in the process and products. (Zhou and Benton, 2007). It is increasingly becoming a significant management practice for firms because it promotes information integration and coordination among supply chain partners (Lee *et al.*, 2016; Barber, 2017). The dynamicity and complexity of supply -chains, can render risk to every activity conducted by the member of supply-chain which may trigger unforeseen disruptions at some other point in the supply-chain that may cause unexpected monetary losses and, in extremity can also lead to firms' closure (Skipper and Hanna, 2009; Scholten *et al.*, 2014). This additionally encourages the organisations to have a symbiotic relationship with their ecosystem (Teece, 2007). The Dynamic Capabilities -View as an extension of Resource Based -View (RBV) theory , suggests that a firm aiming to achieve sustainable competitive advantage should develop new or should reconfigure existing resources and capabilities to act upon the emerging opportunities (Eisenhardt and Martin, 2000). More specifically, a dynamic capability can be viewed as a pattern of modified routines undertaken by organisation to advance its performance (Zollo and Winter 2002). The recent literature has highlighted the role of dynamic capabilities in the firms performance (Barreto, 2010).

D. Firms' Performance

Traditionally Sustainable- supply chain management (S-SCM) focused only on economic goals, with contemporary business developments, it now blends the goals of both Corporate -Social Responsibility (C-SR) and Green -Supply Chain Management (G-SCM), thus creating a more reliable and synthesized measure of sustainable performance . There are many empirical studies with central focus on environmental and G-SCM theme wherein they have attempted to develop the specific determinants of G-SCM and have explored how G-SCM effects the environment and economic performance of an organization. (Zhu *et al.*, 2012; Green Jr. *et al.*, 2012; Giovanni, 2012; Mitra and Datta, 2014).

Thus, these studies had a primary focus on only two dimensions of S-SCM – economic and environmental and had not expanded their focus to include the third component of sustainable performance i.e. the social aspect. There is another stream of literature which had primary focus on social responsibility of the organizations (Manie *et al.*, 2016; Zhu *et al.*, 2016). They developed a theoretical framework on social dimension and tested it empirically but had not considered the other two dimensions- economic and environmental.

III. RESEARCH GAP

The review of literature has led to identification of three major gaps in literature.

1. Firstly, the S-SCM literature is dominated by the explanations of one component of sustainable -supply chain management at a time. Though these researches provided a perspective on different components of S-SCM however a more integrative research entailing various components of S-SCM is needed. Further, literature highlights the significance of SC- DCs in sustainability and many studies (Pagell and Wu, 2009; Reuter *et al.*, 2010; Chakrabarty and Wang, 2012; Gimenez and Tachizawa, 2012; Liboniet *al.*, 2017; Reuter *et al.*, 2010) indicate the inevitability of dynamic-capability to achieve sustainability. However there is scarcity of literature aiming to explain improving performance across TBL by combining S-SCM practices and DCs. Therefore, this explicitly calls for reference model that integrates all three phenomenon-S-SCM, DCs and TBL. (Das, 2017)

2. Second the review shows consensus that sustainability suggests a business unit should have balanced performance across the triple aspects of economic, environment and society, However, most studies discuss the effect of S-SCM on performance in context of either one or two combination of the three dimensions- economic /financial; social/ corporate-social responsibility (C-SR) and environmental/green initiatives. There is scarcity of literature on comprehensive study of impact of S-SCM and dynamic capabilities focusing on TBL performance i.e. planet, people and profit.

3) Most of the current researches in the sustainability field is reported from developed countries. As the S-SCM practices in developing countries are comparatively under developed, hence limited researches in the field of S-SCM is published with reference to emerging economies (Holt and Rao, 2005; Zhu *et al.*, 2005; Zhu and Sarkis, 2007). This scarcity of empirical studies relating to S-SCM practices and their implications on performance explicitly calls for further empirical investigation in emerging economies. In India this scarcity is more pronounced as there is dearth of empirical studies in reference to pairing of S-SCM practices and dynamic capabilities and three dimensional performances of firms.

This research highlights the need for decision model and framework that incorporates the complex intricacy involved in sustainability, and the task of Dynamic Capabilities in achieving sustained TBL performance. On the basis of the examined literature gaps this research proposes to develop a framework suitable for firms to develop and maintain sustainability by organizing sustainable -supply chain management (S-SCM) practices, supply chain- dynamic capabilities and triple- bottom line (TBL) based performance.

IV. RESEARCH QUESTIONS

The research tries to build on past studies by examining S-SCM practices in its entirety, by overtly exploring the supply chain dynamic capabilities, and by explicitly asking their influence on the TBL of the firms. Based on theoretical framework developed, researchers aims to address the following research questions:-

1. Upto what extent business firms target and build up S-SCM processes and Dynamic capabilities to respond to changing market requirements?
2. Does the implementation of S-SCM practices affect the firm's social, environmental and economic performance?
3. Does the engagement of firm in Supply chain dynamic capabilities improve the TBL.

V. THEORETICAL DEVELOPMENT OF DETERMINANTS

The combination of theories of Sustainable- development and S-CM acts as the foundation for the theoretical development of the determinants used in the research. The World Council of Economic Development, (WECD,1987) has referred to sustainable-development as a conscious effort by the present generation to utilize the resources keeping in mind the requirements of future generation. The SCM emphasis is on enhancing the entire supply chains functional effectiveness (Simchi-Levi *et al.*, 2008). In the sustainable-development domain the researches undertaken have referred three dimensions of sustainability as three rings that are interconnected (Barton, 2000; Giddings *et al.*, 2002). Such model mostly concentrates on environment, society and economic intersection. Elkington, 1994 had advocated that all three dimensions of sustainability have equal significance in sustainable-development efforts and coined the term “Triple Bottom Line” (TBL) which has become a reference point in the sustainability domain. The TBL perspective has triggered the development of many models and frameworks in the studies in the S-SCM field. Carter and Rogers, 2008; Carter and Easton, 2011; Winter and Knemeyer, 2013).

Dubey *et al.*, 2016 in his study has presented S-SCM as philosophy of management reflected in the processes adopted by management. Other authors like Searcy, 2013, Paulraj *et al.*, 2015, have presented S-SCM as an aggregation of external and internal practices undertaken by the firms with an objective to achieve sustainable growth in all three sectors of TBL. Further we come across many studies which have explored the various components of S-SCM practices through quantitative analyses and have added to the body of S-SCM literature. Throughout the literature we come across researches which have advocated the different elements of S-SCM practice to develop a sound S-SCM framework. Like, it has been argued by Beske *et al.* (2014) that five types of S-SCM practices can be the key to sustainability including supply chain collaboration, strategic orientation, continuity, proactivity and supply chain risk management. Similarly it has been demonstrated by Paulraj *et al.* (2015) that S-SCM practices can be viewed as comprising of 4 underlying dimensions : demand and supply side sustainability, collaboration ,process design and and sustainable product design.

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In similar lines, Esfahbodiet al. (2016) focused on SSC-M practices in four areas, namely, sustainable production, sustainable design, sustainable distribution and investment recovery. Though throughout the literature there is a little consensus on consistent definition of S-SCM practices however there is a growing view to measure S-SCM practices on three dimensions of performance (TBL). Drawing heavily from the framework provided by Beske et al 2014 and on the basis of other literature review the study has tried to identify the following determinantsof SSC-M practices.

A. Sustainable -supply chain management (S-SCM) determinants.

In the review firstly the study attempts to identify the key sustainable themes within the supply chain function. Secondly, the themes gathered of S-SCM are outlined for research using the following categories: coordination and trust; orientation, learning, risk, and continuity within the ambit of overall sustainability dimensions (economic, environmental, and social), as well as management of performance.

Supply -Chain Coordination and Trust

S-SCM requires the coordination between internal sustainability requirements and the expectations of external supply chain stakeholder. There exists cross functional coordinationalissues at supply chain interfaces, across supply chain functions, and between internal business functions which need to be coordinated to ensure valuable outcomes to the customers. (ArshinderandDeshmukh, 2008). Supply chain management is achieved with the help of cross functional supply chain processes that coordinate across various functions to integrate the activities for flow of information to each intersection so that asymmetry of information is removed as well as enhanced results are ensured (Kilger, Reuter, &Stadtler, 2008). Trust is essential for gaining maximum knowledge which supports effective coordinationand lack of trust among supply chain members can be a obstacle in effective collaboration (Lee and Choi,2003,Walker et al., 2008 and Printo 2009;). Trust among supply chain partners is a building block to implement S-SCM practices and firms can reap benefits through implementation of the SSC-M practices (Ageronet al., 2012, Beske and Seuring, 2014).

Supply -Chain Learning

Supply- chain learning as defined by Flint et al, 2008 is the process adopted by the firms to ensure that all members of the firm itself, suppliers as well as customers pursue to learn methods to resolve issues in supply chain management with an aim to achieve sustainability.

Supply- Chain Strategic Orientation

Sustainability is not an occasional topic but it is to be imbibed by the managers as an activity to be followed as a daily routine. The firm's decision making is highly influenced by manager's orientation towards sustainability and the concern to improve TBL's 3 elements - environmental, social and economic. The strategic orientation helps to protect the entire supply chain from the potential business risk, thus not only benefitting the focal firm but also improving the suppliers financial performance (Pagell ,2009).

Supply - Chain Risk Management

Supply -Chain Risk Management(S-CRM) can be defined as a process to identify the likelihood of potential losses, to assess the impact on the business revenue and plans to

mitigate potential loss (Dow, 2012). Christopher (2002) have mentioned the S-CRM as the process to reduce the vulnerability of supply chain by identifying and managing risks through improved supply -chain coordination. The S-CRM has been advocated as a four step management process byHallikaset al., including (i) identificationofrisk (ii) assessment of risk (iii) monitoring and control of risk (iv)and finally implementation of actions planned for risk management .

Supply- Chain Continuity

The goal of supply- chain continuity is to ensure that all members of the supply chaincontinue to be benefitted adequately and stay and grow in business. It should be embedded as an integral part of the firm's culture promoting values that creates equity amongst the members of the supply chain and retains dedicated employees and suppliers. (Pagell et al, 2009)

Sustainability is not a static process and requires regular realignment of corporate strategies and operations with the objective to transcend from less sustainable practices to practices that are more sustainable. Due to this Hahn et al, 2015 has referred to sustainabilityas dynamic process.Hence it suggests for a deeper understanding of the dynamic of supply chain abilities..

B. Supply chain (S-C) dynamic capabilities

According to Beske (2012) Supply chain is a complex system. To ensure sustainable development this complexity calls for certain level of static abilities (Zhang, Yang and Bi, 2011; Diabatet al., 2013). However, with static abilities alone one cannot possibly with stand the challenges of the ever changing environment.The rapidly changing environment, entails the need to adjust these abilities constantly. This capability of adjusting the supply chain and creating new abilities to bring in efficiency in sustainable efforts is the enterprise's dynamic ability. The dynamic capabilities are broadly defined as the abilities of the firm to initiate, build, integrate, and reconfigure competencies to address changing business ecosystem (Eisenhardt and Martin, 2000). The DC origin theory can be traced to the RBV (Resource-based View) theory. However, RBV assumes that the business environment is static and is limited to the actions taken by firms to best utilize the non- imitable and rare resources which renders competitive advantage to the firm (Barney, 1991). The shortcomings of the limited RBV approach can be overcome by the dynamic capability approach which emphasise on resource development and renewal (Hittet al., 2016). It was explained by Sirmonet al. (2007) explain that bundling of intangible as well as tangible resources resulted in capabilities. The integration of DC with Resource base view (R-BV) help companies to create abilities which translate to improved competitiveness within the supply chain (Squire et al., 2009). The literature review reflects the growing popularity of Supply chain dynamic capability but due to its abstract nature it is not easy to comprehend (Defee and Fugate, 2010). According to Gimzauskieneet al. (2015) dynamic capabilities of supply chain enable companies to adapt swiftly as well as easily to market trend making them more flexible to efficiently handle the volatility in the market which ultimately helps the firm to gain competitive advantage in the industry.

Compared to the conventional supply-chain management the Sustainable-supply chain management is relatively more exposed to volatilities and vulnerabilities. As a result, building DCs is critical in order to achieve sustainable performance across TBL. Teece, 2007 has classified DC's as the capacity to sense opportunities and threats, capacity to bag these opportunities and capacity to reconfigure the resources to achieve competitiveness. Specifically sensing, seizing as well as reconfiguring abilities are termed as DC. Supply-chain dynamic capability is a conceptual idea comprising of many sub-capabilities. For instance, Chang (2011) classifies the DC into integration and cooperation. Beske (2012; 2014) breaks it down into development of supply chain partner inter-relationship, knowledge evaluation, supply chain reconstruction, co-evolution, and flexible supply chain control. It is not one particular sub-capability, but rather the combination of all sub-capabilities that brings competitive advantage to the firm (Hall *et al.*, 2012, Beske, 2014). The major determinants of DC's selected for the purpose of this study are:

Knowledge acquisition and absorptive capacity:

Knowledge can be viewed as strategic intangible capability that adds to firms' competitiveness. (Hult *et al.* 2006). Knowledge acquisition, assimilation and interpretation fosters organizational learning. (Huber, 1991). Supply chain managers constantly seek to engage supply partners in exploring and acquiring knowledge to acquire strategies that ensure firms sustainability (Blome *et al.*, 2013).

Market oriented perception ability

The market oriented perception ability as an offshoot of organisational capability theory has focus on marketing routines and development of marketing competencies. It is a strategic orientation which develops capability of organisation to utilise its knowledge and skills for adding value to the marketing oriented competencies. (Kok and Biemans, 2009; Su *et al.*, 2009).

Innovative ability

The rapidly changing socio economic environment entails developing dynamic capabilities for innovation as an integral element to renew, rebuild, replace, and integrate internal competency levels (Teece, 2014). DC's related to innovation ability contribute in the generation of new technologies and their diffusion and are instrumental in contributing significantly in bringing out procedural as well as structural transformations within firms. (Teece, 2014).

Internal reconstruction ability

The researches in the area have recognized internal reconstruction ability as a DC which enables firms to tackle the unexpected risk events so that they efficiently respond and timely recover from such disruptions (Brusset and Teller, 2017). Internal reconstruction ability as a DC enables the organisations to mitigate or absorb the adverse impacts of the potential business risks (Teece, 2007).

Social network relationship ability

The Social Network can be defined as a set of all active and inactive members within and outside firm's supply chain who have the ability to effect the flow of supply chain. (Braziotis *et al.*, 2013). The social network relationship ability primarily focus on the recognition as well as interrelationships between supply chain members. For this study the relationship with the customers, supply chain partners, government and other organisation is considered.

C. Firm's Performance

Literature refers to many studies assessing the impact of S-CM practices on firm performance (Tan *et al.*, 1999; Kannan and Tan, 2005; Li *et al.*, 2006). However, very few studies investigate the association of S-SCM practices with sustainable 3 dimensional performance. Liboniet *et al.*, 2017 have pointed at this research gap and have suggested that researchers need to develop sustainable capabilities to learn means to sustain long term triple bottom line (TBL) growth. Hence the need of hour is to incorporate all the 3 dimensions of sustainable performance so as to benefit from the expanded perspective.

Environmental- Performance (EP)

Environmental- performance includes measuring the ability of the firm to reduce energy consumption as well as pollution, and waste; reduction in consumption of natural resources and use of hazardous materials; reduction in occurrences of environmental or shop floor accidents and managerial actions to safeguard biodiversity (Harms *et al.*, 2013, Zhu *et al.* 2013, Esfahbodi *et al.*, 2016).

Social-Performance (SP)

The performance of the firm in terms of social dimension can be measured by components like employee satisfaction and community friendly practices (Lin *et al.*, 2005) The evaluation of firm performance from both the employee and enterprise perspective needs to be monitored as to evaluate the supportive actions initiated by the firm to improve the working culture, to provide fair remuneration and benefits to employees and to create enabling environment to enhance and empower the surrounding community. (Maniet *al.*, 2016; Hong *et al.*, 2018) In the study the social aspect of the performance of an organization is examined for employee perspective and Enterprise perspective)

Economic –Performance (ECP)

ECP can be measured by measuring the performance across three components operation performance; market performance and financial performance.

Operations-performance (OP) entails the improvement of the firm in terms of cost efficiency across the whole supply chain. OP can be evaluated for metrics like (i) Decrease in cost of production. ii) reduction in the energy consumption or decrease in cost of energy consumption iii) increase in efficiency of logistics i.e. decreased delivery time and reduced transportation costs (Park and Lee, 2015; Esfahbodi *et al.*, 2016).

Financial- performance (FP) included items which measure growth in sales/revenue, cost performance, profitability, earnings and share value (Lin *et al.*, 2005). It can be measured by evaluation of (a) profit as percentage of sales (b) net income before tax (EBIT), and (c) return on investments (Chen and Paulraj 2004; Ameer and Othman 2012)

Market Performance: Lint *et al.* (2015) recommended items like market share, and customer loyalty to measure the market performance. Further market performance include items like responsiveness of the firm to market fluctuations to include the indicators in their product and process thus adding flexibility.

The above determinant of S-SCM practices and Dynamic capabilities can be regarded as the building blocks of S-SCM.

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These determinants cannot be evaluated independently and their true essence is reflected only when examined jointly with the 3 dimensional performance to get a holistic view of firm's sustainability. It is expected from the managers working towards S-SCM implementation that they need to be equally sensitive towards their social and environmental responsibilities and cannot be merely appraised for the reduction in logistics cost or increase in profits. All five determinants of S-SCM practices and Dynamic capabilities are likely to have an effect on market competitiveness of firm due to their probable impact on economic performance, environmental performance, and social performance.

Table 1: Variables with their dimensions and items

Variable	Sub-Variable	Items	Citations
S-SCM Practices	Supply-Chain Coordination and trust	3	Pagell and Wu (2009), Reuter <i>et al.</i> (2010), Raine <i>et al.</i> (2010), Beske <i>et al.</i> (2014), Paulraj <i>et al.</i> (2015), Hendrik and David (2016), Wills (2016) and Esfahbod <i>et al.</i> (2016),
	Supply-Chain Learning	3	
	Supply-Chain Strategic Orientation	3	
	Supply-Chain Risk Management	4	
	Supply-Chain Continuity	3	
SC Dynamic Capabilities	Knowledge acquisition and absorptive ability	4	Zheng <i>et al.</i> (2011), Shin <i>et al.</i> (2012), Klassen and Vereecke (2012), Ramesh (2014), Beske <i>et al.</i> (2014), Lin <i>et al.</i> (2015), and Meinel Schmidt <i>et al.</i> (2016),
	Market Oriented perception-ability	4	
	Innovative-ability	3	
	Internal reconstruction-ability	4	
	Social network relationship-ability	4	
Economic performance	Operation	4	Lin <i>et al.</i> (2005), Cory (2009), Nazli <i>et al.</i> (2010), and Emilie <i>et al.</i> (2014).
	Market	3	
	Finance	6	
Environmental Performance	Pollution Control	3	Zhu <i>et al.</i> (2006), Cory (2009), Natalia <i>et al.</i> (2012) and Luthra <i>et al.</i> (2014).
	Resource Utilization	3	
Social Performance	Enterprise perspective	4	Vachon and Mao (2008), Patlitzi <i>et al.</i> (2008), Adivar (2010), and Tajbakhsh (2015).
	Employee perspective	3	

VI. INDIAN CONTEXT

In literature we find there is hardly any study in reference to India which considers the synthesis of the S-SCM practices and dynamic capabilities to produce a sustainable

organisation performance. Hong *et al.* (2018) conducted a study on manufacturing firms in China and found that there is positive impact of S-SCM practices on dynamic capabilities and social, economic & environmental performance of the enterprise. Thus it highlights the need of a similar study in context of Indian manufacturing firms. As the previous seminal studies by Hong *et al.*, 2017, Das 2017 had limited their focus on a heterogeneous group of manufacturing companies hence this study has been undertaken with an objective to examine the interrelationship of the three determinants in two specific industries – i) automotive & automobiles and ii) electronic & electrical goods. The two sectors have been selected purposely as these are the sectors which are highly dependent on efficiency of their supply chains and it is assumed that the companies may have matured supply chain with experienced supply chain managers who can provide better insights to our research. The extant literature has set forth the foundation to propose our hypotheses which investigate the relationship between S-SCM practices, dynamic capabilities and firm's performance in context to Indian Manufacturing firms.

VII. THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

The framework of the study has been designed from the work of Hong *et al.*, 2017. The study investigate whether the proposed S-SCM practices are undertaken by firms and to what extent these practices affect the firms' economic, social and environmental performance. Many authors argue that S-SCM practices cannot survive for long on static abilities and require dynamic capabilities which render flexibility to them to adjust to the ever changing business ecosystem. The significance of combination of S-SCM and Dynamic capabilities was specifically noted by Beske *et al.*, 2014 and Vargas and Mantilla, 2014) who have clearly advocated that Dynamic capability should be taken into account in S-SCM field. Further these Dynamic Capabilities effect the firms performance and adds competitive advantage was advocated by Kirci and Seifert (2016). The objective of current research is to investigate the link between S-SCM practices, S-C dynamic capabilities, and firms performance, and to develop a model that ascribes a due explanation to the examined interrelationship among these three determinants. On the basis of theoretical buildup, and the study by Hong *et al.*, 2017 the following conceptual framework of the research is formulated:-

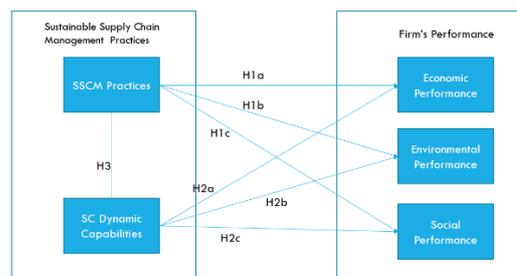


Figure 1 : Conceptual Framework

A. Hypotheses

S-SCM practices and firm’s performance

A number of studies have investigated the mechanism of how S-SCM practices can enhance firm performance. . Hong et al, 2017 in their study on manufacturing companies in China and find that implementing S-SCM does have positive impact on firms TBL performance which is also supported by many previous studies (Zailaniet al., 2012 ; Hasan, 2013 ; Wang and Sarkis, 2013 ; Luthraet al., 2014 ; Hsu et al.2016; Joshi and Sharma, 2018; Sharma and Joshi, 2019). Based on the above observations, it is hypothesize:

H1:Sustainable- supply chain management practice is positively associated with firm’s performance

H1a:Sustainable- supply chain management practiceis positively associated with economic performance

H1b:Sustainable- supply chain management practice is positively associated with environmental performance

H1c:S-SCM practice is positively associated withsocial performance

S-C dynamic capabilities and Firms’ performance

The existing research on dynamic capability hasshown its positive effect on firm performance. (Zott (2003), Griffith et al. (2006), and Eriksson (2013),Caniatoet al. (2014), Cheng et al. (2014, Lee&Rha (2016)). Hong et al,2017 in their similar study had concluded that SC Dynamic capabilities can enhance organizationalperformance. It is thus hypothesize:

H2 Supply chain dynamic capability is positively associated with firm’s performance

H2a Supply chain dynamic capability is positively associated with economic performance

H2b Supply chain dynamic capability is positively associated with environmental performance

H2c Supply chain dynamic capability is positively associated with social performance

S-SCM practices and SC dynamic capability

As suggested by Hall, 2010 S-SCM and DC are associated as S-SCM practices generally bring short term competitive advantage, which results inboostingthe development of dynamic capability (Hall, 2010). DC like knowledge, supply chain partnerships, innovation, resource restructuring etc enhance the companies abilities to swiftly response and adjust to thechanging environments thereby positively influencing the firms performance. (Ramaswany, 2000, Handfield and Bechelt, 2001, Prieto and Revilla ,2009). Hong et al in their study had also found that S-SCM helped in developing the DC’s of the firm and were positively associated, hence, the following hypothesis:

H3 Sustainable- supply chain management practice is positively associated with supply-chain dynamic capability

VIII. RESEARCH METHODOLOGY

The major objective involved in carrying out this research is to comprehend the present level of S-SCM and DC is the firm and also investigate how S-SCM practices and DC’s influence different dimensions of S-SCM performance of a firm.

A. Questionnaire

Research uses the survey method to analyze and validate the research model. The data is collected from the companies through a Questionnaire. The validated questionnaire, pertaining to study the three determinants S-SCM practices, Supply- chain dynamic capabilities and Firm’s performance, was derived from Hong et al, 2018. The survey instrument

operationalised each construct by employing measurement variables identified from extant literature review. However, as the Hong et al, 2017 study was conducted in China hence to ensure the applicability of the same validated instrument in Indian context a literature review was made and also the opinion of academic experts and practicing business managers in supply chain management field was obtained. The three determinants and their variables were considered appropriate for a similar study to be conducted in India.

B. Questionnaire Design

The Questionnaire comprises offour sections. The first part of the questionnaire seeks to obtain the demographic information of the respondents and the organisation. The secondpartseeksreponses on the level of adoption of S-SCM practices. The third partasks questions on the level of adoption of Supply Chain Dynamic Capabilities. The fourth parthave questions related to different aspects of S-SCM performance.The study uses five point Likert scale for collecting responses for the questions on S-SCM practices , Dynamic capabilities and S-SCM performance with the values ranging from 1 = strongly disagree to 5 = strongly agree (Hong et al,2018). The instrument’s content validity was checked by garnering the expert opinion. Experts having relevant experience in supply chain from academics and business were contacted. As suggested minor changes were incorporated to ensure better understanding of the questions by the respondents. The reliability of the three variables was inspected using Cronbach’s coefficient alpha.

C. Sampling

The sampling technique used for the study is purposive convenience sampling. The target firms’ in this study are included from two sectors i) automobiles&auto-components, ii) electronics and electricals appliances. To ensure better responses corresponding to our objectives only senior level supply chain professionals were approached. The online responses were very low so mostly the responses were obtained through offline mode.

D. Research method

Structural Equation Modelling (SEM)

The study employsStructural Equation Modelling(SEM) to analyse the proposed research model. SEM is considered an appropriate method when multiple latent variables are to be studied to examine structural relationship (Henseleret al., 2009). SEM provides benefits over traditional methods as it gives more reliable results when complex direct and indirect relationships between numbers of latent variables is to be examined. (Kumar, 2018)

The study used Smart PLS3,to apply the SEM to analyze the validity and robustness of the proposed model. The model first analysed the measurement model, established its goodness of fit and then analysed the structural modelto test the proposed hypotheses.

IX. DATA ANALYSIS AND INTERPRETATION

The questionnaire was administered to automotive and electronic manufacturing firms for data collection. We obtained 181 responses,however9 questionnaires were not filled properly hence ignored. Thus the effective number of responses recorded was 172.

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The data analyses present an overview of the respondents' demographic profile, descriptive statistics, construct validity, convergent and discriminant validity, factor analysis and hypothesis testing of S-SCM practices and Enterprise performance measures.

A. Demographic profile

Demographic profile of the responses includes nature/sector of organization, manpower and annual turnover. The collected data represented the following industries: 96 automobile and automotive (55.81%); 76 Electronic products & Electrical Appliances (44.18%). The distribution of the respondents in terms of their organizational position is: 26 CEO/VP/Director (6.3%); 55 GM/DGM/AGM (39.6%); 80 Senior Manager/ Manager SCM (54.1%). Further the responses were categorized in terms of the organization size determined by annual turnover and number of employees as shown in Table 2.

Organization Level	Senior Manager/ Manager	80	46.51
	GM/DGM/AGM	55	31.98
	CEO/MD/Director/President /VP	26	15.12
	Consultant	11	6.40

Table 2 : Demographic profile of Respondents

Characteristics	Categories	Frequency	Percentage
Industry	Automobile and Automotive	96	22.67
	Electronic Products and electrical appliances	76	16.28
Annual Turnover	<100 Cr	30	17.44
	100 Cr to < 500 Cr	29	16.86
	500 Cr to < 1000 Cr	49	28.49
	1000 Cr to < 5000 Cr	33	19.19
	>5000 Cr	31	18.02
Manpower	<100	27	15.70
	101-500	26	15.12
	501-1000	32	18.60
	1001-5000	61	35.47
	>5000	26	15.12
Ownership	Fully Indian	101	58.72
	Fully Foreign	27	15.70
	Mixed with majority Indian owned	31	18.02
	Mixed with majority foreign owned	13	7.56
Age	Less than 3 years	8	4.65
	3-10 years	33	19.19
	10-20 years	45	26.16
	10-20 years	86	50.00

B. Content Validity

Content validation of an instrument means the assessment of the aspect that the measurement items designed in the instrument represent all relevant aspects of the construct to be measured. According to Nunnally, 1978 it is important that measurement items should correctly cover or represent all the aspects of the research questions under study. At the stage of instrument designing the instrument was checked for content validity. This was achieved through extensive literature review and soliciting expert opinion. As suggested by the experts minor changes in phrasing of some questions was incorporated to improve the understanding of the respondents. Subsequently Factor Analysis through Smart PLS was carried out for evaluating reliability, and validity of the instruments with respect to determinants of S-SCM practices and S-SCM performance.

C. Reliability

In the present study Cronbach's alpha coefficient and composite reliability was computed for reliability estimates. The value of Cronbach's α and composite reliability if equal or higher than 0.7, then is considered to be reliable (Hair *et al.*, 2009). As shown in the table below the calculated values of Cronbach's alpha and composite reliability are more than 0.7 thereby signifying sound reliability of all understudy determinants.

D. Convergent validity

The Convergent validity measures the variance of the variables which should be high. The Convergent validity of the instrument is checked by two methods :i) factor loadings and ii) average variance extracted (AVE).

The accepted value of factor loadings and AVE is that all items should be greater than 0.5 and our values as listed in the table above show that all factor loadings are greater than 0.5 except knowledge item no 2 which has factor loading of 0.487. As the value is closed to 0.5 hence all values are accepted as satisfactory. Similarly a study of average variance also shows that all determinants have value above 0.5 which indicates strong variance of the construct and the determinants are accepted as satisfactorily validated.

Table 3: Reliability, Composite reliability, Average Variance Extracted (AVE)

Item	Dimension	Factor Loading	Cronbach's Alpha	Reliability	Composite Reliability	Average Variance Extracted (AVE)
DC	Control Oriented 1	0.708	0.942	0.942	0.947	0.532
	Control Oriented 2	0.705				
	Control Oriented 3	0.705				
	Control Oriented 4	0.705				
	Learning 1	0.712				
	Learning 2	0.712				
	Learning 3	0.712				
	Learning 4	0.712				
	Learning 5	0.712				
	Learning 6	0.712				
	Learning 7	0.712				
	Learning 8	0.712				
S-SCM	Control Oriented 1	0.716	0.955	0.955	0.959	0.548
	Control Oriented 2	0.716				
	Control Oriented 3	0.716				
	Control Oriented 4	0.716				
	Learning 1	0.716				
	Learning 2	0.716				
	Learning 3	0.716				
	Learning 4	0.716				
	Learning 5	0.716				
	Learning 6	0.716				
	Learning 7	0.716				
	Learning 8	0.716				
EnvPerf	Control Oriented 1	0.716	0.942	0.942	0.950	0.634
	Control Oriented 2	0.716				
	Control Oriented 3	0.716				
	Control Oriented 4	0.716				
	Learning 1	0.716				
	Learning 2	0.716				
	Learning 3	0.716				
	Learning 4	0.716				
	Learning 5	0.716				
	Learning 6	0.716				
	Learning 7	0.716				
	Learning 8	0.716				
SocPerf	Control Oriented 1	0.716	0.942	0.942	0.956	0.677
	Control Oriented 2	0.716				
	Control Oriented 3	0.716				
	Control Oriented 4	0.716				
	Learning 1	0.716				
	Learning 2	0.716				
	Learning 3	0.716				
	Learning 4	0.716				
	Learning 5	0.716				
	Learning 6	0.716				
	Learning 7	0.716				
	Learning 8	0.716				

	DC	EconPerf	EnvPerf	S-SCM	SocPerf
DC	0.732				
EconPerf	0.804	0.829			
EnvPerf	0.796	0.834	0.884		
S-SCM	0.721	0.822	0.788	0.856	
SocPerf	0.78	0.887	0.828	0.815	0.903

F. The goodness of Model Fit

In the study the goodness of model fit was analysed using SEM. The values obtained are as per the table below.

Table 6: Model Fit

	Saturated Model	Estimated Model
SRMR	0.06	0.068
d_ ULS	6.617	8.524
d_ G	9.928	10.275
Chi-Square	5,883.12	6,030.55
NFI	0.55	0.538

The acceptable value of SRMR is less than 0.08. As the calculated values of SRMR are less than 0.08 and fall in the acceptable range hence we can say that the model is consistent with the data and fits well to the data.

E. Discriminant validity

Discriminant validity is the degree to which each construct measures the concept distinctly. It was also assessed by following two different methods. In the first method the correlations between the determinants was examined which as an accepted value should be less than 0.9. The results as listed in

Table 4 that denote that the determinants are uni-dimensional as the values are less than 0.9.

	DC	EconPerf	EnvPerf	S-SCM	SocPerf
DC					
EconPerf	0.86				
EnvPerf	0.85	0.852			
S-SCM	0.87	0.868	0.846		
SocPerf	0.82	0.848	0.865	0.871	

In the second method of Fornell and Larcker, square root of AVE with correlation of each pair of determinants is compared and if former is more it implies a high proportion of variance. The value of the analysis in the table below indicates the values of square root of AVE are more than the correlation of the determinants, thus indicating strong discriminant validity.

Table 5: Discriminant Validity (Fornell and Larcker criteria)

G. SEM and Hypothesis testing

The structural relationship model of the proposed hypothesis is constructed using the SMART PLS. The structural model depicts the hypothesis relationships of our two determinants of S-SCM and DC with the third construct Enterprise performance.

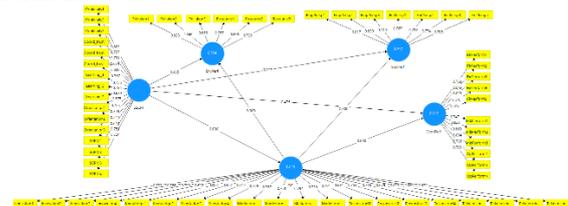


Figure 2 : Structural Model

The model here depicts the relationship that S-SCM construct has an effect on environmental economic and social performance.

Similarly the model also shows the relationship of the second construct Dynamic Capabilities (DC) have an effect on environmental economic and social performance of the organisation.

The model also shows that S-SCM has an effect on DC. Thus the model can now be further assessed for the relevance of structural relationships.

H. Boot Strapping

To determine the relevance of the hypothesized relationships the bootstrapping is calculated on the proposed structural model.

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The results of the bootstrapping indicate the significance (p values) of the path coefficients and help in testing our hypotheses.

The result of boot strap is as below:

Table 7: Path coefficients

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
S-SCM -> DC	0.902	0.902	0.021	43.524	0
S-SCM -> SocPerf	0.659	0.671	0.147	4.497	0
S-SCM -> EnvPerf	0.426	0.42	0.143	2.973	0.003
S-SCM -> EconPerf	0.397	0.392	0.131	3.019	0.003
DC -> EconPerf	0.527	0.532	0.132	4.003	0
DC -> EnvPerf	0.482	0.486	0.145	3.32	0.001
DC -> SocPerf	0.252	0.241	0.152	1.658	0.098

As the table shows the p-value is significant (less than 0.5) for the relationships of H1a, H1b, H1c

Hence it proves that the hypothesis that S-SCM practices are positively associated with the firm's performance on three dimensions. Thus hypotheses H1a, H1b and H1c are proven and accepted.

Similarly, the p-value is significant (less than 0.5) for the relationships of H2a, H2b, however it is insignificant (more than 0.5) for H2c. Hence it proves that Dynamic capabilities are positively associated with economic and environmental performance. However the hypothesis H2c that DC's are positively associated with social performance is rejected.

X. CONCLUSIONS

The literature review has pointed out that the S-SCM practices have a positive impact on the firms' performance. With this as a building block the study had also assumed to establish the positive association of S-SCM practices with firms performance. The empirical evidences were in agreement with this assumption. The data reveals that the S-SCM practices are positively associated with firm's environmental performance. Due to increased awareness regarding just use of environment many firms have improved their efforts to follow processes and systems that are more environmental friendly. Due to the increased government programs and stringent rules the firms are forced to follow guidelines for pollution control and better resource utilization. The firms are now required to adhere to ISO 14001 for maintenance of environmental standards. All these channelized efforts have led to elimination of many environmental polluting machines or methods. It has also increased the development and usage of machines and processes which are more efficient in terms of energy consumption.

The S-SCM practices are positively associated with social performance of the firm. Many companies in India have now increase their CSR activities. The companies' along with other partners of supply chain are integrating efforts to enhance the positive working condition of the employees and also efforts to contribute towards the society in large. The supply chain managers are increasingly introducing safety measures in the production procurement and distribution processes. This has led to reduced floor accidents. Thus a more healthy and positive environment has contributed

towards increased employee loyalty and decreased employee turnover.

Sustainable -supply chain management practices are positively associated with economic performance. The SC coordination and supply chain sustainable orientation has led to organisations facilitating their suppliers to implement six sigma, total quality management which has led to building up of quality into the product. This has led to improved product quality and services. The introduction of lean production management, better inventory control, supply chain agility, reduced delivery cycles has increased the overall productivity or the efficiency in utilization of the capacity.

Thus the study produces results in agreement with the findings of the study by Paulraj, 2011, Luthra et al, 2014, Hsu et al 2016, Hong et al, 2017 etc who have concluded that the S-SCM practices enhance performance of the firms in terms of leading market positions, increased market shares and improved profits.

The study also observes that the Supply chain dynamic capabilities are positively associated with environmental and economic performance but not is not positively associated with social performance.

Knowledge generation, integration and reinforcement help the supply chain managers to quickly and effectively communicate information to the suppliers and also implementation in the organization. The SC dynamic capabilities with respect to restructuring and integrating the internal resources to the changes in the environment is well developed in the manufacturing companies operating in India. The improved supply chain dynamic capabilities supports better implementation of environmental compliances and their monitoring. Hence the organisations have developed dynamic abilities to utilize their available resources flexibly and optimally. The materials and equipments used have become more efficient with respect to consumption of energy and there is significant decrease in the emission of toxic wastes. The amount of wastes produced have been reduced and the better waste management has resulted in recycling reduce and reuse of waste. This has enhanced the environmental compliance of the entire supply chain and has subsequently improved the sustainable environmental performance of the firm.

However it is observed that the dynamic capabilities do not have positive association with social performance. As it is reported that much longer time is taken by the firms to yield social benefits by developing and implementing dynamic capabilities. The results of the study are found to be in agreement with the results of the studies conducted by Klassen et al, 2012. Klassen et al, 2012 have similarly arrived to the conclusion that SC dynamic capabilities do not have a significant effect on improving social performance of the firm.

The study finds that S-SCM are positively associated with the development of Dynamic Capabilities. The S-SCM practices of supply-chain learning and supply-chain continuity have enhanced the need of development of dynamic capabilities of knowledge acquisition and absorption. Vachon et al, 2008 have also indicated that supply chain learning contributes towards development of DC of the firm to respond to environmental changes. The S-SCM orientation has increased the firm's ability to track the changes in the technology, products and process and flexibly adjust to the changing customer and market preferences. This increases the firms' innovativeness to restructure internal resources to integrate the entire supply-chain to respond positively to changes in environment. The S-SCM practice of coordination and trust with the supply chain partners and other stakeholders has a positive bearing on building the SC dynamic capability of social network relationship ability. The firms devise ways to adjust the relationship with supply-chain partners and other stakeholders aligned with the changes in environment and company objectives. The findings of the study are similar to the research on manufacturing companies in China by Hong et al, 2016 who have concluded in their study that the S-SCM practices have a significant positive impact on Supply chain Dynamic Capabilities.

XI. THEORETICAL IMPLICATIONS

The study has two fold impact on theory. First the study identifies the determinants of S-SCM, DC and sustainable performance from existing secondary data thereby enriching the theoretical foundation. There is scarcity of literature exploring the direct link between the S-SCM and DC. The study here explores this less analysed phenomenon. Thus the study introduces the third dimension of DC to the existing framework of S-SCM and Performance. This further strengthens the theoretical concoction of SSM and performance. In India there is huge scarcity of studies focusing simultaneously on all three dimensions of performance taken together rather than in isolation. Secondly the literature review had highlighted the gap in empirical studies in emerging economies. This study empirically evaluates the S-SCM practices and performance in specific sector of automobiles automotive parts and electronic goods.

XII. MANAGERIAL IMPLICATIONS

The paper has many positive implications for the practicing managers. Firstly, it emphasises the criticalness of adoption of S-SCM practices and encourages the supply chain managers to create a culture of S-SCM practices and Dynamic capabilities within the organization in order to sustain and grow over long time. Secondly, it provides blueprint to the

managers to assess the company's current standing on S-SCM practices and dynamic capabilities. They can understand the grey areas of the company and can work on improving and adopting the S-SCM practices which are less developed. It encourages the management to devise more efficient ways to utilize the resources, knowledge absorption, understand market dynamics and restructure the internal configurations to adjust their supply chain dynamics to the changing atmosphere and emerge a winner.

Thus these determinants can serve as tool to audit the current implementation level and later can serve like, tool to benchmark and evaluate the performance of the managers in terms of S-SCM initiatives.

XIII. LIMITATIONS AND FUTURE SCOPE OF RESEARCH

The study though has generated consistent results with previous studies yet it has many limitations which can serve as opportunities for future researches. The study involves scale development to measure the determinants of S-SCM and dynamic capabilities. Though the study heavily draws from existing literature however there is a possibility that not all items to measure the three determinants may have been incorporated. Thus the study is a primitive attempt to develop a scale to measure S-SCM and DC determinants and can serve as a basic foundation for triggering future researches. Secondly the study has collected empirical evidences from two manufacturing sectors viz. automobiles & automotive and ii) electronics and electrical appliances, relatively these industries have more matured supply chains. Thus the study may have biased results. This can be further extended to services supply chains and can have representation of MSME's in the study. Another limitation is the sample size which is relatively small, the future studies can prefer a larger size of sample. The study focuses only on India. The future researches can study other emerging markets. A comparative study among emerging markets or emerging markets vis a vis developed market study can also further enrich the subject.

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