Missing link between sustainability collaborative strategy and supply chain performance: role of dynamic capability

Article (Accepted Version)

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Abstract

Formulation of right strategies is believed to be able to bring sustainable performance across triple bottom line (TBL), i.e., economic, environmental and social aspects within and across organizations. The purpose of this study is to investigate the role of misaligned collaboration and dynamic capabilities on TBL performance. Misaligned collaboration signifies those configurations of collaboration that deviate from ideal profile of collaboration. The ideal profile of collaboration corresponds to superior performance. Collaboration has been operationalized through joint planning and resource sharing (JPRS) and collaborative culture (CC) which brings relational aspects into collaboration. Specifically, this research provides important extensions to the theory of profile deviation and dynamic capabilities (DC) perspective in the context of sustainable supply chain performance and misaligned collaboration utilizing the empirical evidence. Uniqueness of the proposed model is established by comparing with four other alternate models. We find both JPRSmisalign (misalignment of JPRS from the ideal profile) and CCmisalign (misalignment of CC from the ideal profile) influence all dimensions of TBL through DCs. Only direct influence of CCmisalign on operational and social performance is significant. Results convey the need of building DCs when collaboration is misaligned with its ideal profile, and this misalignment produces detrimental effects on DCs and TBL performance. This research contributes significantly by building unique model to develop and maintain sustainability. Further, theoretical and managerial contributions are highlighted and contested with existing knowledge.

Keywords: Sustainability; Supply Chain Performance; Collaborative Strategy, Profile Deviation; Survey Research

1. Introduction

Recent studies on sustainable supply chain management (SSCM) effectively utilized resource based view and triple bottom line (TBL) approach to understand the sustainability performance of supply chain. If resource reconfiguration is best way to derive competitive

advantage, various configurations can lead to the same. In dynamic business environment, such situations can manifest in homogenous supply chain (SC), i.e., chains with similar performance and capabilities, which in perfect competitive market will lead to zero profit trap. Perfect competitive market has no point of differentiation amongst firms with respect to technology, skills, information, or markets. Furthermore, if only focal firm focusing on sustainable operations and other members of SC are not responsible to their stakeholders, environment, and society, it is hard to achieve SSCM benefits. To develop and maintain sustainability over time, therefore, dynamic capabilities (DCs) and relationship based collaboration between SC partners are required.

As industrial growth adversely impacts environment and natural resources, emerging economies are under pressure to invest in environment friendly operations in the short term. Basic understanding of sustainability helps to achieve better performance consistently without harming environment and people or society (Pagell and Shevchenko, 2014). This emphasizes the basic need to consider sustainability factors encompassing environment and society in all studies, rather than making sustainability research as a separate stream. The sustainability is usually operationalized through TBL, a concept developed by Elkington (1994), which simultaneously considers balancing economic, environmental and social performance. As sustainability requires development and management of interdependent relationships of SC partners, firms foster strategic collaboration for sustainable development, and thus researchers are studying collaboration as an important strategy for SSCM (Blome et al., 2014; Chen et al., 2015; Murray et al., 2010; Simpson and Power, 2005; Vachon and Klassen, 2008). Studies on sustainable collaboration often employs conceptual, empirical, and case study based research methods to examine the effect of downstream and upstream collaboration on economic and environmental performance.

One category of literature (Carter and Rogers, 2008; Closs et al., 2011; Pagell and Shevchenko, 2014) conceptualizes SSCM by proposing framework and highlighting various factors for sustainable development. Apart from highlighting TBL, this category of studies suggests its implementation requirement by alluding collaboration, culture resilience, coordination, relationships (Ahi and Searcy, 2015), capabilities to innovate and commitment, more emphasis on environment and social dimensions (Pagell and Shevchenko, 2014), need of incorporating DCs in SSCM (Chakrabarty and Wang, 2012; Liboni et al., 2017). Second

category of literature focused on ecological aspects with only implicit recognition of social dimension (Carter and Rogers, 2008). Sustainable SCM literature covers TBL, but most often, its focus was on environmental issues, and socially oriented practices were rarely been studied. Even though TBL is emphasized continuously in literature, willingness to implement and carrying research on social perspective is disappointing. Especially preferring environment and social perspective over economic performance is not encouraging. Research needs to study factors facilitating both environment and social practices (Gimenez and Tachizawa, 2012; Pagell and Shevchenko, 2014) and their behaviors. Always putting profit first as prerequisite of achieving sustainability, as literature often do, is not really sustainable in long-term. On this backdrop, overlooking social dimension is serous limitation of SSCM literature, and this study truly models SSCM by studying structure incorporating all three dimensions of TBL.

Third category of literature (Rao, 2002; Vachon and Klassen, 2008; Zhu and Sarkis, 2007) finds economic implications of environment friendly practice, especially assessing suppliers and collaborating with them. They find improvement in economic performance if suppliers are involved in focal firms' green practice; however, some literature (Zhu et al., 2007) found lack of positive influence of green practice on economic performance. Fourth category of literature (Dao et al., 2011; Gimenez and Tachizawa, 2012; Large and Thomsen, 2011; Ortas et al., 2014; Vachon and Klassen, 2008) recommends and studies relationship based long-term collaboration with both upstream and downstream to realize SSCM. Collaboration with suppliers, their assessment and environment monitoring provide synergy to better build environment capabilities of suppliers (Lee and Klassen, 2008) and downstream members. Most of these studies find positive influence of collaboration on environment and economic performance, but some of them do not find support for the relationship. Going beyond collaboration in SSCM, we ask how the extent of collaboration is the next most critical factors for SSCM.

The extent of implementation of collaboration varies from company to company. If collaborative practice of firms achieving higher performance is considered as benchmark, the deviation of collaboration practice from the benchmark firms may deteriorate capabilities and performance. This deviation is known as misalignment. The alignment or fit between critical strategic constructs (collaboration in our case which is very important to be competitive and

achieve TBL) posed by external environment or organization has been an important theoretical perspective (Venkatraman, 1989; Venkatraman and Prescott, 1990) in many research areas, such as strategy, marketing, retail (Hult et al., 2007; Yarbrough et al., 2011), and most recently in SSCM (Blome et al., 2014). The central proposition of the concept of fit is that aligning internal and external perspectives is prerequisite of higher (sustainable) performance. Here, it is not known if extent of collaborative practice deviates from its ideal profile, how it will impact developing DCs and TBL performance? The ideal profile is characterized by the arrangement and implementation of collaborative practices in ways that lead to highest or superior sustainable performance.

Notably, literature of SSCM mainly draws from resource based view (RBV) which suggest pulling rare, valuable and inimitable resources give competitive advantage (Barney, 1991). Today, in global business with rapid changing business environment, firms have access to same suppliers, resources and information, and different configuration of these resources (i.e., structuring and using resources in different and more efficient ways) can produce same value which in long-term cannot deliver sustainable performance or competitive advantage. In addition, risk and uncertainty (Carter and Rogers, 2008) involved in sustainable operations and development are much more than the conventional SC which further limit the power of resources in drawing competitive advantage (Harms et al., 2013). In such complex and fast-changing markets, having and accessing rare and valuable resources are necessary, but resource and information itself cannot enable firms achieving sustainability. Though know-how is difficult to obtain and apply, special know-how is needed to put things together to capture co-specialization benefits by sensing opportunities, executing plans and configuring and reconfiguring assets and systems (Teece, 2007). Many studies (Pagell and Wu, 2009; Reuter et al., 2010; Chakrabarty and Wang, 2012; Gimenez and Tachizawa, 2012; Liboni et al., 2017; Reuter et al., 2010) allude the necessity of capability building to achieve sustainability; explicitly calls for research on DCs based sustainability. However, to best of our knowledge, no study has aimed to empirically build DCs based model to achieve TBL performance.

Responding to the above research gaps and limitations of existing models, this research addresses three research questions. *Does misaligned collaboration influence DCs and TBL adversely? What effect DCs have on TBL performance? Do DCs mediate the relationship between misaligned collaboration and TBL?* To answer these research questions, we study

misalignment of collaboration from its ideal profile and its role in developing DCs and TBL performance.

This research alludes to the need for models and frameworks that incorporate limitations of resource based view, consider the complexity involved in sustainability, and DCs roles in realizing sustained TBL performance. Specifically, we examine whether misalignment between collaboration and its ideal profile has unfavorable implications for DCs, operational, environmental, and social performance. Collaboration is operationalized in two components: joint planning and resource sharing (JPRS) which helps pulling resource and information to create synergy, and collaborative culture (CC) which help evolve firm and its employees' soft power over time. We measured SCP in terms of both operational (i.e., lead time, quality, customer satisfaction) and economic parameters (i.e., profit). So, operational and economic performance is used interchangeably in this manuscript. Both components of collaboration are needed as JPRS provides and mobilize required resources on which DCs work; CC promotes learning, collective responsibility and trust over time which helps DCs to evolve over time. All three dimensions of TBL namely, economic, environment and social performance are operationalized to know if deviation of JPRS and CC from the ideal profile influences economic, environment and social performance directly or DCs mediate the relationships or both. In this way, this research develops a model suitable for developing and maintaining sustainability by organizing collaboration, DCs and TBL based performance which is built on theory of profile deviation and DCs. In this way, by incorporating DCs in developing sustainability, this research theoretically and practically contributes to the literature (Chakrabarty and Wang, 2012; Liboni et al., 2017) which calls for the need of DCs to maintain sustainability over time. Further, this research brings profile deviation perspective of collaboration and sheds light on DCs and TBL performance. Thus this research significantly contributes to the sustainability literature.

The paper is organized as follows: first, theoretical background of profile deviation, DCs, sustainability and collaboration is presented. Research model and related hypotheses are then developed. Next, research methodology is presented followed by results and analysis. Findings are then discussed in view of related literature. Finally, conclusions, contributions and limitations are highlighted.

2. Theoretical background

2.1. Sustainability and collaboration

The question is if surroundings of firms—environment and society at large—within which they operate are not healthy and stakeholders put pressure to deliver on noneconomic dimensions, how long firms can operate and be profitable? Sustainability means to remain competitive by achieving better performance consistently without harming environment and people or society at large. Sustainability initiatives have been identified with various names, such as green initiatives, corporate social responsibility (CSR), ethical, and responsible SC. Literature largely has consensus that sustainability implies balanced (or good) performance across economic, environment and societal front, which have been termed as triple bottom line (TBL), within which a business unit should operate. The TBL approach focuses on long-term perspective incorporating key stakeholders' interest and building resilient organizations (Ahi and Searcy, 2015). Stakeholders include customers, consumers, suppliers, employees, government, people and society at large.

As all supply chain partners add value to products and services, achieving sustainability by focal firm is not possible if all supply chain partners are not compliant to environment and society. Hence, collaboration among SC partners is crucial, and it is strategic as well as operation level decisions. It is one step further than cooperation and coordination, long-term based relationship (or culture) oriented partnering arrangement (Kumar et al., 2015; Vachon and Klassen, 2006). It allows supporting suppliers and customers with resources and information to achieve their environmental goal. Studies (Chen et al., 2015; Vachon and Klassen, 2006) find that collaboration has positive impact on performance; few find positive relationship to economic; other find positive relationship to environment (Chen et al., 2015; Zhu et al., 2007) and society or TBL (Blome et al., 2014; Sancha et al., 2016). Sancha et al. (2016) assert suppliers' assessment improves buyer's social performance and collaborating with them improves suppliers' social performance. Both upstream and downstream collaboration is required for better performance towards sustainability (Chen et al., 2015). However, most researches deal with collaboration with suppliers only. Majority of the studies (Vachon and Klassen, 2008) consider achieving environment performance as basis of the collaboration for sustainability. Environmental collaboration encompassing joint environmental planning activities and cooperation in finding solutions to environmental

challenges can have significant impact on manufacturing and environment performance (Vachon and Klassen, 2008). Sustainability literature has static view of its development, and focuses on initial development of environment and social practices. Literature has paid little or no attention to how to sustain TBL dimensions in long run. Researches need to fill this literature gap by understanding ways and means to sustain TBL dimensions through important capabilities over time (Liboni et al., 2017). Most of these studies incorporate only financial or economic performance as dependent variable. Only few studies explored all three dimensions of TBL. Hence, it is required to incorporate all three dimensions of TBL in supply chain collaboration literature to gain a comprehensive insights (Chen et al., n.d.). Murray et al. (2010) note that collaboration, an approach to deal with complexity, should be usefully explored further to address social responsibility and sustainability issues in order to exploit synergy and produce interaction.

Relational view extends scope of RBV to network of firms (Dyer and Singh, 1998). Relational view represents building deeper tie with firms which brings soft skills to firms and its employees. One school of thought categorizes relationships into individual and organizational traits/capabilities (Ring and Ven, 1994) as reflections of collaborative culture (Kumar and Banerjee, 2012). The culture, trust, and willingness to change are 'people issues' and are fundamental to successful collaboration (Touboulic and Walker, 2015a). Trust, an attribute of culture or relationship, improves coordination and relationships. Collaboration initiatives take advantages of shared resources, information, and culture. Culture which provides life to relationships implies an open environment promoting learning, trust, sharing knowledge, benefits and risks, social and environmental responsibility. Firms invest in relationship to create relation-specific rents instead of firm-specific rents (Lavie, 2006). We allude to alignment of collaboration to SC partners which can generate resource and relation specific rents to build capabilities and competitive advantage. Despite culture being critical to collaboration, literature has not studied empirically its importance in sustainability context.

From the above discussion, we identify three literature gaps. The literature is dominated by the explanations of collaboration for sustainability with the help of stakeholder, resource dependence, and relation based theories (Chen et al., n.d.; Touboulic and Walker, 2015b). Main idea behind collaboration is to access complementary resources of partner firms and

establish culture based relationship to build rare capabilities that can bring competitive advantage in rapidly changing market. This idea is based on RBV that explains firms' resource generation and its configurations which are rare, valuable, difficult to imitate and substitute provide competitive advantage (Dyer and Singh, 1998). However, collaboration based on RBV has serious flaws in that SC with same or different resource configurations can achieve same value which can threaten competitive advantage, in long-run. To establish harmony with dynamic market and to achieve competitive advantage in long-run (i.e., sustainable performance), collaboration must develop DCs. Literature (Liboni et al., 2017) highlights critical role of DCs in sustainability, but, to date, collaboration for sustainability literature has not explained achieving performance across TBL through collaboration and building DCs. Therefore, a model integrating DCs and TBL is desperately the need of the hour. Second, most literature studied impact of collaboration on economic, financial or environmental performance. As implementation of relation based collaboration is difficult and its implementation across different firms or SC would be different. The ideal level of collaboration corresponds to highest performance, but all firms may not be able to implement collaboration close to the ideal level, their collaboration actually deviates from ideal collaboration. This deviation is also known as misalignment. Previous literature does not answer how does imperfect or unideal collaboration impact performance across TBL and help building capabilities? Third, as culture is an integrated part of collaboration, previous literature does not attempt to capture its importance in sustainability context. Therefore, aim of this research is to address these research gaps, which are critical to achieve truly sustainable performance, by developing collaboration for sustainability model integrating DCs and theory of profile deviation. The next two subsections briefly explain theory of profile deviation and DCs.

2.2. Theory of profile deviation

The one idea of this research is to analyze the impact of misalignment of collaboration from the ideal profile on developing DCs and TBL. Firms with certain strategy work to achieve superior performance. A profile deviation approach views fit between organization and strategy in terms of the extent to which different organizational characteristics (operational functions) differ from those of a specified profile identified as ideal for implementing a particular strategy (Venkatraman, 1989; Vorhies and Morgan, 2003). The ideal profile is defined as configuration of organizational characteristics that fit the implementation

requirements of the particular strategy and thus produce high performance (Venkatraman and Prescott, 1990; Vorhies and Morgan, 2003). Empirically, it is organizational characteristics (collaborative activities in our case) of high performing firms. Alignment signifies a desirable property of organization as it has positive performance implications. On contrary, misalignment is undesirable configuration of organizational characteristics which results in negative performance implications. Fit or alignment is theoretically explicated into six different perspective: moderation, mediation, matching, covariation, gestalts and profile deviation (Venkatraman, 1989). The choice of a particular perspective of fit needs an explicit clarification for theory testing and to further advance our knowledge. It is important to identify the most suitable fit perspective for our research. Moderation, mediation and matching perspectives are not considered as these methods are concerned with alignment between two concepts (Sun et al., 2009); however, our aim is to assess misalignment of collaborative activities from the ideal profile that is practiced by few firms that results in high performance. Similarly, covariance and gestalts are not preferred as they operationalize alignment in terms of internal consistency and internal congruence without any reference to criterion (performance) variables.

Profile deviation enables us to understand if an ideal strategic profile is specified in an environment, a business unit's adherence to this profile will positively related to the performance. On the other hand, deviation from the ideal profile will result in deteriorating performance (Venkatraman, 1989; Venkatraman and Prescott, 1990). The approach of profile deviation is akin to pattern-analytic approach implying deviation from high performing firms will lead to reduced performance. To achieve improved sustainable and business performance, firms need to align its supply chain collaboration with its production capabilities (Blome et al., 2014). In this direction, to best of our knowledge, theory of profile deviation is not yet applied in collaboration based sustainability. Research on misaligned collaboration and TBL performance is not available. Implementing only collaboration with supplier or customer will not help. Aligning supply chain strategy with environmental uncertainties is more important than simply examining influence of supply chain strategy on performance (Sun et al., 2009). As our multi-dimensional constructs are related to a criterion (performance), this research thus considers profile deviation perspective to explore if degree of adherence to the externally specified profile is required, and understand how strategic deviation from the ideal profile worsen building DCs and TBL based performance.

2.3. Dynamic capabilities

The concept of DCs is rooted in the thought that markets, consumers' preference and demand and other business environments keep changing, and it is not possible to sustain in such environment with static capabilities. The DC is *the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments* (Teece et al., 1997). It addresses the shortcomings of RBV which conveys that sets of resources which are rare, valuable and difficult to imitate give competitive advantage to firms (Barney, 1991). The RBV assumes that business environment is static and stays at equilibrium over time which does not hold true in dynamic (or high-velocity) markets (Teece, 2007). Dynamic markets characterize unclear market boundaries, globalized environment, change occurs often, non-linear and unclear direction, and market players are undiscernible (Eisenhardt and Martin, 2000). Again, different configurations of resources can create the same value, exhibiting equifinality, which can further threaten the competitive advantage based on RBV. Therefore, along with having rare and valuable resource configuration, it is necessary that firms build DCs. Extent of risk, uncertainty and dynamism of business environment is even more intense with SSCM than the conventional SCM. Hence, building DCs is critical in order to achieve sustainable performance across TBL. DCs could be of three types: capacity (1) to sense and shape opportunities and threats, (2) to seize opportunities, and (3) to maintain competitiveness through enhancing, protecting and reconfiguring tangible and nontangible resources (Teece, 2007). More precisely, DCs are abilities to sense, seize and reconfigure.

Vahlne and Jonsson (2017) refers to globalization and considers organizational ambidexterity as an important component of DCs. Organizational ambidexterity signifies deployment of a balanced approach between efficient exploitation of existing capabilities and exploring new capabilities to remain competitive. This has been illustrated with Nokia as an example which become static in phone design and unable to catch the dynamism of market where as Swedish car manufacturer SAAB focused on technological advancement with little attention towards effectiveness (Vahlne and Jonsson, 2017). For sustainable growth, ambidexterity is also critical for firms aiming to achieve global success. For example, IKEA became a global firm by balancing exploration with exploitation, while AB Volvo explored globalization but has yet to improve on the effectiveness of exploitation (Vahlne and Jonsson, 2017).

Firms that use sustainability as strategy have to deal with more unpredictable changes in rapidly changing business environment. Given unpredictable and complex nature of economic, environment, and social paradigm (Pagell and Wu, 2009), the real action towards sustainability has to pass through changes and adaptations to be able to readapt dynamically over time (Liboni et al., 2017). Sustainability calls for a transition from currently unsustainable (or less sustainable) to more sustainable business practices which requires changes in corporate strategy and operations. Thus this nature of transition refers to sustainability as dynamic process (Hahn et al., 2015). Strong innovation capabilities associated with intensive R&D and the strong market-orientation capabilities associated with high level of internationalization, when combined can help firm not only develop but also maintain sustainability practices over time (Chakrabarty and Wang, 2012). Advancing sustainable solutions as per need requires interdisciplinary innovation and collaboration. Here, question is not how to achieve sustainability development but how to maintain sustainability over time. To maintain sustainable performance, firms have to take into account market dynamics, and engage into exploration and exploitation in order to make their knowledge base adaptable to the changing market condition (Schrettle et al., 2014). When firms go beyond compliance based actions, they develop capabilities to improve continuously (Chen et al., 2015) to support TBL. Despite extent sustainability literature underlining importance of DCs, little emphasis has been given in building DCs and then achieving sustainable performance. In this direction, many researchers (Beske et al., 2014; Chakrabarty and Wang, 2012; Liboni et al., 2017; Mathivathanan et al., 2017) have called for considering DCs in building and maintaining sustainability over time. Most research is based on static view of sustainability, focusing on initial development of TBL. However, to maintain it over time sustainability needs DCs. Growth of partner firms in sustainable or environmental collaboration is essentially a dynamic capability of firms that can be used to take competitive and sustainable benefits. New research has to fill this research gap by considering DCs as a crucial construct in developing and maintaining sustainable performance.

3. Conceptual model and hypotheses

Deriving insights from literature and built on theories of profile deviation and DCs, a conceptual model was developed. Figure 1 shows the conceptual model incorporating collaboration, DCs and TBL. Collaboration includes two main constructs: JPRS and CC; the TBL includes SCP, SCEP and SCSP. Collaboration uses complementary shared resources

and relationships to develop capabilities. The shared resources are captured by JPRS, and depth of relationships is modelled by CC. Both resources and relationships are required to develop and execute DCs. The DC are attributes of firms which work on resources, information (Eisenhardt and Martin, 2000), and relationships. Development and execution of DCs can be further intensified by CC which provides it trust, learning, smooth and open communication, sharing of skills and knowledge, etc. Though these soft powers of alliance and its employees develop over extended period of time, they develop, strengthen and sharpen skills of sensing, seizing and reconfiguring through learning, knowledge and skills sharing. As DCs framework is partially in the spirit of evolutionary theorizing (Teece, 2007), JPRS can help it activate and CC can both help it activate and develop over time. Finally, JPRS, CC and DCs result in sustainable development based on TBL. Thus our research model captures more realistic path of achieving sustainable development, and establishes relationships between key variables involved. Here, we capture how degree of collaborative practice influences SSCM. JPRS and CC are studied in terms of deviation from their ideal profile or how misaligned are the JPRS (JPRSmisalign) and CC (CCmisalign) from the ideal profile. The theory of profile deviation conveys that if the ideal profile gives the best performance, deviation from it will deteriorate the performance. To empirically determine the ideal profile is explained in Section 5.2 (structural model).

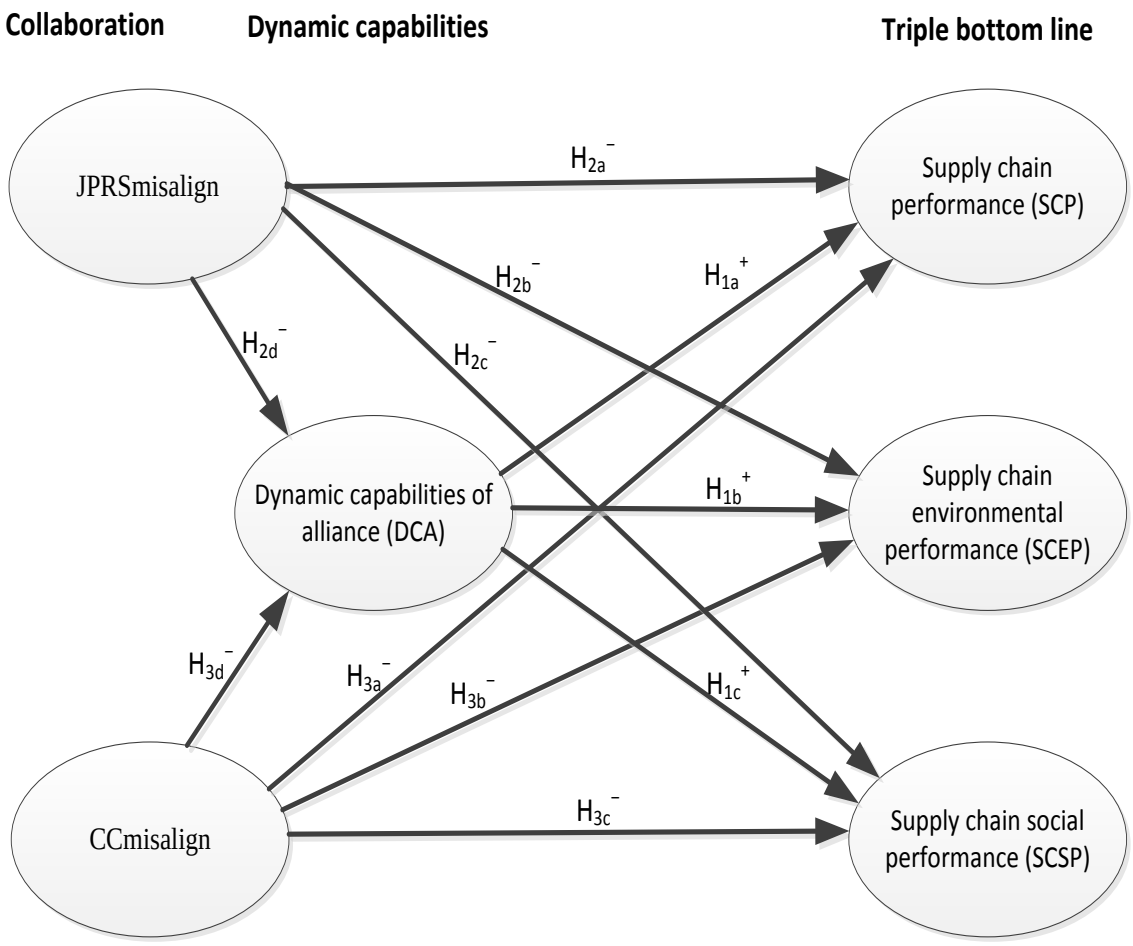

Figure 1: Research model and hypotheses

3.1. Dynamic capabilities (DCs) of alliance and performance

Sustainability practices can be achieved by implementation of routines which can be considered as DCs. Managers need to focus not only on environmental pro-activeness but they have to build cooperative capabilities to achieve environmental and competitive excellence (Chen et al., 2015). Early work (Teece et al., 1997) on DCs clearly indicates direct relationships between firms' DCs and performance. The framework of DCs explains success and failure and competitive advantage over time (Teece, 2007). The DCs is also characterized by utilization which means firms using existing resources sooner and more fortuitously than the competition achieve competitive advantage (Eisenhardt and Martin, 2000). It can minimize risks in meeting expectation of stakeholders over time through innovation, inventory minimization, learning, trust and ability to build recyclable parts and positioning resources when needed in different configuration which can enhance environment, social and economic performance. In dynamic business environment, "Codes of Conduct" and

certification for social responsibility and environmental standard become less effective (Mueller et al., 2009) where DCs can help to implement new social norms and environment standard. Research (Eisenhardt and Martin, 2000) also suggest DCs creates temporal competitive advantage through improved performance which in succession to each other can very well lead to sustained competitive advantage across all dimensions of TBL. Hence, we can postulate:

H_1: Dynamic capabilities of alliance are positively related to supply chain (a) operational performance, (b) environmental performance and (c) social performance.

3.2. Collaboration and performance

Collaboration plays an important role in enhancing competitive advantage of SC and reducing cost and uncertainty (Carter and Rogers, 2008; Kumar and Banerjee, 2014). It is a key to achieve sustainability through joint forecasting and product design and development, logistics planning, complementing resources and knowledge, improving work condition (Vachon and Klassen, 2008), innovation, developing required capabilities (Golicic and Smith, 2013), and providing services to society at large by creating synergies. Combination of evaluation and collaboration brings synergies that help suppliers build capabilities and skills to manage environmental performance (Lee and Klassen, 2008) which can further improve buyer's capabilities and performance. As per theory of DCs, the ability to build such capabilities over time is hard to replicate and capable to deal with uncertainty involved in sustainable development. Degree of collaboration significantly impacts environmental proactive performance and strengthens competitiveness of collaborative chain (Chen et al., 2015). In relationships with SC partners, shared investment in equipment, capacity, personnel, information exchange and training results in reduced cost and better alignment of suppliers' process capabilities with focal firm's (environment friendly) product requirement (Handfield and Bechtel, 2002). Hence, these common investments improve position of competitiveness and environmental outcomes. Buying firms choose to invest personnel, time and resources to increase the performance and capabilities (Gimenez and Sierra, 2013). As intensity of collaboration increases SC capabilities and performance, collaboration with low intensity should bring DCs and performance down. Hence, misalignment of JPRS from its ideal profile should adversely impact DCs and performance across TBL and we can hypothesize

H_2: Joint planning and resource sharing misalign will negatively influence supply chain (a) operational performance, (b) environmental performance, (c) social performance, and (d) dynamic capabilities of alliance.

The foundation of sustainable SC is the mindset (Pagell and Wu, 2009) and overall culture is its driver in implementing environmental and social practices. Inter-firm relationships are very important to develop tacit attributes of firms and their employees which are crucial for realizing better performance in short-term and developing capabilities in long-term. Healthy culture based relationships help firms develop additional value and capabilities over time to change its process, products or services. Through supplier relationship, waste reduction, environmental innovation, cost-effective solutions, uptake of innovation in environmental technologies can be facilitated to boost the TBL consequence of collaboration (Simpson and Power, 2005). Development and maintenance of relationships can be achieved through collaboration where trust, commitment (Handfield and Bechtel, 2002; Simpson and Power, 2005) and loyalty play critical roles. Increased trust, commitment and loyalty improve responsiveness (Handfield and Bechtel, 2002), and minimizes knowledge spillover and risk of opportunistic behavior of partners. It also helps reducing power asymmetry which can bring benefits beyond firms' compliance environmental management practices. Environmental practices can be developed as a part of close relationships in low transactional cost manner by adapting lean practices (Simpson and Power, 2005). Relational resources enhance collaboration towards an ideal collaboration profile and enable firms' sustainability production capabilities to eventually improve sustainability performance (Blome et al., 2014). In dynamic or high-velocity market, to compensate limited, existing relevant knowledge, engaging in experiential actions to learn quickly to create new knowledge about the current situation is required (Eisenhardt and Martin, 2000) and our cultural construct will be highly effective in this situation. As DCs also rely more on real-time information, cross-functional relationships and intensive communication (Eisenhardt and Martin, 2000) among partners involved in process, products and society, CC can also help them in this endeavor by removing barriers to information flow and idea exchange. Since, performance across TBL and DCs increases with increase in the degree of culture or depth of the relationships, magnitude of TBL performance and DCs should decrease if the realized culture deviates from its ideal profile. So we can hypothesize:

H_3: Collaborative culture misalignment will negatively influence supply chain (a) operational performance, (b) environmental performance, (c) social performance and (d) dynamic capabilities of alliance.

4. Methods

To analyze and validate the research model, survey method to collect data from companies was employed. Each construct was measured by multiple variables identified from literature and in discussion with experts in the operations and SCM field. Wherever was required, identified variables were adjusted to make it fit in sustainability and SC collaboration context. Variables were measured on five-point Likert scale, ranging from 'strongly disagree' (1) to 'strongly agree' (5). Constructs, their corresponding measurement variables, and quality measures (reliability and validity) of scale are shown in Table 1. The quality measures are discussed in the next (Result) section. Constructs are operationalized by employing most measurement items from previous literature, and few of them were modified/added to make it clear and suit our objective. For example, ability and willingness to help society at large is not considered in previous literature as a measurement item of SCSP, but in Indian context this item is more relevant as most firms spend on education, sanity, healthcare, etc., as part of CSR spending. As shown in Table 1, all constructs and scales are derived from the previous studies.

Table 1: Constructs, measurement items and their loading, Cronbach's alpha, AVE and composite reliability

Constructs/ observable variables	**Loading*** **	**References**
Collaborative Culture (CC) [CA: 0.919, AVE: 0.633, CR: 0.897][a]		
Openness & communication (CC1)	0.800	(Kumar et al., 2016; Zacharia et al., 2009)
Knowledge and skill sharing (CC2)	0.796	(Kumar et al., 2016)
Mutual risks and rewards (CC3)	0.750	(Kumar et al., 2016)
Joint learning (CC4)	0.780	(Kumar et al., 2016)
Trust (CC5)	0.841	(Kumar et al., 2016)
Loyalty (CC6)	0.827	(Kumar et al., 2016)
Environment awareness with social responsibility (CC7)	0.771	
Joint planning and resource sharing (JPRS) [CA: 0.893, AVE: 0.566, CR: 0.901]		
Eco-friendly product development (JPRS1)	0.767	(Wu et al., 2016; Youn et al., 2013)
Material requirement planning combined with recycled materials (JPRS2)	0.740	(Paulraj et al., 2014)
Purchasing with green supplier assessment (JPRS3)	0.817	(Carter and Jennings, 2002; Paulraj et al., 2014)
Reduce, reuse, and recycle (3R) practice (JPRS4)	0.729	(Carter and Jennings, 2002; Youn et al., 2013)
End-user's environment oriented demands (JPRS5)	0.800	(Youn et al., 2013)
Technology and machinery sharing (JPRS6)	0.702	(Kumar et al., 2016)

Constructs/ observable variables	Loading***	References
Inventory related information sharing (JPRS7)	0.705	(Kumar et al., 2016)
Supply chain environmental performance (SCEP) [CA: 0.881, AVE: 0.688, CR: 0.897]		
Waste reduction (SCEP1)	0.859	(Large and Thomsen, 2011; Paulraj et al., 2014)
Compliance with laws (SCEP2)	0.868	(Large and Thomsen, 2011)
Increased recycling (SCEP3)	0.681	(Large and Thomsen, 2011)
Overall environmental performance (SCEP4)	0.893	(Large and Thomsen, 2011)
Supply chain performance (SCP) [CA: 0.837, AVE: 0.607, CR: 0.860]		
Shorter lead time (SCP1)	0.772	(Kumar et al., 2016)
Improved quality (SCP2)	0.819	(Kumar et al., 2016)
Higher profit (SCP3)	0.700	(Mikalef and Pateli, 2017)
Enhanced reputation with customer satisfaction (SCP4)	0.822	
Supply chain social performance(SCSP) [CA: 0.893, AVE: 0.703, CR: 0.904]		
Community health and safety (SCSP1)	0.868	(Paulraj et al., 2014; Sancha et al., 2016)
Better working condition (SCSP2)	0.803	(Paulraj et al., 2014; Sancha et al., 2016)
Ability and willingness to help (donation, resource) (SCSP3)	0.859	
Always giving true information (SCSP4)	0.823	
DCs of alliance (DCs) [CA: 0.800, AVE: 0.574, CR: 0.841]		
Make recyclable parts (DC1)	0.583	(Wu et al., 2016)
Understand markets and people through effective use of technology (DC2)	0.750	(Jiao et al., 2013; Mikalef and Pateli, 2017)
Understand how business environment affects supply and demand (DC3)	0.858	(Lin and Wu, 2014; Mikalef and Pateli, 2017)
Learning ability and innovation (DC4)	0.812	(Jiao et al., 2013; Mikalef and Pateli, 2017)

*** $p<0.001$; [a]CA: Cronbach's Alpha, AVE: Average variance extracted, CR: Composite reliability

Based on measurement variables, we developed a questionnaire which was divided in three sections: first section asked demographic details of respondents; second section asked one question for each variable listed in Table 1; and third section asked respondents' comment on the survey. The email carrying survey link briefly mentioned the purpose of the survey, promise to keep data as confidential, sharing of research report with respondents and name of institutes carrying this research. To have better generalizability, email detailing survey and survey link was sent to potential respondents in industries in India. Multi-industry study was preferred as it allows broad application of findings. Focusing on specific industry limits generalizability of the study (Kumar et al., 2015; Walton et al., 1998), and studying both manufacturing and service industries reduces noise caused by industry differences (Liu et al., 2010; Marshall et al., 2015). The choice of multi-industry will enable the scholarly community to compare findings and offers a potential pathway for future studies to understand the big picture of the study (Marshall et al., 2015). This also enables us to collect additional samples for the subject which is in early stage of practice, such as collaborative sustainability.

To maximize sample size, we preferred convenient sampling, including those who were approached through direct and indirect contacts. The survey was conducted in two phases: after removing four samples with excess missing value, 119 responses in first phase and 52 in

second, totaling to 171 usable responses were left for analysis. As two sets of responses were received in two different time duration, the two sets of responses may be different (Armstrong and Overton, 1977). Using t-test, we compared the two groups using respondent's industry for randomly selected 10 variables from the study. This comparison revealed that respondents from the same industry do not differ ($p>0.05$) across the two groups. Similar approach was adapted by previous studies (Paulraj et al., 2017; Schmidt et al., 2017; Youn et al., 2013). This suggests that non-response bias is not a serious concern.

A look at demographic profile of respondents reveals our respondents were managers, consultants/analyst, director, vice president, etc. 57.9% respondents were less than and equal to 30 years old, 38% were between 30 and 50 years old, and 3.5% were above 50 years old. We received 46.6% of responses from manufacturing industry and 53.4% of them were from service industry with all firm size greater than 500 employees. 19.3% of our respondents were from automobile industry, 18.7% belong to software industry, 11.1% were from electrical/electronic/computer industry, and rest were from other industries. 57.3% of respondents collaborated with both suppliers and customers, 29.8% collaborated with only downstream or customers while rest of them collaborated either only with suppliers or service provider, manufacturer, wholesalers. As this study is a part of larger study, only relevant information is presented, here.

A test of Normal Q-Q plot depicted all data points are close to the diagonal line, conveying data is close to the normal distribution. Then, skewness and kurtosis were examined which were observed as (-1.222 to -0.503) and (-0.448 to 1.549), respectively. For univariate normal distribution, previous studies (Curran and West, 1996; Liu et al., 2016; Paulraj, 2011) suggest that value of skewness and kurtosis should be less than 2 and 7, respectively. Hence, it is obvious our variables follow approximate normal distribution, and thus maximum-likelihood estimation can be applied. To analyze the research model and establishing relationships between criterion and response constructs, covariance based structural equation modeling (SEM) was employed. This method is appropriate when multiple variables are used to measure a concept and to confirm a theory (Henseler et al., 2009). We used AMOS 22, to apply the SEM with maximum likelihood estimation to analyze the model. This method will enable us to assert our theory and findings for strong validity and robustness. The model was studied in two steps: analyzing measurement and structural model. After validating

measurement model, ideal profile for both JPRS and CC are identified and two new variables JPRSmisalign and CCmisalign (representing misalignment of JPRS and CC from its respective ideal profile) are derived, and then structural model and mediation effects are studied.

5. Analysis and results

As same scale was used for all questions, we checked common method bias (CMB) by loading all variables on the single factor. We found worst covariance-fit (RMR=0.954, NFI=80, AGFI=0.637, RMEA=121) as compared to our research model, conveying CMB is not a serious for our data (Podsakoff et al., 2003).

5.1. Measurement model

We conducted reliability test for each construct using SPSS. We found value of Cronbach's Alpha ranging from 0.800 (DCs) to 0.919 (CC) which are greater than 0.70. Composite reliability (CR) of all constructs are also greater than 0.70. Hence, it establishes reliability of theoretical constructs. Table 1 shows constructs, its items and measurement quality. This table reveals loadings, average variance extracted (AVE) and composite reliability (CR) are greater than the recommended threshold, 0.7, 0.5 and 0.8 respectively (Hair et al., 2007). However, SCEP3 and DC1 have loading 0.681 and 0.583. As per generally accepted practice, important items with loading below 0.5 should be dropped. Since loading of SCEP3 and DC1 is above 0.50 and to preserve these important items related to SCEP and DC, we preferred to keep SCEP3 and DC1 in this study. This observation indicates all indicators are significantly related to its respective construct, hence showing convergent validity.

To verify discriminant validity, we employed paired construct test which is widely used for assessing discriminant validity in SEM. According to this test, discriminant validity is tested by examining every possible pair of constructs, in which constrained model—correlation between the paired constructs was constrained to 1.0—is compared to the original unconstrained model in which correlation between constructs is freely estimated (Anderson and Gerbing, 1988). Results of this test are shown in Table 2. All Chi-square difference test for each pair of constructs (Chen and Paulraj, 2004) were found significant ($p<0.001$). In addition, using partial-least squares method, we observed loading is well above the cross-

loadings (see Appendix A2). Hence, it can be concluded that discriminant validity is not a problem. We observed correlation between constructs ranging from 0.60 to 0.72.

Table 2: Discriminant validity test

	Constrained model***	
	χ^2	*df*
DCs vs. JPRS	149.58	44
DCs vs. CC	113.86	44
DCs vs. SCEP	65.50	20
DCs vs. SCSP	54.48	20
DCs vs. SCP	61.93	20
JPRS vs. CC	183.96	77
JPRS vs. SCEP	106.18	44
JPRS vs. SCSP	123.90	44
JPRS vs. SCP	100.6	44
CC vs. SCEP	130.4	44
CC vs. SCSP	98.98	44
CC vs. SCP	117.27	44
SCEP vs. SCSP	50.45	20
SCEP vs. SCP	58.71	20
SCSP vs. SCSP	49.93	20

***p<0.001

5.2. Structural model

As our goal is to study the importance of co-alignment of collaboration to its ideal profile on the three dimensions of sustainable performance, we adopt method of profile deviation to generate ideal profile of two constructs of collaboration, JPRS and CC. Literature (Blome et al., 2014; Venkatraman, 1989) suggests two methods of finding ideal profile: theoretically or empirically. We derived ideal profile empirically, i.e., from our original dataset. To identify ideal profile, we closely followed existing literature (Hult et al., 2007; Venkatraman, 1989). Specifically, we identified 10 percent of our sample based on top performing or score of indicators of SCP, SCEP and SCSP. To achieve this, we sorted our data based on 12 indicators of performance constructs and included 10 percent (17) of our sample in calibrated group. As expected, a close look at this sorted data revealed that top performing firms represented by respondents also have corresponding high score across 14 indicators of JPRS and CC. Further, we find that after 13 samples value across 12 indicators of performance falls considerably, so instead of choosing 17 we chose only 13 firms to form final calibration sample as ideal profile of collaboration which results in highest performance. Mean scores of

all 14 indicators of JPRS and CC were calculated for this calibration group which represent ideal profile for the 14 indicators. Now it is important to compute profile deviation for each sample firm from the ideal profile. The profile deviation is computed using the following Euclidean distance formula (Blome et al., 2014; Venkatraman, 1989):

$$MISALIGN_i = \sum_{j=1}^{7} (X_{ij} - M_j)^2$$

Where X_{ij} is score of the i^{th} firm along j^{th} indicator, and M_j is mean score of ideal profile of collaboration along j^{th} indicator. As number of indicators in JPRS and CC are seven, j varies from 1 through 7. Following this method, the misalignment for JPRS and CC was computed which represents profile deviation from their ideal profile. The greater the Euclidean distance from ideal profile of collaboration, the less attention firms pay to implement JPRS and CC. The misalignment as single score for each JPRS and CC has been derived which served as single indicator construct for each misaligned practice of JPRS and CC.

We employed structural equation modelling by using AMOS 22 to further test the hypothesized relationships. As our goal is to unravel the influence and importance of profile deviation of collaboration and dynamic capabilities in achieving performance on all three dimensions of TBL, we studied four models in sequence to understand the complexities and importance of their play: (1) collaboration as antecedent of TBL, (2) DCs fully mediating relationships of collaboration to TBL, (3) DCs partially mediate the relationship of collaboration to TBL, and (4) both DCs and collaboration influencing TBL directly. As we have constructs, JPRSmisalign and CCmisalign, with single misaligned indicator for each JPRS and CC, error term of these indicators were constrained at zero to resolve identifiable problem. At the same time, to ensure that our results are stable, we tested all the four models with different error values, i.e., at 0 and 0.5, our results did not show any considerable variation in χ^2, path-coefficients, significance level, fit indices or R^2 values. Further, to improve model fit indices, correlation between error of SCSP and SCP was allowed which showed improved model fit.

Table 3: Structural equation modelling and mediation analysis

	Model 1 (without DCs)	Model 2 (DCs mediating fully)	Model 3 (Research Model: DCs mediating	Model 4 (DCs influencing directly)

			partially)	
Structural model				
H_{1a}: DCs->SCP		0.822***	0.465**	0.310***
H_{1b}: DCs->SCEP		0.835***	0.755***	0.539***
H_{1c}: DCs->SCSP		0.823***	0.616***	0.430***
H_{2a}: JPRSmisalign->SCP	−0.399***		−0.144	−0.314***
H_{2b}: JPRSmisalign->SCEP	−0.454***		−0.038	−0.285***
H_{2c}: JPRSmisalign->SCSP	−0.263***		−0.076	−0.110
H_{2d}: JPRSmisalign->DCs		-0.514***	−0.547***	
H_{3a}: CCmisalign->SCP	−0.465***		−0.266*	−0.415***
H_{3b}: CCmisalign->SCEP	−0.373***		−0.054	−0.243**
H_{3c}: CCmisalign->SCSP	−0.583***		−0.321**	−0.521***
H_{3d}: CCmisalign->DCs		-0.488***	−0.428***	
Model fit indices				
χ^2	142.74	224.80	209.59	366.61
Df	71	130	124	126
NNFI, RFI, IFI	0.908, 0.883, 0.952	0.889, 0.869, 0.950	0.897, 0.872, 0.955	0.819, 0.780, 0.873
TLI, CFI	0.937, 0.951	0.940, 0.949	0.944, 0.954	0.844, 0.872
RMSEA	0.080	0.068	0.066	0.110
PNFI	0.709	0.755	0.727	0.675
AIC	210.75	306.80	303.59	456.61
CAIC	348.88	473.37	494.53	639.42
Variance explained (R^2)				
SCEP	0.546	0.698	0.684	0.514
SCP	0.597	0.675	0.647	0.522
SCSP	0.592	0.677	0.683	0.536
DCs		0.801	0.761	

***p<0.001, **p<0.01, *p<0.05

To have uniformity across the model, we applied this constraint and correlation on all the four models. Final results are shown in Table 4. All the four models display very good model fit. Model 1 with only misaligned collaboration is comparable to Model 2 with DCs fully mediating the relationships of misaligned JPRS and CC to TBL. All links or hypotheses in both Model 1 and Model 2 are statistically significant (p<0.001). However, some links in Model 3 are insignificant (p>0.10). It is clear from Table 4 that Model 3 is better fit than Model 1 and Model 2, especially on χ^2/df, IFI, TLI, CFI and RMSEA. In addition, R^2 of

Model 3 are higher than Model 1, hence, importance of DCs in achieving sustainable performance can be underlined.

5.3. Mediation analysis

To test mediation effect, method suggested by Baron and Kenny (1986) is traditionally followed. Following criticisms (Malhotra et al., 2014) to this method, we preferred to follow James et al. (2006) as it also allows to test full as well as partial mediation model. When compared to partial mediation model (Model 3), full mediation model (Model 2) drops direct links of JPRSmisalign and CCmisalign to all performance dimensions. Fit indices of Model 3 clearly reveal Model 3 is better than Model 2. All path coefficients in Model 2 are significant ($p<0.001$), conveying support for the efficacy of full mediation by DCs. Except few direct relationships of collaboration to performance dimensions, many direct links were not found significant, suggesting full mediation for some and partial for other. Specifically, direct links of JPRSmisalign to all performances and CCmisalign to SCEP were found insignificant ($p>0.10$). This indicates that effects of JPRSmisalign on performances and CCmisalign on SCEP are fully mediated by DCs, and effects of CCmisalign on SCP and SCSP are partially mediated by DCs. To further confirm the key mediation role of DCs and Model 1, 2 and 3 are better, we connected DCs and collaboration directly to TBL in Model 4. Direct model, Model 4, in Table 4 provides fit indices significantly worse and variance of SCP, SCEP and SCSP explained is substantially lower than all of the three models, emphasizing DCs mediates the relationships between collaboration and TBL which is full mediation for JPRSmisalign and both full and partial for CCmisalign.

6. Discussion

This research examined the essence of achieving SSCP through collaborative practice. Specifically, drawing on the concept of co-alignment (Venkatraman, 1989), we analyzed two main aspects of collaboration, JPRS and CC, their deviation from ideal profile and their influence on DCs and SSCP. SSCP has been captured in the form of TBL including economic, social and environmental facets. As only RBV cannot achieve SSCP, we further introduced role of DCs to deal with fast changing business environment in sustaining performance. We analyzed four different research models to establish the superiority of our proposed and final model which conveys DCs are important and essential in achieving

sustainability and it mediates the relationships of JPRSmisalign and CCmisalign to different dimensions of sustainability.

In Model 1, as expected, we observed that in absence of DCs, non-adherence to the ideal profile of collaboration negatively influences TBL. More or deeper the practice of JPRS and CC deviates from its ideal profile to achieve sustainability, weaker would be the performance across all dimensions of sustainability. A collaboration aiming to take advantage of shared resources and culture in static way cannot achieve sustainability in long run. If collaboration is weak, task becomes further more difficult. Therefore, DCs which have direct positive effect on TBL—SCP, SCEP and SCSP—has to intervene the effect of collaboration on TBL. DCs are abilities of collaborative alliance to readjust itself to changing market atmosphere including changes in social-orientation and environmental requirement. Utilizing shared resources and healthy culture, which promotes learning, sharing knowledge, trust, commitment etc., DCs can be nurtured effectively which can draw advantage of resource, relations, and ability to change to achieve sustainable performance. Both JPRSmisalign and CCmisalign are negatively related to DCs, conveying firm's degree of misalignment of JPRS and CC from ideal profile jeopardizes the development of DCs which in turn damages the path to maintain sustainability. This finding complements literature (Dabhilkar et al., 2015; Vachon and Klassen, 2006) that greater level of collaboration can improve product and process design. Also, a misaligned collaboration would not allow fostering sustainable production (Blome et al., 2014). Misaligned collaborative activities from its ideal profile seems a strong reason that collaboration is reported (Fadeeva, 2005) frequently falling far short of expectations.

DCs and TBL

DCs are essential to sustain social performance, it plays a greater role in achieving sustainable performance across all the three dimensions of TBL performance, namely social, environmental, and economical performance. DCs influence TBL performance both directly and indirectly. It represents a core condition in achieving sustainable performance as collaboration based on RBV has limited capacity to achieve sustained performance across TBL in today's dynamic and globalized markets. With the traditional SCP, achieving social and environmental sustainability is questionable. DCs along with collaboration will enable this endeavor. To sense social requirement regarding work condition, health facilities, special technological needs of social segments, and seizing such opportunities to get sustained

competitive advantage require collaboration and DC's (Herrera, 2015; Mirvis et al., 2016). Collaboration helps in acquiring complementary resources and sharing market and supplier information. DCs will enable firms to understand pulse and inclination towards future market in terms of social, environmental, and supply chain interest by leveraging its shared resources in the best ways. Ability of an alliance to sense, learn, and respond to socially-relevant requirements will create values and improve social perception. For example, sensing technological needs of disabled, aged people, needs for health and education for economically backward community, requirement for healthy work conditions, etc., can improve firms' social performance. In order to address social-ills requires designing and developing socially-relevant products and processes and making it affordable for all communities. This further requires (social) innovation (Herrera, 2015) where DCs can serve as enabler to achieve social performance. Though, this approach also allows equifinality in the ways resources can be leveraged, market demand can be met, and stakeholders can be satisfied, DCs build on shared resources and culture bring more flexibility and capability to the alliance to sense market quickly, reconfigure resources, readjust itself, and to adapt (Beske et al., 2014; Teece, 2007; Teece et al., 1997) to the changing market, social and environmental need that can sustain competitive advantage.

DCs are also essential to sustain environmental performance. Innovation, which is an important aspect of DCs, is required to build eco-capability and to improve SCEP. DCs improve firms' environmental performance by identifying natural environment's requirement and reconfiguring its operations to adapt to the changing market's need. Natural environment's requirement may include systems to reduce pollution, renewable energy technologies, waste management equipment, recycling technologies, information technology, etc. Eco-innovation can help developing eco-friendly products and processes and make it affordable for consumers. In today's uncertain market, DCs help in identifying or predicting risks, uncertainties, opportunities, and returns on investment (Wu et al., 2016). The DCs need to be based on learning, intelligence, and data-driven. Top and operations level management can sense environmental opportunities and changing environmental laws, and can extend their understanding of laws and regulations in industries to seize upon changing trends (Wu et al., 2016).

Traditionally, DCs are used to achieve SCP. DCs help in understanding relative position and ability of competitors, changing market requirements, and deploying cost-effective solutions

to optimize profits, cost, lead time, quality, mode of delivery, inventory control, market specific solutions, required technologies to satisfy customers at right time. The DCs need to be built on shared resources and relational capabilities which can promote learning, trust, and problem solving instinct between supply chain partners. DCs based innovation is required to develop new products and processes with competitive price and quality. Supplier integrative capability which is also a part of DCs, enables buyer to sense changes in supply environment, to seize opportunities, and transform existing processes. This capability helps achieving market and financial performance (Vanpoucke et al., 2014).

Collaboration and TBL

Collaboration is operationalized by JPRSmisalign and CCmisalign. JPRSmisalign represents planning together and sharing resources, and CCmisalign represents relation based culture. Notably, only few direct effects of JPRSmisalign and CCmisalign on performances are significant, most direct effects were found insignificant. JPRSmisalign does not appear influencing any performance aspect of sustainability directly while CCmisalign does not impact SCEP directly. Though, direct influence of CCmisalign on SCP and SCSP is negative and significant. JPRS brings advantages through planning eco-friendly products and processes and sharing of information and resources. If these resources and information are not utilized towards firm's sustainability goal, it is hard to imagine that merely sharing resources will add value through enhanced performance of TBL. So, there must be a mechanism which can churn and utilize these resources aligned with sustainability goal, then, only JPRS would add value directly to the performances. This finding corroborates Blome et al. (2014) who find misaligned demand and supply side collaboration does not impact performance directly, rather it impacts through sustainable production. As we find JPRSmisalign influences SCP, SCEP and SCSP through DCs, this finding complements Blome et al. (2014)'s findings in that misaligned JPRS needs DCs which can utilize and reconfigure shared resources and information towards sustainability. Another plausible and considerable reason could be that until level of collaboration crosses a minimum level, value of JPRS does not translate into expected performances or competitive advantages. The rationale of a minimum level is also aligned with literature (Zhu et al., 2007) that find minimum threshold of environment performance and enough time elapsed are required to realize its impact on economic performance. Deeds and Rothaermel (2003) suggest collaboration may be related in U-shaped curve with performance where performance first declines and then it increases as collaboration ages. Further, when some researchers question

that if anything can be sustainable, our model seems sound which brings ability to cope with today's dynamic and uncertain environment which can be expected as more sustainable and robust. On contrary, a static production arrangement (Blome et al., 2014) which may be environment friendly cannot be sustainable if it can't adjust to stakeholders, social expectation or suddenly changed environment policy by government.

Emerging economies and TBL

As emerging economies are stragglers in innovations, technologies, and other resources, to compete in global and changing markets, collaboration and DCs are relatively more important not only for India but also for other emerging economies. So, collaboration and resource reconfiguration is critical for emerging economies as India and other developing economies have begun to pay attention to achieve TBL performance (Jayaram and Avittathur, 2015; Zhu and Sarkis, 2007). China may be an exception where availability of technologies and other business resources are notable. Firms' focus is more in achieving SCSP and SCP as implementation of JPRSmisalign through DCs and CCmisalign directly as well as through DCs is effective for these two dimensions of SSCP. However, SCEP appears less concerned dimension. This is also possible when resources and work culture are not directed towards environmental performance. Indian firms consider reverse logistics, recycling, and improving suppliers' environmental performance as immaterial (Nishant et al., 2016). This is also in line with other studies (Kansal and Singh, 2012) that finds environment and emission are less concerned areas while community development and human elements attract investment from firms. Lack of awareness and uncertainty in deriving economic benefits from environmental investment are possible causes of less attention towards environmental performance. Emerging economies, such as India (Katiyar et al., 2018), Malaysia (Alazzani et al., 2017), etc. are more social and humane oriented where firms are more inclined to invest in community, health, education, food, water, sanitation, etc. Their focus is mainly compliance based and immediate operations, rather than incorporating sustainability at strategic level (Rana and Majmudar, 2016). Therefore, India, which is to be fastest growing economy (Mishra, 2018) need to focus on achieving SCEP along with SCSP and SCP. Because of aforementioned attributes of emerging economies, we believe this is true for other emerging economies as well.

6.1 Managerial implications

Our findings offer valuable guidance to management practitioners. A misaligned CC from the ideal profile still makes a negative and direct impact on economic and social performance, as expected. As CC promotes social responsibility and environment awareness, knowledge flow, learning, trust, loyalty, risks and reward sharing, it facilitates smooth execution of commitment to goals and coordinated flow of goods from upstream to downstream which results in better SCP. A healthy culture through human interaction in open environment brings sense of belongingness, shared life and social responsibility, thereby enhancing SCSP. Importance of culture can be underlined that even if it is weak or deviates from the ideal profile, it impacts both economic and social dimensions of practicing firms. As it has been acknowledged that implementation and realization of true culture in collaborative arrangement is difficult, our findings convey to managers that its implementation even up to a certain degree will be beneficial for SCP and SCSP. Since, it impacts SCSP directly, it can further enhance SCP which can result in compounded positive effect on SCP. CCmisalign further negatively develops DCs which in turn enhance every aspect of sustainable performance positively. It means farther the CC from the ideal profile, lesser it contributes in developing DCs, hence, our findings encourage managers to build a deeper culture in order to have stronger DCs. As building capabilities is crucial for sustainability, CC becomes even more important. It conveys that CC as a crucial element of collaboration is critical for achieving sustainability.

As compared to JPRSmisalign, CCmisalign seems more effective in contributing to sustainability as it contributes in realizing DCs, SCP and SCSP directly. One plausible reason is JPRSmisalign becomes more effective when significant amount of resources and information is shared between supply chain partners. Another reason could be that collaboration based on shared resources takes time before yielding impressive results. This is also in line previous studies (Deeds and Rothaermel, 2003) that collaboration may follow U-shaped curve in realizing improved performance. It is hard to take advantage from shared resources if amount of resources is not significant, complementary, and shared for a long-term. If JPRSmisalign is far from ideal profile, it fails to create value directly for sustainability; however, it adds value through DCs. On the contrary, if CCmisalign is weak, i.e., it is far from the ideal profile, except SCEP, it adds value to DCs, SCP and SCSP directly. As our findings highlight the importance of DCs for all the three dimensions of sustainability, there is a need to carry integrated innovation for society, environment, and

traditional supply chain. So, managers should incorporate both market- and non-market factors in its strategy as well as in operations. Non-market factors should also contribute to strategic assessment, environment- (Herrera, 2015) and social- sensing mechanisms that are parts of strategy implementation. These findings convey to managers that firms must invest in building CC and DCs while investment in JPRS needs to be significant and practiced for a long time.

6.2 Theoretical contributions

Integrating theory of profile deviation and DCs, this research contributes to developing and maintaining all three dimensions of sustainable supply chain performance namely, SCP, SCEP and SCSP through collaboration and DCs by utilizing the empirical evidence. Therefore, it contributes to sustainability literature (Beske et al., 2014; Blome et al., 2014; Gimenez and Tachizawa, 2012; Reuter et al., 2010; Teece, 2007) in different ways. Our specific theoretical implications for research are as follows.

First, this study explains development and maintenance of TBL based performance through DCs and collaboration. This approach addresses limitation of existing sustainability frameworks which are static in nature and do not highlight how to maintain sustainable performance, hence this becomes a contribution to the sustainability literature (Chakrabarty and Wang, 2012; Gimenez and Tachizawa, 2012; Liboni et al., 2017). Prior SSCM literature overlooked the social performance of TBL (Gimenez and Tachizava, 2012; Pagell and Shevchenko, 2014). This study truly models the SSCM performance by considering all the three dimensions (SCP, SCEP and SCSP) of TBL separately.

Second, as collaboration is a shared resource based and relationship oriented partnerships (Kumar et al., 2015), we operationalized collaboration in two main aspects: JPRS which is responsible to pull resources and CC which facilitates learning, knowledge and skill flow and promotion of collective responsibility to society and environment. Particularly, we captured the notion that JPRS activates DCs and CC helps it evolve over time (Teece, 2007). Following Murray et al. (2010), we have further explored the relational aspects of collaboration to effectively address the social responsibility and sustainability issues. So RBV and relational view together explain DCs well. In this direction, to the best of our knowledge, we are the first to apply theory of profile deviation to collaborative culture in realizing SSCP.

Third, as most firms' degree of collaboration is usually not high, this study captures collaboration, operationalized by JPRS and CC, when their implementation deviates from the ideal profile. All the three components of TBL based SSCM performance (SCP, SCEP, and SCSP) are operationalized to know if deviation of JPRS and CC from the ideal profile directly influence SSCM performance or DCs mediate the relationships or both. This perspective of profile deviation gives us insights that if collaboration is just implemented and its level is not high, how it impacts DCs and TBL based sustainable performance (Chakrabarty and Wang, 2012; Liboni et al. 2017). Till date no study has captured the interplay perspective of profile deviation of collaboration, DCs, and TBL. In this way, this study significantly contributes to the sustainability literature.

Fourth, as emerging economies are playing a significant role in production and distribution of affordable consumer goods globally (Katiyar et al., 2018), it is critical for these economies to operate within the premises of sustainability. This study contributes to the emerging economies literature where lack of sustainability studies persist (Jayaram and Avittathur, 2015; Kansal and Singh, 2012; Liboni et al., 2017, 2017; Mathivathanan et al., 2017). Specifically, in fast emerging economy, we identified TBL practices, its development and maintenance through collaboration and DCs. Implementing the collaboration only with the supplier or customer may not help. For emerging economies, several practical implications are highlighted in relation to the understanding of how strategic deviation from the ideal profile worsen building DCs and TBL based SSCP.

7. Conclusions and future scopes

The aim of this research was to analyze the impact of misalignment of collaboration from the ideal profile and DCs on the three dimensions of sustainability (i.e., TBL). Ideal profile was derived empirically, and research model was tested using SEM approach by data collected from companies from various industries. Considering past research and theories, four competing models were analyzed to establish final research model. The final model is most effective for realizing sustainable performance, i.e., performance across TBL dimensions. Our findings convey that firms need to develop resource and relationship based DCs to get benefits from supply chain collaboration to realize sustainable performance. Two crucial dimensions of collaboration have been captured: JPRS and CC. If JPRS deviates from the

ideal profile, DCs are critical to develop sustainable performance. However, even a weak CC contributes in developing SCP and SCSP directly as well as through dynamic capabilities. JPRS along with DCs is required for all three dimensions (SCP, SCEP and SCSP) of sustainable performance. However, CC along with DCs is must for SCEP.

By highlighting the importance of DCs, RBV and relation oriented arrangement this study opens a new avenue for future research. Categorizing DCs into sensing, seizing, and reconfiguring and studying their roles in sustainability separately can impart deeper insights. It would be useful to unearth the effectiveness of collaboration and DCs when a focal firm collaborates with upstream, downstream and both side of the supply chain. As DCs have multiple dimensions, it remains to be seen which aspects of DCs are important for a certain dimension of TBL performance. This will help formulating important collaborative strategies to achieve sustainable performance. Following the line of Pagell and Shevchenko (2014), it would be important to determine the tradeoff among TBL dimensions, and putting a pause on profit-first instinct, which mainly drives the sustainability research. Insights on how firms invest in noneconomic outcomes (for example, SCEP and SCSP) when challenged by economic outcomes will be helpful. Whenever literature discusses about social outcomes they mainly focus on employees' welfare, safety and human rights, this research emphasizes that apart from employees' welfare, firms should focus on society at large, though some may argue against it that this is not the core responsibility of firm. Firms are driven by profit earning. In long-term, focus on society at large will deliver extraordinary value in terms of social rapport, trust and loyalty. All these instincts will help pointing out/leading the change which will make supply chain truly sustainable, rather focusing only backwards at what SC managers have already know: how to make SC less unsustainable.

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Appendix A

Table A1: Non-response bias t-test results

Automotive										
Variable	JPRS1	JPRS3	JPRS6	CC3	SCEP2	SCEP3	DC1	DC2	SCSP3	SCP3
p-value	0.240	0.266	0.330	0.628	0.182	0.245	0.533	0.086	0.328	0.056
Electrical/Electronics/Computer										
Variable	JPRS1	JPRS3	JPRS6	CC3	SCEP2	SCEP3	DC1	DC2	SCSP3	SCP3
p-value	0.236	0.113	0.855	0.091	0.079	0.556	0.411	0.190	0.421	0.071
Software										
Variable	JPRS1	JPRS3	JPRS6	CC3	SCEP2	SCEP3	DC1	DC2	SCSP3	SCP3
p-value	0.325	0.055	0.212	0.162	0.194	0.326	0.460	0.232	0.476	0.138
Others										
Variable	JPRS1	JPRS3	JPRS6	CC3	SCEP2	SCEP3	DC1	DC2	SCSP3	SCP3
p-value	0.250	0.163	0.384	0.238	0.164	0.452	0.347	0.169	0.517	0.329

Table A2: Loading and cross loadings of each measurement item

	CC	**DCs**	**JPRS**	**SCEP**	**SCP**	**SCSP**
Capability_1	0.292	**0.600**	0.487	0.479	0.301	0.263
Capability_2	0.558	**0.828**	0.581	0.515	0.489	0.504
Capability_3	0.693	**0.872**	0.677	0.623	0.569	0.613
Capability_4	0.590	**0.894**	0.703	0.566	0.551	0.603
Collaboration_1	0.490	0.650	**0.768**	0.576	0.529	0.541
Collaboration_2	0.397	0.600	**0.745**	0.542	0.435	0.372
Collaboration_3	0.395	0.617	**0.837**	0.566	0.504	0.431
Collaboration_4	0.509	0.616	**0.743**	0.540	0.503	0.544
Collaboration_5	0.467	0.615	**0.821**	0.538	0.562	0.574
Collaboration_6	0.509	0.630	**0.778**	0.450	0.514	0.488
Collaboration_7	0.515	0.515	**0.767**	0.466	0.576	0.524

Culture_1	**0.825**	0.601	0.543	0.489	0.509	0.620
Culture_2	**0.821**	0.540	0.476	0.517	0.538	0.590
Culture_3	**0.798**	0.564	0.437	0.476	0.445	0.501
Culture_4	**0.809**	0.502	0.458	0.455	0.517	0.608
Culture_5	**0.857**	0.610	0.500	0.457	0.545	0.602
Culture_6	**0.839**	0.534	0.459	0.522	0.573	0.646
Culture_7	**0.790**	0.631	0.566	0.581	0.589	0.623
SCEP_1	0.502	0.613	0.582	**0.901**	0.510	0.533
SCEP_2	0.670	0.636	0.565	**0.884**	0.602	0.666
SCEP_3	0.285	0.435	0.558	**0.742**	0.404	0.388
SCEP_4	0.587	0.654	0.622	**0.900**	0.647	0.633
SCP_1	0.473	0.482	0.584	0.573	**0.816**	0.582
SCP_2	0.577	0.607	0.584	0.561	**0.857**	0.663
SCP_3	0.458	0.392	0.424	0.481	**0.756**	0.499
SCP_4	0.606	0.518	0.568	0.480	**0.844**	0.739
SCSP_1	0.664	0.597	0.566	0.618	0.686	**0.887**
SCSP_2	0.613	0.548	0.476	0.522	0.601	**0.853**
SCSP_3	0.632	0.536	0.593	0.610	0.706	**0.882**
SCSP_4	0.639	0.573	0.586	0.536	0.671	**0.860**