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The Underlying Mediation Of Inter-Firm Green Supply Chain Practices In A Relationship Between Supply Chain Integration And The Firm's Triple Bottom Line Of Sustainability. A Case Of Manufacturing Smes Of Pakistan

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Abstract

Purpose – This paper intends to analyse both the direct and indirect impact of an organisation's supply chain integration practices (SCI) on its overall sustainable performance through the mediation of external green supply chain practices (EGSCM). Corporate sustainability, especially across supply chains of firms operating in the manufacturing sectors of third world emerging countries, is an under-investigated research area that begs for an in-depth exploration. For this purpose, the current study aims to explore various dimensions of SCI, GSCM, and firm's sustainable performance, coupled with providing strong theoretical and empirical validations of the interrelationships within manufacturing SMEs of Pakistan.

Design/Methodology/Approach – A holistic conceptual framework was developed, highlighting the linkages of all the dimensions of SCI i.e., internal integration, supplier integration and customer integration with all the pillars of firm's sustainable performance i.e., environmental, economic and social performance, mediated by EGSCM practices. To validate this framework empirically, data were collected through self-administered questionnaires, while surveying 263 SMEs, operating within the manufacturing sector of Pakistan. The number of participants of this study was 405, thus constituting its sample size. A rigorous data analysis was conducted, using sophisticated statistical packages i.e., SPSS V.26 and AMOS V.23. To test our hypothesized linkages we employed, specialized techniques, such as, SEM, for credible results. To test our mediation hypotheses, we employed Preacher and Hayes technique, along with bootstrapping mechanism.

Findings – Findings revealed that SCI practices, with all its sub-dimensions has a strong positive influence in enhancing each pillar of a firm's sustainable performance, surrounding the triple bottom line concept, while EGSCM practices partially mediate this linkage. Hence, our proposed framework holds perfectly well, as all our proposed direct and indirect hypotheses were statistically significant, and therefore accepted.

Originality/Value – In a resource-constrained, environmentally, economically and socially challenged country, this study is of paramount importance, with multi-tiered benefits towards policy makers, practitioners and academicians. By covering, the entire TBL of corporate sustainability and justifying its interrelationships with other multi-dimensional constructs i.e. SCI and GSCM, this study adds tremendously to the prevalent sustainability literature within supply chains. Furthermore, a comprehensive framework backed up by hybrid theoretical foundations, coupled with advanced statistical tests provide this study with unique depths of academic and analytical rigor.

Keywords – Supply chain integration, triple bottom line, EGSCM, corporate sustainability.

1. Introduction

While keeping in view the raising environmental and social issues with an alarmingly detrimental impact on the conservation and stability of our ecosystem, various direct and indirect stakeholder groups are constantly pressurizing manufacturing firms around the globe for the last twenty years to go green and transform into socially viable enterprises (Allaoui et al., 2019; Jabbour et al., 2020). These pressure groups, mainly including regulatory authorities, suppliers and customers continuously urge the firms to take into serious consideration the social and environmental dimensions, alongside pursuing economic gains within their business practices (Mardani et al., 2020). As a result, the underlying significance of corporate sustainability has gained a persistent impetus over the years for firms competing vigorously in today's volatile and globalised business arena (Chams & García-Blandón, 2019; Lubin & Esty, 2010).

This steady growth in sustainability agenda falling within the realm of operations management, has led firms to rethink their supply chain management practices (SCM), given its integral role in the firms' competitiveness in today's fierce business environment and its direct influence on ecological stability and social well-being (Bratić, 2011; Nugraha & Hakimah, 2019). As a result, SCM, as a field has evolved tremendously, witnessing massive developments in both its scope and scale, giving rise to more complex and multi-disciplinary concepts. For instance, sustainable supply chain management practices (SSCM) and green supply chain practices (GSCM), to name only a few (Brandenburg et al., 2014; Green et al., 2012; Tseng et al., 2019; Tseng et al., 2015). Such a uniform transformation of a firm's traditional supply chain concerned about addressing operational and economic issues primarily, towards adopting a more intricate, robust and post-industrial approach can be credited towards the changing patterns, in terms of market demands and competitive landscape, emerged from various internal and external drivers (Gold & Schleper, 2017; Khan et al., 2021).

Besides the external pressures imposed on a firm, there are various internal drivers, including a firm's commitment to undertake sustainability initiatives within its operations, aimed for achieving minimum material usage through recycling and reuse, and thus minimizing the overall production cost, while achieving higher efficiency levels (Kirchherr et al., 2018; Moktadir et al., 2018). Similarly, competing in such a turbulent environment with potential competitors and highly aware customers in terms of their demands, a firm's global and local reputation in the business arena is paramount for its long-term success. One way of doing this is to persistently enhance its overall repute by fulfilling the demands for environmentally friendly products of both the local and international customers (Kamble et al., 2020; Mousa & Othman, 2020).

Hence, these triggers, including a firm's internal financial drivers with an anticipated streak of additional responsibilities, coupled with the amplified pressures from direct and indirect stakeholders add to the on-going sustainability agenda. Resultantly, pushing firms to translate environmental and social initiatives within and across their supply chains (Fatorachian & Kazemi, 2018; Yadav et al., 2020). However, translating these initiatives into a firm's supply chain, which is beyond its internal operations is a crucial task, garnering tremendous attention of supply chain researchers, while examining its linkage with enhancing the firm's overall sustainable performance (Beske & Seuring, 2014; Winter & Knemeyer, 2013).

Undoubtedly, majority of manufacturing firms around the world are now highly obliged to undertake responsible and economically viable production activities, while meeting environmental and social demands of various stakeholders (Hussain et al., 2018; Zaid et al., 2018). For this purpose, these firms are striving continuously for achieving the right balance between the three pillars of its overall sustainable performance, which is also referred to as the triple bottom line of corporate sustainability (Elkington, 1997; Freudenreich et al., 2020). However, implementing a highly effective environmental management system across the whole supply chain by achieving a perfect equilibrium between a firm's economic, environmental and social performance, while taking into account multiple stakeholders including pressures faced by governmental bodies in many cases is considered crucial and highly controversial (Haffar & Searcy, 2017; Yusliza et al., 2020).

Drawing upon the definition provided by Lambert and Cooper (2000), and Mentzer et al. (2001), a firm's supply chain is a logistical channel integrating central business processes starting from suppliers to consumers, aimed for offering products or services including information that is of considerable value to various stakeholders, thereby highlighting the significance of partners-integration (Mora-Monge et al., 2019). As a result, understanding the growing importance of strategic collaboration between various supply chain actors with an environmental orientation, aimed for achieving growth in firm's sustainable performance within and across its supply chain has become a highly interesting research area for conducting further in-depth investigations (Kiron et al., 2015). Given the multi-faceted and complex nature of global corporate sustainability, supply chain integration (SCI), centred on external and internal strategic collaboration with all supply chain partners might play a critical role in enhancing firm's overall sustainable performance (Flynn et al., 2010; Kang et al., 2018; Wang et al., 2016).

Despite the prolific research conducted on the topic of sustainability within several disciplines including SCM, a notable dearth can still be seen within the extant literature. Thereby, highlighting the lack of understanding of various manufacturers trying to achieve the desired sustainability performance by collaborating with all its supply chain members (Kang et al., 2018). As a result, it is still unclear how the adoption of SCI practices coupled with an environmental orientation i.e. GSCM practices leads to an improved sustainable performance of the firm, surrounding the whole TBL (Abbasi, 2017; Geng et al., 2017; Touboulic & Walker, 2015). Very few studies in the prevalent literature have highlighted an indirect positive influence of SCI practices on firm's enhanced sustainability (Gelhard & Von Delft, 2016; Paulraj, 2011). Some of these studies also suggest that implementation of SCI does not necessarily leads towards improved firm's performance, as it is a complicated and multidimensional process with several other factors interplaying, such as, industrial nature and competitive priorities of the firm within the network (Wiengarten et al., 2019).

Similarly, a lack of consensus can also be seen regarding the association between GSCM practices and firms' sustainable performance. Some researchers have demonstrated a strong positive linkage between GSCM and TBL of firm's sustainability, while others have highlighted negative or no association between the two (Abdul-Rashid et al., 2017; Chin et al., 2015). Furthermore, while investigating the linkage between GSCM practices and firm's TBL of sustainability, several studies have emphasized mainly on the environmental or economic aspect, leaving the social aspect behind (Das, 2018; Geng et al., 2017). Similarly, some of the studies have failed to address the necessary antecedents leading towards the implementation of GSCM practices, which in turn enhance the overall firm's sustainable performance (Guerci et al., 2016).

Therefore, in an attempt to address the lack of consensus, inconclusive findings and mixed views of various studies, this study aims to present a more balanced investigation in a cross-functional manner, thereby fulfilling potential gaps within the existing literature. In doing so, it tends to put forward a comprehensive framework representing the direct and indirect linkages between SCI and firm's TBL of sustainability, through the mediation of inter-firm GSCM practices, thereby providing answers to the following questions central to this investigation.

RQ1. How do the three dimensions of SCI influence all the pillars of a firm's sustainable performance?

RQ4. Is there any mediation role played by the inter-firm GSCM practices in the linkage between SCI and firm's sustainable performance?

Hence, this research is of considerable significance to both academia and industry. As it adds to the field of sustainability, within the context of SCM by offering novel viewpoints from which to examine the crucial role of SCI in the implementation of sustainable supply chain practices, which in turn enhances firm's overall sustainable performance. It also provides practical insights to the manufacturing firms and policy makers, aiming to achieve the desired sustainability goals by implementing practices like SCI and GSCM effectively.

2. Theoretical foundation and hypotheses development

Having discussed the background of our central research phenomenon, this study now moves forward towards discussing our central research constructs, in order to develop study's hypotheses to be investigated further. We analysed the pertinent literature about SCI, GSCM practices and firm's sustainable performance thoroughly for establishing strong theoretical foundations, justifying the linkages between all the constructs and sub-constructs employed in this study. The constructs along with their interrelationships are discussed in the following sections.

2.1 Supply Chain Integration

Integration across a firm's supply chain going beyond its internal operations, with various other players operating within the network is a crucial issue receiving tremendous attention of supply chain researchers and practitioners (Lii & Kuo, 2016; Qi et al., 2017). Numerous advantages associated with these integration practices, such as, cost minimization, value maximization and establishment of competitive superiority make SCI a critical concept to be defined in terms of both its scope and its scale (Alfalla-Luque et al., 2013; Huo et al., 2014). From a theoretical viewpoint, SCI as a concept is defined by different researchers from different perspectives, for instance, in terms of the breadth of integration (Flynn et al., 2010; Wong et al., 2011) or depth (Leuschner et al., 2013; Wiengarten & Longoni, 2015). The breath indicates the nature of integration, whether external or internal (Ataseven & Nair, 2017; Turkulainen & Ketokivi, 2012), while depth highlights the emphasis of integration, which includes collaboration for information, operational collaboration, and integration for developing new products (Liu et al., 2016; Wiengarten et al., 2019).

According to the definition provided by Flynn et al. (2010), firm's SCI refers to;

"The degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organization processes. The goal is to achieve the effectives and efficient flows of products and services, information, money and decision, to provide maximum value to the customer at low cost and high speed" (Flynn et al., 2010, p. 59).

Drawing upon this definition, there are three dimensions of SCI, namely internal integration, upstream supplier integration and downstream customer integration (Flynn et al., 2010; Kang et al., 2018). Keeping in view the wide acceptance of these dimensions within the prevalent SCM literature (Wong et al., 2011; Zhao et al., 2013), the current study adopts this definition for further examination of SCI construct.

Internal integration refers to intra-firm collaborative practices across various functional areas within a firm (Ramirez et al., 2020). Such a cross-functional integration mechanism allows firms to share information and data systems, including joint decision making, in order to facilitate alignment and responsiveness of functional organisational goals (Williams et al., 2013), which ultimately leads towards enhanced operational performance (Lotfi et al., 2013), competitiveness (Antonio et al., 2009), and overall organisational performance (Huo et al., 2013; Swink et al., 2007). According to Flynn et al. (2010), internal integration can be defined as;

"The degree to which manufacturer structures its own organizational strategies, practices and processes into collaborative, synchronized processes, in order to fulfil its customers' requirements and efficiently interact with its suppliers" (Flynn et al., 2010, p. 59).

On the other hand, inter-firm or external integration, which further includes upstream integration and downstream integration refers to a firm's collaborative practices with other supply chain partners operating within the network i.e. customers and suppliers (Cao et al., 2015; Qi et al., 2017). It can be defined as;

"The degree to which a manufacturer joins with its external partners to structure inter-organizational strategies, practices and processes into collaborative, synchronized processes" (Zhao et al., 2013, p. 77).

Based on this definition, inter-firm or external integration primarily includes activities, such as, information flows, joint decision-making approaches, and system coupling, while working closely with key customers and suppliers (Huo et al., 2014; Yang et al., 2015).

2.2 External Green Supply Chain Practices

Green supply chain management is a versatile and inter-disciplinary concept allowing firms to introduce environmentally oriented activities across its entire supply chain (Eltayeb et al., 2011). Given its inclusive nature, several scholars have provided myriad conceptualizations of GSCM, by identifying various dimensions, for instance Srivastava (2007, p. 169) defines GSCM as;

"Integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing process, delivery of the final product to the consumers as well as end of life management of the product after its useful life."

Drawing upon this definition, GSCM is a multi-faceted and specialized procedure, which concentrates on the environmental dimension of every supply chain activity of a firm, and considers multiple partners rather than relying solely on an individual firm (Srivastava, 2007). The growing emergence of GSCM both in literature and in business operations can be attributed towards the detrimental influence of production on overall natural environment, as well as increasing awareness of various stakeholders regarding the growing environmental concerns, for instance, pollution, rapid resource depletion, emission of poisonous gases etc. (Walker & Devine-Wright, 2008). Therefore, implementation of GSCM practices is an effective environmental strategy providing basis for an enhanced environmental performance, alongside improving various other sustainability performance outcomes (Younis et al., 2016).

Due to the increasing attention paid to both the intra and inter-firm integration within and across a firm's supply chain, by incorporating multiple stakeholders operating within the network, the boundaries of a firm's environmental management practices have also been widened (Krause et al., 2009). As a result, green responsibilities also include activities that are external to the firm, thereby overcoming its usual limitations. In other words, a firm's GSCM practices could be directed both intrinsically or extrinsically (Gimenez & Tachizawa, 2012). However, the current study focuses primarily on inter-firm external GSCM practices being adopted for the implementation of eco-friendly values across a firm's supply chain, while including other supply chain partners, such as, customers and suppliers (Srivastava, 2007).

According to Bon et al. (2018, p. 236), external or inter-firm GSCM practices can be defined as,

"The environmental management practices, which need partial cooperation and transactions with suppliers and customers in terms of their environmental cooperation (EC), green purchasing (GP), and reverse logistics (RL)."

Several other conceptualizations of EGSCM practices also exist within the prevalent supply chain and sustainability literature, for example previous works of De Giovanni (2012), Laari et al. (2016), Zhu et al. (2013), Srivastava (2007) etc. Besides being an impending strategy for enhancing a firm's overall competitiveness, the implementation of EGSCM practices allow every member within the network to undertake green initiatives across the downstream or upstream side of the firm's supply chain (Rao & Holt, 2005; Shi et al., 2012; Zhu et al., 2010). In view of this, EGSCM practices are further categorized into two groups i.e. EGSCM implementation, while collaborating with suppliers i.e. upstream collaboration and collaborating with customers i.e. downstream collaboration (Zaid et al., 2018). Thus, EGSCM practices allow firms to green the inbound logistics, while collaborating effectively with suppliers in material sourcing and purchase, as well as associating the firm with customers' sophisticated demands by greening the outbound logistics including distribution (Sarkis, 2012; Shi et al., 2012). Several researchers have called for an in-depth analysis, in order to comprehensively investigate the association between multiple dimensions of GSCM practices and firms triple bottom line of sustainability (Geng et al., 2017; Yu & Ramanathan, 2015). For this purpose, the current study aims to fulfil the gaps within the existing body of knowledge by illustrating the inconsistencies in the findings, still prevalent within the GSCM literature.

2.3 Firm's Sustainable Performance

As mentioned earlier, the current research adopts the triple bottom line of sustainability approach for examining the firm's overall sustainable performance. According to Svensson (2007), every component of TBL of sustainability, i.e. economic, environmental and social performance, while evaluating a firm's sustainable performance create shared value and weighs the same. However, an effective examination of sustainable performance requires simultaneous, yet individual assessment of the three pillars of sustainability, mentioned above (Zaid et al., 2018). Therefore, for an organisation to perform effectively, while competing on multiple fronts in today's environment, it should embrace and create a proper balance between all the pillars of TBL (Hussain et al., 2018).

The environmental aspect of a firm's sustainable performance mainly refers to its abilities of minimizing waste, reduction of air pollution, minimization of the use of toxic and hazardous material during production, as well as lowering down environmental accident frequencies (Zhu et al., 2008). It can be defined as;

"The outcomes of an organization's attempts to establish well-suited associations among various stakeholders who are concerned with environmental issues" (Gimenez & Ventura, 2005, p. 27).

On the other hand, the economic aspect of a firm's sustainable performance primarily deals with its financial and non-financial (marketing) performance enhancements, resulted from the implementation of eco-friendly practices, i.e. GSCM, which in turn improve the firm's standing in the overall industry (Inman et al., 2011; Zhu et al., 2005). According to Zhu and Sarkis (2007), economic performance can be defined as;

"The outcomes that include both financial as well as marketing performance outcomes. For instance, real impact of GSCM practices on firms' financial outcomes like the increase in revenue, productivity, profitability, reduced cost and increased sales."

While the social aspect is concerned about a firm's overall reputation and the social standing of its product in the eyes of various stakeholders, including customers, employees, suppliers, and community (Newman et al., 2016). Drawing upon the studies conducted by Wood (1991), social performance can be defined as;

"A business firm's configuration of fundamentals of social obligations, a system of social responsiveness, programs, policies and clear results as these are related to the social relationships of an organisation."

Therefore, firm's sustainable performance in the current study is treated as the actual output of the implementation of SCI and EGSCM practices, utilizing the entire TBL concept of sustainability. This study adds to the existing body of knowledge considerably by examining the association between SCI, EGSCM and firm's sustainable performance by providing strong theoretical underpinning, i.e., RBV (Barney, 1991), Relational View concept (Dyer & Singh, 1998) and Natural Resource Based View (Hart, 1995), along with logical evidences from the extant literature. All the linkages between the constructs and sub-constructs constituting this study's hypotheses are discussed in the following sections.

2.4 Relationship between SCI and firm's sustainable performance

According to the central idea of RBV, resources acquired by the firm should meet the criteria of rareness, non-imitability, uniqueness and value, in order to accomplish a sustained competitive advantage. This concept has widely been adopted within the extant strategic management literature to determine ways for firms to harness and control such resource bundles. These resource bundles are further classified into two categories i.e., tangible (e.g., land, equipment, raw material), and intangible resources (employees' expertise, firm's reputation, organisation's culture etc.(Karia, 2011; Mentzer et al., 2004). Both of resource categories play their unique roles, facilitating the firms to achieve competitive superiority through enhanced firm's performance (Porter, 1980). However, competitive advantage achieved with the help of tangible resources does not last, as these resources are easily acquired by the firm, as well as, readily imitated by competitors (Fahy, 2000). In addition, resources whether tangible or not are non-productive on their own and thus, cannot be evaluated in isolation (Collis & Montgomery, 1995). Therefore, organisation should focus on its capabilities to create a unique mix of these resources, including both physical and non-physical bundles scattered across the entire supply chain, in order to create a shared value (Russo & Fouts, 1997). The more unique the acquisition of these resource bundles in a specific manner, the harder it is for the competitors to imitate, thus contributing towards superior performance of the firm, resulting in sustained competitive advantage (Karia, 2011).

However, one of the biggest limitations of RBV concept is that it focuses on the creation of unique resource bundles within a single firm, without taking into account the entire supply chain network, including other partners, such as, suppliers, customers etc. To address this shortcoming (Dyer & Singh, 1998), proposed a new concept, referred to as the relational view concept (RV). Building on the idea of creating unique resource bundles within the firm, based on RBV, RV by extending its boundaries to the whole supply chain network focuses on inter-firm relations, thereby establishing a robust knowledge community. Such unique, idiosyncratic, and relation-specific resource bundles, allow firms operating within the same network to enhance its profitability including other performance measures, such as, knowledge sharing, effective governance, establishment of mutual trust, complimentary resource endowments, to name only a few (Dyer & Singh, 1998).

Supply chain integration practices are joint idiosyncratic resources acquired through a specialized combination of tangible and non-tangible resources within and across a firm's supply chain by building strong strategic alliances with relevant supply chain partners (Luzzini et al., 2015; Yu et al., 2019). Acquisition of such relation-specific and valuable resource bundles benefit firms in a variety of domains, including its overall environmental (Gopalakrishnan et al., 2012; Griffith & Bhutto, 2009; Luzzini et al., 2015; Rosenzweig et al., 2003), economic (Karia & Wong, 2013; Pellathy et al., 2019; Wong & Boon-Itt, 2008; Zhang & Huo, 2013), and social performance (Klassen & Vereecke, 2012; Yang et al., 2019; Zhang et al., 2015). For instance, strong internal integration mechanism allows firms to give rise to cross-functional teams within the firm, combining various departments i.e., R&D and marketing etc. (Rosenzweig et al., 2003). These teams as a unique resource bundle facilitates firms to cater to customers' changing demands by offering specialized high-quality products in minimum production cost and low usage of energy and other resources. Thereby ensuring value maximization, which in turn enhances the firm's economic and environmental performance (Beheshti et al., 2014). Furthermore, intra-firm integration across departments within the firm enhances overall firm's repute by sorting out various operational and social issues within its supply chain, for instance, support from management, information exchange, organizational procurement mechanism, employees' fair treatment etc. which in turn, improve its overall social performance (Pullman et al., 2009; Van De Voorde et al., 2012).

Similarly, inter-firm integration across its supply chain, including upstream collaboration with its suppliers and downstream customer integration, concerned about the conservation of natural environment renders various economic, social, and environmental benefits for the firm (Li & Lin, 2006; Welker et al., 2008). Highly integrated firms in today's volatile industrial environment are more likely to accomplish a sustained competitive advantage as compared to those operating on a stand-alone basis (Busse et al., 2017; Somapa et al., 2018). Rapid information exchange across such a knitted supply chain operating in a network allows firms to maximize their leverage by sorting out issues like material shortage, lack of information regarding customers' demands, negative market feedback etc. (Ataseven & Nair, 2017). Therefore, achieving optimum levels of inter-firm integration facilitates in lowering down the operational costs, and develops an atmosphere of mutual trust, resulting in enhanced firm's repute, higher flexibility, corporate legitimacy, and improved economic and environmental performance (Gelhard & Von Delft, 2016; Huq et al., 2016; Kim & Schoenherr, 2018; Wu et al., 2014; Yu et al., 2019).

Based on the discussion above, this study proposes the following hypotheses;

H1a: Internal Integration positively influences firm's environmental performance.

H1b: Internal Integration positively influences firm's economic performance.

H1c: Internal Integration positively influences firm's social performance.

H2a: Supplier Integration positively influences firm's environmental performance.

H2b: Supplier Integration positively influences firm's economic performance.

H2c: Supplier Integration positively influences firm's social performance.

H3a: Customer Integration positively influences firm's environmental performance.

H3b: Customer Integration positively influences firm's economic performance.

H3c: Customer Integration positively influences firm's social performance.

2.5 Mediation of EGSCM between SCI and Firm's Sustainable performance

This study tends to investigate both the direct and indirect relationship between SCI and firm's sustainable performance, with the mediating role of inter-firm GSCM practices. Drawing upon the review of extant literature, collaborative practices within and across a firm's supply chain enhance its overall performance in a variety of ways (Mitra & Datta, 2014). However, in certain cases it might not necessarily lead towards improved sustainable performance outcomes (Brockhaus et al., 2013). Since SCI is a multi-dimensional complex process, and its association with firm's performance has several unique nuances owing to a variety of other contingent factors (Wiengarten et al., 2019). Therefore, a firm lining up for an enhanced sustainable performance, surrounding the whole TBL must ensure objective alignments among all the relevant partners operating within the network, while sharing social, environmental, and economic principles (Herczeg et al., 2018; Wu, 2013). In view of this, a firm's internal and external SCI practices devoid of creating a proper balance between economic viability, social and environmental standards fail to achieve required sustainability outcomes (Kang et al., 2018).

Drawing upon the tradition RBV concept, discussed earlier, Hart (1995) recommended that firms should continuously acquire new resource bundles, in order to prevent current resource bundles from becoming outdated, due to the uncertain nature of external environment. He further argued that firms relying primarily on transaction costs, while evaluating intra and inter-firm linkages within the network, without considering the natural environment fall behind its competitors. Since the natural environment, including its opportunities and limitations is considered to be one of the major drivers of acquiring new, unique and valuable resource bundles (Golicic & Smith, 2013). Therefore, Hart (1995) introduced a new concept by extending the boundaries of traditional RBV concept, while adding environmental and social dimensions, which is referred to as the natural resource-based view of the firm (N-RBV).

Based on the central notion of N-RBV, creation of unique resource bundles by undertaking environmentally oriented activities across the whole supply chain is one of the most impending and contemporary strategies that promises long-term success (Choi & Hwang, 2015). Thus, activities like environmental stewardship, clean and green production, pollution prevention, recycling and reuse are of strategic importance, which give rise to unique resource bundles i.e., GSCM practices rendering long term benefits for the firms (Hart, 1995; Molina-Azorín et al., 2009). Literature suggests that collaborative supply chain mechanism i.e., SCI, without environmental thinking fails to identify and reach all its sustainability performance goals (Huq et al., 2016; Klassen & Vachon, 2003). Therefore, EGSCM practices as a representative of a firm's environmental initiatives undertaken across its overall supply chain, while collaborating with all the relevant partners lead towards enhanced sustainable performance covering the entire TBL (De Giovanni, 2012; Rao & Holt, 2005; Zhu & Sarkis, 2004). In this regard, it can be argued that an effective implementation of inter-firm GSCM practices across its overall supply chain relies solely on its environmentally conscious SCI practices both internally and externally, resulting in superior sustainable performance (de Sousa Jabbour et al., 2017; Tseng et al., 2019).

Drawing upon the discussion above, and applying N-RBV theory, this study proposes the following hypothesis, demonstrating the mediating role of EGSCM practices, which influences the positive association between SCI and firm's sustainable performance.

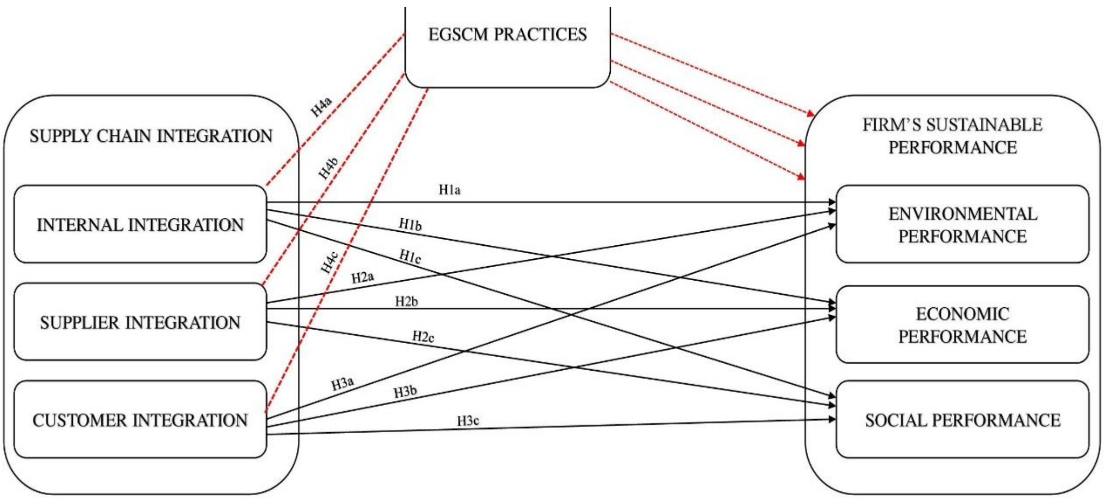
H4a: EGSCM practices mediate the linkage between internal integration and firm's sustainable performance.

H4b: EGSCM practices positively mediate the relationship between supplier integration and firm's sustainable performance.

H4c: EGSCM practices positively mediate the association between customer integration and firm's sustainable performance.

Figure 1

Proposed conceptual framework



3. Research Methodology

3.1 Data Collection and Sampling

To analyse our proposed linkages between all the constructs and sub-constructs, as presented in the conceptual framework of the study above (see figure 1), data was collected using a survey strategy. This design was deemed appropriate, as it has been adopted extensively in several investigations surrounding SCI and firms' performance issues (Mora-Monge et al., 2019; Zhang & Huo, 2013). Furthermore, while adopting the cross-sectional approach, data was collected at a single point in time using a self-administered adopted questionnaire. Following the logic of deductivism and thoroughly evaluating the underlying research paradigms, positivism was selected as this study's philosophical paradigm from a methodological viewpoint.

As discussed earlier, this study primarily deals with the conceptualization of SCI and EGSCM practices and analysing its influence on a firm's sustainable performance. Therefore, manufacturing SMEs were targeted for data collection. The selection of manufacturing sector for this investigation is due to its direct connection with degradation of natural environment, as compared to other sectors, for instance, services and retail (Carrillo-Castrillo et al., 2016; Shabbir & Kassim, 2018). Furthermore, Pakistan's economy is in shambles and the country is facing critical environmental and social concerns in production, thus making the manufacturing sector an interesting area to be investigated (Ali & Rehman, 2015). Another reason for selecting SMEs operating within the manufacturing sector is that all these firms are commoditized and follow the central principles of a traditional supply chain (Kastalli & Van Looy, 2013). While concentrating on wealth creation, they strive for gaining cost efficiencies and ensuring quality standards of the product, thereby influencing natural and social environment in the process (Drohomeretski et al., 2015).

Data was collected among manufacturing SMEs, with a special preference given to the medium-sized firms in three major cities of Pakistan i.e., Peshawar, Islamabad, and Lahore, thereby determining the target population of the study. While keeping in view the choice of specifying a particular sample size for the study, several factors were thoroughly evaluated, including financial and time constraints, unknown population, statistical techniques (SEM) etc. As a result, a sample size of at least 400 was decided for the current study, while adopting a non-probability convenience-based sampling approach, which is in line with the study's central objectives. From a methodological viewpoint, Hair et al. (2010) suggested that a sample size ranging from 400 and above is suitable for a model containing six or more constructs with three sub-dimensions in each. In addition, according to the table formulated by Research Advisor (2007), for a population size of 250,000 and above, a sample size of 385 is required. In this regard, a total of 450 questionnaires were distributed among SMEs operating in three cities, mentioned above, of which 437 were returned. After the initial data cleaning process, including missing data assessment, outliers, and inappropriate responses, we were left with 405 usable questionnaires, which were deemed appropriate for further analysis.

3.2 Measurement Scales

A 5-point Liker-Scale was employed (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree), in order to assess the responses collected through the self-administered questionnaire. All the items included in the questionnaire were adapted for various sources and review of extant literature. For instance, our predictor variable SCI was measured using a 32-itemed measurement scale, adapted directly from Vachon and Klassen (2007), Swink et al. (2010), Suansawat (2013), Flynn et al. (2010), and Stank et al. (2001). As discussed earlier, SCI is further divided into three sub-constructs, therefore, sub-construct II comprised of 09 items, SI was measured by 12 items, whereas sub-construct CI was assessed using 11 items, collectively giving rise to the corresponding first-order construct of SCI.

Similarly, measurement scale of EGSCM, as a mediator was adapted from Lee et al. (2012), Suansawat (2013), and Shi et al. (2012) constituted of 08 items. On the other hand, firm's sustainable performance, treated as our outcome variable is divided into three sub-constructs i.e., EP (06 items), ENP (07 items) and SOP (05 items), based on TBL concept. Its measurement scale comprising of 18 items in total, is adapted from Paulraj (2011), Carter and Rogers (2008), Maydeu-Olivares and Lado (2003), Vickery et al. (2003), Bansal (2005), and Rao and Holt (2005). All these measurement scales have been validated and used extensively in prior studies surrounding the concept of sustainability within supply chain management.

4. Data Analysis and Results

4.1. Firm's and Respondents' Profile

As mentioned earlier, we collected 405 usable responses by targeting 264 SMEs within several industries operating in the manufacturing sector. Of the total targeted SMEs, automotive and automotive components industries comprised of 7.6 %, electric components made up 21.7 %, while food and beverage industries comprised of 15.4 %. Furthermore, industrial machinery industries made up 3.7 %, chemical industries were 0.2 %, while transportation and logistics industries comprised of 9.1 %. Similarly, textile industries made up 19 %, clothes and decorating industries were 2.8 %, while industries falling into the category of 'others' made up a total of 20.5 %. Besides the industrial groups, firms were also divided based on ISO certifications. For instance, firms with ISO 9000 certifications made up 85.9 %, while the remaining were non-certified firms making up 14.1 %. Similarly, firms with ISO 14001 certification comprised of 25.7 %, while the remaining 74.3 % were non-certified firms.

In addition, responses regarding firm's size were collected based on the number of employees. As a result, firms having between 50 to 100 employees made up 37.8 %, firms with 100 to 200 employees were 24.7 %, while firms with number of employees between 200 and 300 comprised of 34.5 %. In terms of the primary products' characteristics, 37.5 % were firms falling into 'assembled-to-order' category, while 21.7 % made up 'made-to-stock' category. Similarly, 27.2 % were firms with 'make-to-order', as their final product characteristics, while the firms falling into 'others' category made up 13.6 %.

Besides firms' profile, a comprehensive examination of respondents' as unit of analysis was also carried out. Based on the findings, employees working in the capacity of CEOs constituted 8.4 %, logistic managers were 2 %, while supply chain managers made up 7.4 %. Similarly, production managers made up 13.3 %, 15.8 % were operations managers, while 9.6 % comprised of plant managers. In addition, employees falling into 'others' category made up 43.5 %.

4.2 Assessment of Measurement Model

Prior to CFA and SEM analysis, we carried out a comprehensive EFA (exploratory factor analysis), in order to identify the underlying structure of relationship among our constructs. Varimax was employed as a rotation technique using principle axis extraction approach (Anderson & Gerbing, 1988). Findings of EFA generated seven distinct factors with eigenvalues exceeding 1. Measurement item (EP01) was discarded due to its cross-loading on two factors i.e., EP and ENP, with a factor-loading score of 0.618. The final factor solution, with 7 factors measured by 57 items with factor-loading score of each item ranging between 0.62 and 0.75 was deemed acceptable (see table 1).

While preparing the data for rigorous analysis like SEM, we screened it for any potential presence of common method bias (CMB), to prevent it from yielding incorrect conclusions stemming out from the biased linkages among constructs (Podsakoff et al., 2003). We employed Harman's single factor test (HSF) for addressing CMB issues, while subjecting all the measurement items to an in-depth exploratory factor analysis (EFA). Based on the findings of HSF, generated factors explained 43.191 % of the total variance, falling between the acceptable range of 10 and 50 % (Podsakoff et al., 2012), thereby specifying no material indication of the presence of CMB in our data set.

We performed our statistical analysis through AMOS V.23. Both validity and reliability were analysed thoroughly. By adopting the two-step approach, recommended by Anderson and Gerbing (1988), we initially carried out confirmatory factor analysis (CFA), in order to assess our measurement model for each latent variable (Jackson et al., 2009). In the following stage, we analyzed our structural model by employing structural equation modeling (SEM), in order to examine the hypothesized linkages between our research constructs.

The goodness-of-fit (GFI) indices employed in this research for assessment of our structural and measurement models' fit, include the normed chi-square i.e. CMIN/df, with a value less than 3, for an acceptable model fit (Kline, 2011). Comparative fit index (CFI) and Tucker-Lewis fit index (TLI), with values equal to or greater than 0.90 for acceptable and greater than or equal to 0.95 for good model fit (Hu & Bentler, 1999). Finally, root mean square error of approximation (RMSEA), with value falling between the acceptable range of 0.05 and 0.08, where a value less than 0.05 represents a good fit of the model (Hu & Bentler, 1999; Kline, 2011). In view of this, CFA was carried out for examining our measurement model. Findings revealed that our measurement model was an excellent fit with Chi-square CMIN $_{(df= 1518)}$ = 2625.829, Normed Chi-square (CMIN/df) = 1.730, SRMR = 0.038, RMSEA = 0.043, CFI = 0.936, and TLI = 0.933.

Subsequently, construct validity, including convergent and discriminant validity was examined, by evaluating the uni-dimensionality of our constructs, in terms of CFA item-loading scores, along with the AVE scores for each construct, as shown in table 1 below. Based on the findings, sufficient convergent validity was affirmed, as all item-loading scores exceeded the recommended threshold of 0.5 (Kline, 2011). Furthermore, values of the average variance extracted (AVE) for every construct were greater than 0.5, recommended by Anderson and Gerbing (1988). Thereby, indicating that the measurement items truly represent the relative constructs (See table 1).

Besides the assessment of convergent validity, discriminant validity was also confirmed, using squared correlation matrix, generated by AMOS, as shown in table 2 below. Based on the results, the AVE scores of all the constructs falling between the range of 0.542 and 0.679, surpassed the squared correlations between the constructs, thereby providing strong evidence regarding the establishment of sufficient discriminant validity. We also examined our construct's reliability using Cronbach's alpha (α) estimates. Findings of reliability revealed that Cronbach's Alpha values for all the constructs ranged from 0.792 to 0.887, surpassing the recommended threshold of 0.70 (Cortina, 1993; Hair et al., 2010), thus providing confirmation of constructs' reliability. In addition, composite reliability (CR) values were also evaluated to examine an in-depth construct reliability. Findings in table 1 below, indicate that CR values of all the constructs ranged between 0.904 and 0.947, exceeding the recommended value of 0.70 (Hair et al., 2010).

Table 1 Measurement model assessment

Constructs	Measurement Items	EFA Loading	CFA Loading	CR	AVE	MSV
	II01: Data Integration among internal functions.	0.752	0.877			
	II02: Enterprise integration application among internal functions.	0.698	0.819			
	II03: Integrative inventory information.	0.687	0.792			
	II04: Sharing inventory levels among departments.	0.725	0.800			
Internal Integration (II)	II05: Sharing logistics-related data among departments.	0.783	0.787	0.946	0.659	0.437
	II06: Conducting periodic inter-departmental meetings.	0.748	0.808			
	II07: Using cross-functional teams in process improvement.	0.770	0.773			
	II08: Using cross-functional teams in product improvement.	0.739	0.805			
	II09: Integration of internal functions	0.713	0.841			
	SI01: Information exchange with suppliers through information networks.	0.714	0.777			
	SI02: Quick ordering system with suppliers.	0.707	0.815			
	SI03: Strategic partnership with suppliers.	0.693	0.779			
	SI04: Long-term procurement relationships with suppliers.	0.724	0.811			
	SI05: Involvement of suppliers in procurement and production process.	0.654	0.790			
Supplier Integration (SI)	SI06: Involvement of the firm with suppliers in design stage.	0.690	0.740	0.947	0.599	0.475

	SI07: Suppliers sharing production schedule with the firm.	0.656	0.756			
	SI08: Suppliers sharing production capacity information with the firm.	0.712	0.804			
	SI09: Firm sharing production plan information with suppliers.	0.694	0.724			
	SI10: Firm sharing demand forecast information with suppliers.	0.658	0.737			
	SI11: Firm sharing inventory related information with suppliers.	0.693	0.757			
	SI12: Firms helping suppliers in process improvements.	0.685	0.789			
Customer Integration (CI)	CI01: Firm's connection with customers through information networks.	0.654	0.746	0.944	0.604	0.494
	CI02: Computerization for customer ordering.	0.768	0.797			
	CI03: Customers sharing market information with the firm.	0.766	0.817			
	CI04: Firm providing effective communication channels to customers.	0.669	0.789			
	CI05: Establishment of quick ordering system for customers.	0.708	0.783			
	CI06: Firm following up on customers' feedback.	0.709	0.764			
	CI07: Firm's frequent contacts with customers.	0.705	0.750			
	CI08: Customers sharing POS information with the firm.	0.666	0.770			
	CI09: Customer sharing demand forecast information with the firm.	0.670	0.798			
	CI10: Firm sharing inventory information with customers.	0.682	0.756			
	CI11: Firm sharing production plan with customers.	0.729	0.778			
EGSCM Practices	EGSCM01: Firm providing design specifications to suppliers with environmental requirements.	0.696	0.697	0.904	0.542	0.454
	EGSCM02: Cooperation with suppliers for achieving environmental objectives.	0.733	0.736			
	EGSCM03: Firm's use of environmental audits of suppliers.	0.688	0.747			
	EGSCM04: Firm's encouragement of supplier's ISO 14001 certification.	0.676	0.719			
	EGSCM05: Firm's evaluation of 2nd tier suppliers' eco-friendly practices.	0.685	0.747			
	EGSCM06: Firm's cooperation with customers in eco-design.	0.704	0.756			
	EGSCM07: Firm's cooperation with customers in cleaner production.	0.650	0.779			
	EGSCM08: Firm's cooperation with customers in green packaging.	0.674	0.702			

Environmental Performance (ENP)	ENP01: Firm's efforts in reducing air emissions during production.	0.635	0.776	0.925	0.637	0.499
	ENP02: Firm's efforts in reducing wastes in water.	0.698	0.812			
	ENP03: Firm's efforts in reducing solid waste.	0.710	0.812			
	ENP04: Firm's efforts in reducing the consumption of toxic material during production.	0.751	0.803			
	ENP05: Firm's efforts in reducing scrap.	0.720	0.775			
	ENP06: Firm's efforts in reducing environmental accidents.	0.699	0.806			
	ENP07: Firm's efforts in improving overall environmental reputation.	0.671	0.799			
Economic Performance (EP)	EP02: Firm's average profit, relative to its competitors over the past three years.	0.595	0.800	0.887	0.611	0.566
	EP03: Firm's profit growth.	0.638	0.785			
	EP04: Firm's average return on sales.	0.624	0.786			
	EP05: Firm's growth in market share.	0.656	0.773			
	EP06: Firm's growth in sales volumes.	0.666	0.766			
Social Performance (SOP)	SOP01: Improvement brought in stakeholders' welfare.	0.629	0.797	0.914	0.679	0.566
	SOP02: Improvement brought in community's health and safety.	0.687	0.830			
	SOP03: Reduction in environmental risks and its impact on public.	0.635	0.846			
	SOP04: Improvement in occupational health and safety of employees.	0.660	0.831			
	SOP05: Improvement in awareness of people and protection of their claims.	0.657	0.816			

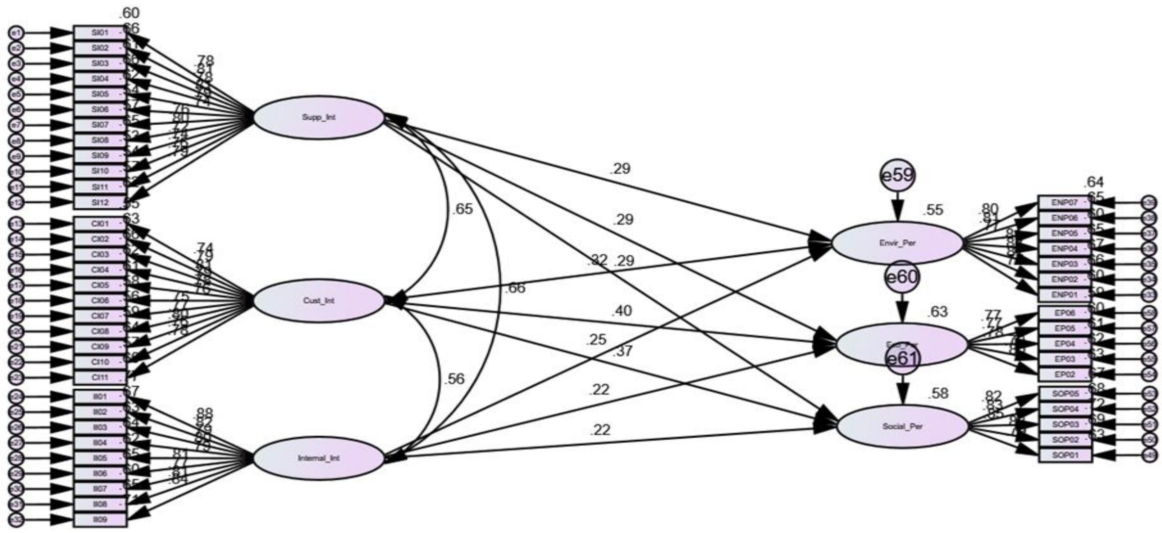
Table 2 Discriminant validity assessment

	SI	CI	II	ENP	EGSCM	SOP	EP
SI	**0.774**						
CI	0.651***	**0.777**					
II	0.661***	0.560***	**0.812**				
ENP	0.651***	0.633***	0.612***	**0.798**			
EGSCM	0.589***	0.596***	0.580***	0.569***	**0.736**		
SOP	0.665***	0.667***	0.609***	0.706***	0.674***	**0.824**	
EP	0.689***	0.703***	0.632***	0.695***	0.589***	0.753***	**0.782**

4.3 Assessment of Structural Model (Direct Linkages)

Having validated our measurement model, we employed SEM to examine our structural model in the second stage, in order to analyse the hypothesized linkages among our constructs. Two structural models were examined. First for the group of hypotheses indicating the direct linkages, while second group of hypotheses representing the indirect associations, with a mediation of EGSCM practices. Initial structural model for direct linkages, showed an acceptable model fit, with $CMIN_{(df = 1115)} = 2075.784$, CMIN/df = 1.862, CFI = 0.937, TLI = 0.934, RMSEA = 0.046 and SRMR = 0.044. Path diagram of our structural model for direct linkages is illustrated in figure 2 below;

Figure 2 Path Diagram (Direct Linkages)



4.3.1 Hypotheses Test Results (Direct Linkages)

As shown in table 3 below, all the direct causal relationships were analysed at p<0.001, p<0.01 and p<0.05. Results revealed that firm's SCI practices including II, SI and CI plays a pivotal role in improving its overall sustainable performance surrounding TBL. As all our hypotheses indicating direct linkages between SCI (II, SI and CI) and SP (ENP, EP and SOP) i.e., H1(a), H1(b) and HI(c), H2(a), H2(b), H2(c), H3(a), H3(b) and H3(c), were statistically significant, and thus supported. We relied upon the path coefficient (β) values and t-values or critical ratios for examining the statistical significance of proposed linkages. For instance, H1(a) representing a direct linkage between internal integration and firm's environmental performance, with path coefficient (β) value of 0.252, and t-value of 4.579 at p<0.001, was highly significant, thus demonstrating a strong positive linkage between II and a firm's ENP. Similarly, H1(b) representing the association between internal integration and firm's economic performance, with path coefficient (β) of 0.225, t-value of 4.244 at p<0.001, was also statistically significant, therefore, supported. Furthermore, H1(c) (II→SOP) with β value of 0.218, t-value of 4.068 at p<0.001, was approved. Similarly, H2(a), H2(b) and H2(c) highlighting the linkage between supplier integration and firm's environmental, economic and social performance, were also statistically significant, thereby approved, with β values of 0.286, 0.288 and 0.290, t-values of 4.643, 4.831 and 4.802 at p<0.001, respectively. Moreover, H3(a), H3(b) and H3(c) were statistically significant, thereby demonstrating a strong positive linkage between customer integration and firm's environmental, economic, and social performance, respectively. Path coefficient (β) values for H3(a), H3(b) and H3(c) were 0.318, 0.401 and 0.369, with corresponding t-values of 0.057, 0.056 and 0.068 at p<0.001 respectively.

Table 3 Hypothesis Tests (Direct causal linkages)

Path	Hypothesis	Estimate (β)	S.E.	C.R. (t-value)	P-Value	Interpretation
II→ENP	H1 (a)	0.252	0.043	4.579	***	Supported
II→EP	H1 (b)	0.225	0.041	4.244	***	Supported

II→SOP	H1 (c)	0.218	0.051	4.068	***	Supported
SI→ENP	H2 (a)	0.286	0.057	4.643	***	Supported
SI→EP	H2 (b)	0.288	0.054	4.831	***	Supported
SI→ SOP	H2 (c)	0.290	0.068	4.802	***	Supported
CI→ENP	H3 (a)	0.318	0.057	5.642	***	Supported
CI→EP	H3 (b)	0.401	0.056	7.112	***	Supported
CI→SOP	H3 (c)	0.369	0.068	6.555	***	Supported

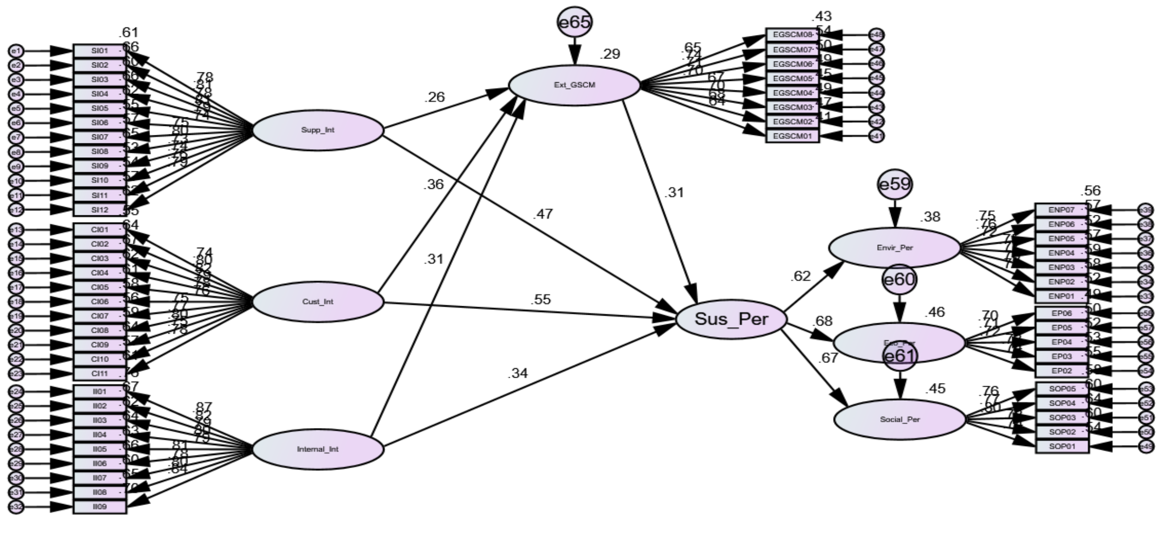
Note: ***p<0.001, **p<0.01, *p<0.05

4.3.2 Hypotheses Tests Results (Indirect Linkages)

As discussed earlier, this paper attempts to examine both the direct and indirect influence of a firm's SCI practices on all the pillars of its sustainable performance, through the mediating role of inter-firm GSCM practices (EGSCM). From analytical viewpoint, our predictor variable (SCI) for mediation analysis was dimensionalized, using the same three dimensions i.e., II, SI and CI, while the outcome variable (SP) was treated as a uni-dimensional construct. One of the primary purpose for doing so is to avoid unnecessary complications in our research framework and maintain its conclusive capabilities. As a result, this study proposed three mediation hypothesis H4(a), H4(b) and H4(c) highlighting indirect relationships between SCI (II, SI and CI) and firm's sustainable performance, comprising of ENP, EP and SOP, through the mediation of EGSCM practices.

We employed Preacher and Hayes (2004) technique for mediation analysis, along with the adoption of bootstrapping technique, requesting 2000 samples. While implementing the maximum likelihood method, we fixed the bias-corrected confidence intervals at 95, based on the recommendations of Preacher and Hayes technique. Implementation of these techniques enable a researcher to achieve more conclusive and credible findings with higher statistical power, as compared to other techniques, such as, Baron & Kenny approach (Baron & Kenny, 1986), Sobel technique (Sobel, 1982) etc. Prior to the examination of indirect relationship, we evaluated the goodness-of-fit of our mediation model, following the same criteria as for the preceding structural model with direct linkages. Results indicated an absolute fit of the structural model concerning mediation with $CMIN_{(df = 1530)}$ = 3122.648, CMIN/DF = 2.041, CFI = 0.908, TLI = 0.904, and RMSEA = 0.051. Path diagram of the mediation model is illustrated in figure 3 below;

Figure 3 Path Diagram (Indirect Linkages)



Having validated our structural model for mediation analysis, we examined the direct, indirect, and total effects of II, CI and SI on firm's sustainable performance through the mediation of EGSCM, following the directions of Preacher and Hayes to detect any possible mediation effect. To assess the linkages, we relied upon the values of lower and upper bounds, which should not likely be zero, path coefficients (β) and corresponding p-values. Bootstrapped results of the mediation analysis are presented in table 4 below.

Table 4 Mediation Analysis

Path	Estimate (β)	p-value	Upper Bound	Lower Bound
Direct Effect				
II→SP	0.344	0.004	0.550	0.139
SI→SP	0.467	0.001	0.675	0.262
CI→SP	0.552	0.001	0.731	0.324
Indirect Effect				
II→EGSCM→SP	0.097	0.003	0.186	0.028
SI→EGSCM→SP	0.080	0.003	0.174	0.019
CI→EGSCM→SP	0.110	0.003	0.208	0.032
Total Effect				
II+EGSCM→SP	0.441	0.002	0.634	0.234
SI+EGSCM→SP	0.548	0.001	0.760	0.340
CI+EGSCM→SP	0.662	0.001	0.813	0.450

Drawing upon the results, the indirect relationships between SCI, including II, SI and CI and firm's sustainable performance through the mediation of EGSCM are all statistically significant at $p<0.05$, hence our mediation hypotheses are all supported. This claim is further strengthened by reviewing upper and lower bounds of the indirect effects, which are not likely to be zero, thereby sufficiently confirming that EGSCM plays a mediation role by influencing the positive linkage between SCI (II, SI, and CI) and firm's sustainable performance. Since, the direct linkages between II, SI and CI and SP are also statistically significant at $p<0.05$, therefore it can be stated with utmost clarity that EGSCM plays a partial mediation in the relationship between SCI and SP. As a result, our research hypothesis H4(a) (II→EGSCM→SP), H4(b) (SI→EGSCM→SP) and H4(c) (CI→EGSCM→SP) are supported empirically, and therefore, approved.

Moreover, reviewing the total effects for all the indirect relationships, as shown in the table 4 above, in terms of its upper and lower bounds (non-zero), p-value ($p<0.05$) and β value provides substantial evidence, enhancing our claim. It means that a firm's SCI practices (II, SI and CI) coupled with inter-firm eco-friendly practices (EGSCM) enhance a firm's overall sustainable performance simultaneously, based on TBL concept.

5. Discussion & Conclusions

The current study offers strong evidence regarding the simultaneous as well as individual impacts of SCI and EGSCM practices on firms' sustainable performance, operating within the manufacturing sector of Pakistan. Referring to the empirical findings, our proposed conceptual framework holds perfectly well together from both theoretical and empirical viewpoints. Such preservation of credibility in our findings can be credited towards the legitimacy of our research process and demonstration of higher degrees of theoretical and analytical rigor. Huge parallels can be drawn between the findings of this study and prior researches conducted within the field of SCI and firm's sustainability.

By reviewing our empirical findings, first group of our hypotheses representing direct linkages, indicate strong positive and direct associations between SCI, including II, SI and CI and firm's sustainable performance, including the three pillars i.e., environmental, economic, and social performance, respectively. Therefore, in general terms, it is safe to state that SCI, including II, SI and CI positively influences firm's TBL of sustainability. The empirical findings of this study, concerning the influence of SCI on firm's sustainable performance are somewhat consistent with (Griffith and Bhutto (2008); Griffith & Bhutto, 2009). The findings of their studies found a positive linkage between collaborative practices across a firm's supply chain (SCI) and its overall environmental performance, using a triangulation approach by employing questionnaires, interviews, and case studies. Likewise, Kang et al. (2018), while analysing the association between SCI (internal & external) and firm's TBL of sustainability, indicated a positive direct and indirect influence of SCI practices on firm's sustainable performance, through the implementation of sustainable management practices, except economic performance. In addition, the findings of this study are in accordance with that of Gimenez et al. (2012), Singh et al. (2018), Paulraj (2011), Germain and Iyer (2006), Rosenzweig et al. (2003), Vachon and Klassen (2006), and Shou et al. (2022), demonstrating a strong positive association between internal and external SCI practices and firm's TBL of sustainability.

In conclusion, the findings of our empirical analysis, backed up by a sound theoretical foundation, and extensive review of relevant literature justify the direct linkages between our research constructs (SCI→SP). It can be contended that a firm's synergistic collaborative activities within and across its supply chain with all the relevant partners operating within a network lead towards a non-zero-sum game, offering a win-win situation for all. It can be also be implied from the findings that implementation of SCI (internal and external) definitely enhances a firm's sustainable performance, but its benefits are not necessarily reflected in the short run, especially the social benefits.

As mentioned earlier, this study also attempts to examine the mediating role of inter-firm EGSCM practices in a relationship between SCI and firm's sustainable performance. According to the review of our empirical investigation, the mediation hypotheses H4(a), H4(b) and H4(c), inspecting the mediating role of EGSCM in the relationship between II, SI and CI and SP, respectively, are statistically significant, and therefore, accepted. As mentioned earlier, we examined direct, indirect, and total effects, as per the directions of Preacher and Hayes (2004) technique, along with bootstrapping. Results revealed that all the mentioned effects were significant, which means that EGSCM plays a partial mediation, while influencing the linkage between SCI and SP. Keeping in view, such a specific mediation of EGSCM adds considerably to the novelty of our research phenomenon, especially within the context of manufacturing firms, operating in developing countries like Pakistan. As a result, the consistencies between the findings of this study regarding mediation, and prevalent literature are very limited.

For instance, Suansawat (2013), while examining the influence of SCI on firm's sustainable performance in Thai manufacturing firms came up with a full mediation of GSCM practices including internal and external GSCM. The study indicated no direct relationship between SCI and firm's sustainable performance including environmental and economic performance. Therefore, results of the current study are consistent to a certain degree with the findings of Suansawat (2013). Moreover, some parallels can also be drawn between our study and research conducted by Vachon (2003). However, despite the employment of same principle constructs, sub-dimensions were different i.e., for SCI the sub-dimensions included logistic and technological collaboration. Similarly, environmental management system was dimensionalized into GSCM and environmental technology, while firm's performance comprised of quality, flexibility, cost etc. collectively giving rise to overall operational performance. Furthermore, GSCM was not treated as a mediator variable, although their findings revealed an indirect positive influence of SCI on firm's performance via GSCM practices. Therefore, it can be stated that employing EGSCM as a mediator in the relationship between SCI and SP within the context of SMEs operating in manufacturing sector of Pakistan, is a study first of its kind, to the best of researcher's knowledge.

5.1 Theoretical & Managerial implications

This study contributes considerably to the field of supply chain management, especially SCI and GSCM practices, by addressing potential gaps within the prevalent literature. Our proposed conceptual framework backed up by strong theoretical support has the potential to analyse the influence of each dimension of SCI and GSCM on all the three pillars of a firm's sustainability. Such an amalgamation of relevant yet disjointed research fragments has been demonstrated is very rare, especially within the manufacturing sector of a developing countries, like Pakistan. Hence, the framework put forward should be looked at from a holistic perspective, which is developed by extensively evaluating several streams of researches conducted across the globe in various contexts. Despite its all-inclusive nature, certain variables in our conceptual framework are under developed, especially within the context of Pakistani SMEs, therefore, it needs to be investigated further, till it reaches its saturation point.

In contrast with the prior researches, for instance, Rosenzweig et al. (2003), and Stank et al. (1999), employing SCI and performance as a uni-dimensional constructs, this research provided a thorough conceptualization and dimensionality of the constructs. In addition, the hybrid theory approach adopted in this study, for justifying the linkages between the constructs, such as, N-RBV, RV and RBV offers valuable insights to the field of SCM and corporate sustainability. The findings of our study suggests that manufacturing SMEs should focus more on collaborative practices, which exceeds its internal operations, with all the relevant partners operating within the same network, in order to acquire unique and relation-specific resources (Karia & Wong, 2013; Vachon & Klassen, 2008). Such collaborative activities coupled with an environmental orientation promises superior firm's performance, including logistic, operational, and sustainable performance, thus justifying the rationale put forward by Hart (1995).

Moreover, this paper provided extensive empirical investigation of a proposed model by Shi et al. (2012). They hypothesized the linkages between environmentally motivated collaborative practices and firm's financial, environmental, and operational performance, based on N-RBV, but these hypotheses were not examined empirically. The current, therefore, attempted to cover this gap within the prevalent literature. The significance and novelty of this paper lies in the inclusion of GSCM practices into the equation, and its mediating role, besides the recommendations for employing an integrated approach, across a firm's supply chain.

Besides theoretical contributions, several managerial implications of this study can also be advocated. In a resource-constrained environment of a developing country, faced with severe environmental, economic, and social challenges (Ali & Rehman, 2015), this research is extremely beneficial for regulatory authorities, policy makers and managers, working in the manufacturing sector of the country. The country's environmental and economic conditions are in shambles, as it is ranked 7^{th} in the list of environmentally vulnerable countries, based on Climate Index report (Eckstein et al., 2017). Furthermore, being an active member of international agreements, it is paramount for the policy makers and managers operating in manufacturing SMEs of Pakistan to revise their policies and restructure their operations along their supply chains. As undertaking sustainable practices across the whole supply chain by collaborating effectively with all the partners in the network ensure a sustained competitive advantage by enhancing the firm's environmental and social performance, alongside its economic gains (Ikram et al., 2019).

In this regard, our comprehensive framework, both validated theoretically and justified empirically, while outlining potential strategic initiatives, along with the assessment of the synergistic effect of such practices, offers valuable policy guidelines. These guidelines should be adopted by the working managers in manufacturing sector as a benchmarking tool, enabling them to prioritize among several SCI and GSCM practices, implemented proactively.

5.2 Limitations and Future Research Avenues

Despite its many contributions towards theory and practice, this study is faced with certain limitations, which could open potential research avenues for future studies and further in-depth investigations. Firstly, the data was collected in three cities of Pakistan, which might diminish the generalizability of our findings. Secondly, the data was collected using non-probability sampling approach from a wide spectrum of industries, operating within the manufacturing sector. As a result, both ISO14001 certified and non-certified firms were selected randomly, thereby creating inconsistencies in the interrelationships and affecting our findings. Hence, future studies should consider using ISO14001 certification as a control. Third, this employed cross-sectional approach for data collection, deemed as one of this study's limitations. For a comprehensive investigation, future studies should take into consideration the longitudinal approach, to analyse the real change over time in real world situations.

In addition, the adoption of Likert-scale has restricted the responses, compelling the researcher to stick strictly to single items. For a better measurement of latent variables, which cannot be measured directly and singularly, future studies should consider the use of semi-structured interviews, and open-ended questions, while collecting data for additional information. Despite its comprehensive nature, our conceptual framework is devoid of highlight every aspect of SCI, GSCM and firm's sustainable performance. Inclusion of other aspects, such as, GHRM, EMS, SMPs, JIT etc. which was beyond the scope of this study is highly possible, requiring additional data, finances, and time. Keeping in view the mediation analysis, this study treated the outcome variable (SP) as uni-dimensional reflective construct, to avoid unnecessary complications. Future studies should conduct a more in-depth mediation analysis by considering the sub-dimensions of the relative constructs.

In conclusion, this paper has made a tremendous attempt to cover a wide range of dimensions, interplaying in enhancing and facilitating awareness concerning corporate sustainability. Raising environmental issues, including deforestation, over population, emission of greenhouse gases, lack of proper environmental regulations, air, and water pollution, etc. especially within the context of developing countries is one of the most urgent threats. In response to which, our research framework has the potential to benefit practitioners, policy makers and academicians to design green and sustainable business models, thereby hushing the politics of greed and blind pursuit for economic gains at the cost of environment.

6. References

Abbasi, M. (2017). Towards socially sustainable supply chains–themes and challenges. European Business Review.

Abdul-Rashid, S. H., Sakundarini, N., Ghazilla, R. A. R., & Thurasamy, R. (2017). The impact of sustainable manufacturing practices on sustainability performance: Empirical evidence from Malaysia. International Journal of Operations & Production Management.

Alfalla-Luque, R., Medina-Lopez, C., & Dey, P. K. (2013). Supply chain integration framework using literature review. Production Planning & Control, 24(8-9), 800-817.

Ali, A., & Rehman, H. U. (2015). Macroeconomic instability and its impact on gross domestic product: an empirical analysis of Pakistan. Pakistan Economic and Social Review, 285-316.

Allaoui, H., Guo, Y., & Sarkis, J. (2019). Decision support for collaboration planning in sustainable supply chains. Journal of Cleaner Production, 229, 761-774.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. Psychological bulletin, 103(3), 411.

Antonio, K. L., Richard, C. Y., & Tang, E. (2009). The complementarity of internal integration and product modularity: An empirical study of their interaction effect on competitive capabilities. Journal of Engineering and Technology Management, 26(4), 305-326.

Ataseven, C., & Nair, A. (2017). Assessment of supply chain integration and performance relationships: A meta-analytic investigation of the literature. International journal of production economics, 185, 252-265.

Bansal, P. (2005). Evolving sustainably: A longitudinal study of corporate sustainable development. Strategic management journal, 26(3), 197-218.

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of management, 17(1), 99-120.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of personality and social psychology, 51(6), 1173.

Beheshti, H. M., Oghazi, P., Mostaghel, R., & Hultman, M. (2014). Supply chain integration and firm performance: an empirical study of Swedish manufacturing firms. Competitiveness Review.

Beske, P., & Seuring, S. (2014). Putting sustainability into supply chain management. Supply Chain Management: an international journal.

Bon, A. T., Zaid, A. A., & Jaaron, A. (2018). Green human resource management, Green supply chain management practices and Sustainable performance. Paper presented at the 8th International Conference on Industrial Engineering and Operations Management (IEOM),(Bandung, Indonesia) March.

Brandenburg, M., Govindan, K., Sarkis, J., & Seuring, S. (2014). Quantitative models for sustainable supply chain management: Developments and directions. European journal of operational research, 233(2), 299-312.

Bratić, D. (2011). Achieving a competitive advantage by SCM. IBIMA Business Review, 2011, 1-13.

Brockhaus, S., Kersten, W., & Knemeyer, A. M. (2013). Where do we go from here? Progressing sustainability implementation efforts across supply chains. Journal of Business Logistics, 34(2), 167-182.

Busse, C., Schleper, M. C., Weilenmann, J., & Wagner, S. M. (2017). Extending the supply chain visibility boundary: Utilizing stakeholders for identifying supply chain sustainability risks. International Journal of Physical Distribution & Logistics Management.

Cao, Z., Huo, B., Li, Y., & Zhao, X. (2015). The impact of organizational culture on supply chain integration: a contingency and configuration approach. Supply Chain Management: An International Journal.

Carrillo-Castrillo, J. A., Rubio-Romero, J. C., Onieva, L., & López-Arquillos, A. (2016). The causes of severe accidents in the Andalusian manufacturing sector: the role of human factors in official accident investigations. Human Factors and Ergonomics in Manufacturing & Service Industries, 26(1), 68-83.

Carter, C. R., & Rogers, D. S. (2008). A framework of sustainable supply chain management: moving toward new theory. International journal of physical distribution & logistics management.

Chams, N., & García-Blandón, J. (2019). On the importance of sustainable human resource management for the adoption of sustainable development goals. Resources, Conservation and Recycling, 141, 109-122.

Chin, T. A., Tat, H. H., Sulaiman, Z., & Muhamad Zainon, S. N. L. (2015). Green supply chain management practices and sustainability performance. Advanced Science Letters, 21(5), 1359-1362.

Choi, D., & Hwang, T. (2015). The impact of green supply chain management practices on firm performance: the role of collaborative capability. Operations Management Research, 8(3), 69-83.

Collis, D. J., & Montgomery, C. A. (1995). Competing on Resources: Strategy in the 1990s. Knowledge and strategy, 73(4), 25-40.

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. Journal of applied psychology, 78(1), 98.

Das, D. (2018). The impact of Sustainable Supply Chain Management practices on firm performance: Lessons from Indian organizations. Journal of cleaner production, 203, 179-196.

De Giovanni, P. (2012). Do internal and external environmental management contribute to the triple bottom line? International Journal of Operations & Production Management.

de Sousa Jabbour, A. B. L., Vazquez-Brust, D., Jabbour, C. J. C., & Latan, H. (2017). Green supply chain practices and environmental performance in Brazil: Survey, case studies, and implications for B2B. Industrial Marketing Management, 66, 13-28.

Drohomeretski, E., da Costa, S. E. G., de Lima, E. P., & de Oliveira Neves, T. R. (2015). The Application of sustainable practices and performance measures in the automotive industry: a systematic literature review. Engineering management journal, 27(1), 32-44.

Dyer, J. H., & Singh, H. (1998). The relational view: Cooperative strategy and sources of interorganizational competitive advantage. Academy of management review, 23(4), 660-679.

Eckstein, D., Künzel, V., & Schäfer, L. (2017). Global climate risk index 2018. Germanwatch, Bonn.

Elkington, J. (1997). The triple bottom line. Environmental management: Readings and cases, 2, 49-66.

Eltayeb, T. K., Zailani, S., & Ramayah, T. (2011). Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes. Resources, conservation and recycling, 55(5), 495-506.

Fahy, J. (2000). The resource-based view of the firm: some stumbling-blocks on the road to understanding sustainable competitive advantage. Journal of European industrial training.

Fatorachian, H., & Kazemi, H. (2018). A critical investigation of Industry 4.0 in manufacturing: theoretical operationalisation framework. Production Planning & Control, 29(8), 633-644.

Flynn, B. B., Huo, B., & Zhao, X. (2010). The impact of supply chain integration on performance: A contingency and configuration approach. Journal of operations management, 28(1), 58-71.

Freudenreich, B., Lüdeke-Freund, F., & Schaltegger, S. (2020). A stakeholder theory perspective on business models: Value creation for sustainability. Journal of Business Ethics, 166(1), 3-18.

Gelhard, C., & Von Delft, S. (2016). The role of organizational capabilities in achieving superior sustainability performance. Journal of business research, 69(10), 4632-4642.

Geng, R., Mansouri, S. A., & Aktas, E. (2017). The relationship between green supply chain management and performance: A meta-analysis of empirical evidences in Asian emerging economies. International Journal of Production Economics, 183, 245-258.

Germain, R., & Iyer, K. N. (2006). The interaction of internal and downstream integration and its association with performance. Journal of business logistics, 27(2), 29-52.

Gimenez, C., Sierra, V., & Rodon, J. (2012). Sustainable operations: Their impact on the triple bottom line. International Journal of Production Economics, 140(1), 149-159.

Gimenez, C., & Tachizawa, E. M. (2012). Extending sustainability to suppliers: a systematic literature review. Supply Chain Management: an international journal.

Gimenez, C., & Ventura, E. (2005). Logistics-production, logistics-marketing and external integration: their impact on performance. International journal of operations & Production Management.

Gold, S., & Schleper, M. C. (2017). A pathway towards true sustainability: A recognition foundation of sustainable supply chain management. European Management Journal, 35(4), 425-429.

Golicic, S. L., & Smith, C. D. (2013). A meta-analysis of environmentally sustainable supply chain management practices and firm performance. Journal of supply chain management, 49(2), 78-95.

Gopalakrishnan, K., Yusuf, Y. Y., Musa, A., Abubakar, T., & Ambursa, H. M. (2012). Sustainable supply chain management: A case study of British Aerospace (BAe) Systems. International Journal of Production Economics, 140(1), 193-203.

Green, K. W., Zelbst, P. J., Meacham, J., & Bhadauria, V. S. (2012). Green supply chain management practices: impact on performance. Supply Chain Management: An International Journal.

Griffith, A., & Bhutto, K. (2008). Improving environmental performance through integrated management systems (IMS) in the UK. Management of Environmental Quality: An International Journal.

Griffith, A., & Bhutto, K. (2009). Better environmental performance: a framework for integrated management systems (IMS). Management of Environmental Quality: An International Journal.

Guerci, M., Longoni, A., & Luzzini, D. (2016). Translating stakeholder pressures into environmental performance–the mediating role of green HRM practices. The International Journal of Human Resource Management, 27(2), 262-289.

Haffar, M., & Searcy, C. (2017). Classification of trade-offs encountered in the practice of corporate sustainability. Journal of business ethics, 140(3), 495-522.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate analysis: A global perspective. Kennesaw State University: Kennesaw, GA, USA.

Hart, S. L. (1995). A natural-resource-based view of the firm. Academy of management review, 20(4), 986-1014.

Herczeg, G., Akkerman, R., & Hauschild, M. Z. (2018). Supply chain collaboration in industrial symbiosis networks. Journal of Cleaner Production, 171, 1058-1067.

Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural equation modeling: a multidisciplinary journal, 6(1), 1-55.

Huo, B., Qi, Y., Wang, Z., & Zhao, X. (2014). The impact of supply chain integration on firm performance: The moderating role of competitive strategy. Supply Chain Management: An International Journal.

Huo, B., Zhao, X., & Lai, F. (2013). Supply chain quality integration: antecedents and consequences. IEEE transactions on engineering management, 61(1), 38-51.

Huq, F. A., Chowdhury, I. N., & Klassen, R. D. (2016). Social management capabilities of multinational buying firms and their emerging market suppliers: An exploratory study of the clothing industry. Journal of Operations Management, 46, 19-37.

Hussain, N., Rigoni, U., & Orij, R. P. (2018). Corporate governance and sustainability performance: Analysis of triple bottom line performance. Journal of Business Ethics, 149(2), 411-432.

Ikram, M., Zhou, P., Shah, S., & Liu, G. (2019). Do environmental management systems help improve corporate sustainable development? Evidence from manufacturing companies in Pakistan. Journal of Cleaner Production, 226, 628-641.

Inman, R. A., Sale, R. S., Green Jr, K. W., & Whitten, D. (2011). Agile manufacturing: relation to JIT, operational performance and firm performance. Journal of operations management, 29(4), 343-355.

Jabbour, C. J. C., Seuring, S., de Sousa Jabbour, A. B. L., Jugend, D., Fiorini, P. D. C., Latan, H., & Izeppi, W. C. (2020). Stakeholders, innovative business models for the circular economy and sustainable performance of firms in an emerging economy facing institutional voids. Journal of environmental management, 264, 110416.

Jackson, D. L., Gillaspy Jr, J. A., & Purc-Stephenson, R. (2009). Reporting practices in confirmatory factor analysis: an overview and some recommendations. Psychological methods, 14(1), 6.

Kamble, S. S., Gunasekaran, A., & Gawankar, S. A. (2020). Achieving sustainable performance in a data-driven agriculture supply chain: A review for research and applications. International Journal of Production Economics, 219, 179-194.

Kang, M., Yang, M. G. M., Park, Y., & Huo, B. (2018). Supply chain integration and its impact on sustainability. Industrial Management & Data Systems.

Karia, N. (2011). Resource-based logistics (RBL) and logistics performance. University of Hull.

Karia, N., & Wong, C. Y. (2013). The impact of logistics resources on the performance of Malaysian logistics service providers. Production Planning & Control, 24(7), 589-606.

Kastalli, I. V., & Van Looy, B. (2013). Servitization: Disentangling the impact of service business model innovation on manufacturing firm performance. Journal of operations management, 31(4), 169-180.

Khan, S. A. R., Yu, Z., Golpira, H., Sharif, A., & Mardani, A. (2021). A state-of-the-art review and meta-analysis on sustainable supply chain management: Future research directions. Journal of Cleaner Production, 278, 123357.

Kim, Y. H., & Schoenherr, T. (2018). The effects of supply chain integration on the cost efficiency of contract manufacturing. Journal of Supply Chain Management, 54(3), 42-64.

Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., & Hekkert, M. (2018). Barriers to the circular economy: Evidence from the European Union (EU). Ecological Economics, 150, 264-272.

Kiron, D., Kruschwitz, N., Haanaes, K., & Reeves, M. (2015). Joining forces: Collaboration and leadership for sustainability. MIT Sloan Management Review, 56(3).

Klassen, R. D., & Vachon, S. (2003). Collaboration and evaluation in the supply chain: The impact on plant-level environmental investment. Production and operations Management, 12(3), 336-352.

Klassen, R. D., & Vereecke, A. (2012). Social issues in supply chains: Capabilities link responsibility, risk (opportunity), and performance. International Journal of production economics, 140(1), 103-115.

Kline, R. B. (2011). Convergence of structural equation modeling and multilevel modeling: na.

Krause, D. R., Vachon, S., & Klassen, R. D. (2009). Special topic forum on sustainable supply chain management: introduction and reflections on the role of purchasing management. Journal of Supply Chain Management, 45(4), 18-25.

Laari, S., Töyli, J., Solakivi, T., & Ojala, L. (2016). Firm performance and customer-driven green supply chain management. Journal of cleaner production, 112, 1960-1970.

Lambert, D. M., & Cooper, M. C. (2000). Issues in supply chain management. Industrial marketing management, 29(1), 65-83.

Lee, S. M., Kim, S. T., & Choi, D. (2012). Green supply chain management and organizational performance. Industrial Management & Data Systems.

Leuschner, R., Rogers, D. S., & Charvet, F. F. (2013). A meta-analysis of supply chain integration and firm performance. Journal of Supply Chain Management, 49(2), 34-57.

Li, P.-C., & Lin, B.-W. (2006). Building global logistics competence with Chinese OEM suppliers. Technology in Society, 28(3), 333-348.

Lii, P., & Kuo, F.-I. (2016). Innovation-oriented supply chain integration for combined competitiveness and firm performance. International Journal of Production Economics, 174, 142-155.

Liu, H., Wei, S., Ke, W., Wei, K. K., & Hua, Z. (2016). The configuration between supply chain integration and information technology competency: A resource orchestration perspective. Journal of Operations Management, 44, 13-29.

Lotfi, Z., Mukhtar, M., Sahran, S., & Zadeh, A. T. (2013). Information sharing in supply chain management. Procedia Technology, 11, 298-304.

Lubin, D. A., & Esty, D. C. (2010). The sustainability imperative. Harvard business review, 88(5), 42-50.

Luzzini, D., Brandon-Jones, E., Brandon-Jones, A., & Spina, G. (2015). From sustainability commitment to performance: The role of intra-and inter-firm collaborative capabilities in the upstream supply chain. International Journal of Production Economics, 165, 51-63.

Mardani, A., Kannan, D., Hooker, R. E., Ozkul, S., Alrasheedi, M., & Tirkolaee, E. B. (2020). Evaluation of green and sustainable supply chain management using structural equation modelling: A systematic review of the state of the art literature and recommendations for future research. Journal of cleaner production, 249, 119383.

Maydeu-Olivares, A., & Lado, N. (2003). Market orientation and business economic performance: A mediated model. international journal of service industry management.

Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., Nix, N. W., Smith, C. D., & Zacharia, Z. G. (2001). Defining supply chain management. Journal of Business logistics, 22(2), 1-25.

Mentzer, J. T., Min, S., & Bobbitt, L. M. (2004). Toward a unified theory of logistics. International Journal of Physical Distribution & Logistics Management.

Mitra, S., & Datta, P. P. (2014). Adoption of green supply chain management practices and their impact on performance: an exploratory study of Indian manufacturing firms. International journal of production research, 52(7), 2085-2107.

Moktadir, M. A., Rahman, T., Rahman, M. H., Ali, S. M., & Paul, S. K. (2018). Drivers to sustainable manufacturing practices and circular economy: A perspective of leather industries in Bangladesh. Journal of Cleaner Production, 174, 1366-1380.

Molina-Azorín, J. F., Claver-Cortés, E., Pereira-Moliner, J., & Tarí, J. J. (2009). Environmental practices and firm performance: an empirical analysis in the Spanish hotel industry. Journal of Cleaner production, 17(5), 516-524.

Mora-Monge, C., Quesada, G., Gonzalez, M. E., & Davis, J. M. (2019). Trust, power and supply chain integration in Web-enabled supply chains. Supply Chain Management: An International Journal.

Mousa, S. K., & Othman, M. (2020). The impact of green human resource management practices on sustainable performance in healthcare organisations: A conceptual framework. Journal of Cleaner Production, 243, 118595.

Newman, A., Miao, Q., Hofman, P. S., & Zhu, C. J. (2016). The impact of socially responsible human resource management on employees' organizational citizenship behaviour: the mediating role of organizational identification. The international journal of human resource management, 27(4), 440-455.

Nugraha, A. T., & Hakimah, Y. (2019). Role of relational capabilities on the supply chain performance of Indonesian textile sector with moderating effect of technology adoption. International Journal of Supply Chain Management, 8(5), 509-522.

Paulraj, A. (2011). Understanding the relationships between internal resources and capabilities, sustainable supply management and organizational sustainability. Journal of Supply Chain Management, 47(1), 19-37.

Pellathy, D. A., Mollenkopf, D. A., Stank, T. P., & Autry, C. W. (2019). Cross-functional integration: concept clarification and scale development. Journal of Business Logistics, 40(2), 81-104.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. Journal of applied psychology, 88(5), 879.

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. Annual review of psychology, 63, 539-569.

Porter, M. E. (1980). Industry structure and competitive strategy: Keys to profitability. Financial analysts journal, 36(4), 30-41.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behavior research methods, instruments, & computers, 36(4), 717-731.

Pullman, M. E., Maloni, M. J., & Carter, C. R. (2009). Food for thought: social versus environmental sustainability practices and performance outcomes. Journal of supply chain management, 45(4), 38-54.

Qi, Y., Huo, B., Wang, Z., & Yeung, H. Y. J. (2017). The impact of operations and supply chain strategies on integration and performance. International Journal of Production Economics, 185, 162-174.

Ramirez, M. J., Roman, I. E., Ramos, E., & Patrucco, A. S. (2020). The value of supply chain integration in the Latin American agri-food industry: trust, commitment and performance outcomes. The International Journal of Logistics Management.

Rao, P., & Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance? International journal of operations & production management.

Rosenzweig, E. D., Roth, A. V., & Dean Jr, J. W. (2003). The influence of an integration strategy on competitive capabilities and business performance: an exploratory study of consumer products manufacturers. Journal of operations management, 21(4), 437-456.

Russo, M. V., & Fouts, P. A. (1997). A resource-based perspective on corporate environmental performance and profitability. Academy of management Journal, 40(3), 534-559.

Sarkis, J. (2012). A boundaries and flows perspective of green supply chain management. Supply chain management: an international journal.

Shabbir, M. S., & Kassim, N. M. (2018). Supply chain management drivers and sustainability of green initiatives in manufacturing enterprises: A case in Pakistan. International Journal of Entrepreneurship, 22(1S), 1-19.

Shi, V. G., Koh, S. L., Baldwin, J., & Cucchiella, F. (2012). Natural resource based green supply chain management. Supply Chain Management: An International Journal.

Shou, Y., Kang, M., & Park, Y. W. (2022). Supply Chain Integration and Sustainability: The Supply Chain Learning Perspective Supply Chain Integration for Sustainable Advantages (pp. 129-147): Springer

Singh, H., Garg, R., & Sachdeva, A. (2018). Supply chain collaboration: A state-of-the-art literature review. Uncertain Supply Chain Management, 6(2), 149-180.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. Sociological methodology, 13, 290-312.

Somapa, S., Cools, M., & Dullaert, W. (2018). Characterizing supply chain visibility–a literature review. The International Journal of Logistics Management.

Srivastava, S. K. (2007). Green supply-chain management: a state-of-the-art literature review. International journal of management reviews, 9(1), 53-80.

Stank, T., Crum, M., & Arango, M. (1999). Benefits of interfirm coordination in food industry supply chains. Journal of business logistics, 20(2), 21.

Stank, T. P., Keller, S. B., & Daugherty, P. J. (2001). Supply chain collaboration and logistical service performance. Journal of Business logistics, 22(1), 29-48.

Suansawat, R. (2013). The influence of supply chain integration and green supply chain management practices on sustainable firm performance in Thai manufacturing industry. University of Hull.

Svensson, G. (2007). Aspects of sustainable supply chain management (SSCM): conceptual framework and empirical example. Supply chain management: An international journal.

Swink, M., Narasimhan, R., & Wang, C. (2007). Managing beyond the factory walls: effects of four types of strategic integration on manufacturing plant performance. Journal of operations management, 25(1), 148-164.

Swink, M. L., Golecha, R., & Richardson, T. (2010). Does supply chain excellence really pay off? Supply Chain Management Review, 14(2).

Touboulic, A., & Walker, H. (2015). Love me, love me not: A nuanced view on collaboration in sustainable supply chains. Journal of Purchasing and Supply Management, 21(3), 178-191.

Tseng, M.-L., Islam, M. S., Karia, N., Fauzi, F. A., & Afrin, S. (2019). A literature review on green supply chain management: Trends and future challenges. Resources, Conservation and Recycling, 141, 145-162.

Tseng, M., Lim, M., & Wong, W. P. (2015). Sustainable supply chain management: a closed-loop network hierarchical approach. Industrial Management & Data Systems.

Turkulainen, V., & Ketokivi, M. (2012). Cross-functional integration and performance: what are the real benefits? International Journal of Operations & Production Management.

Vachon, S. (2003). Green supply chain practices: an examination of their antecedents and performance outcomes: Faculty of Graduate Studies, University of Western Ontario.

Vachon, S., & Klassen, R. D. (2006). Extending green practices across the supply chain: the impact of upstream and downstream integration. International Journal of Operations & Production Management.

Vachon, S., & Klassen, R. D. (2007). Supply chain management and environmental technologies: the role of integration. International journal of production research, 45(2), 401-423.

Vachon, S., & Klassen, R. D. (2008). Environmental management and manufacturing performance: The role of collaboration in the supply chain. International journal of production economics, 111(2), 299-315.

Van De Voorde, K., Paauwe, J., & Van Veldhoven, M. (2012). Employee well-being and the HRM–organizational performance relationship: a review of quantitative studies. International Journal of Management Reviews, 14(4), 391-407.

Vickery, S. K., Jayaram, J., Droge, C., & Calantone, R. (2003). The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships. Journal of operations management, 21(5), 523-539.

Walker, G., & Devine-Wright, P. (2008). Community renewable energy: What should it mean? Energy policy, 36(2), 497-500.

Wang, B., Childerhouse, P., Kang, Y., Huo, B., & Mathrani, S. (2016). Enablers of supply chain integration: interpersonal and interorganizational relationship perspectives. Industrial Management & Data Systems.

Welker, G. A., van der Vaart, T., & van Donk, D. P. (2008). The influence of business conditions on supply chain information-sharing mechanisms: a study among supply chain links of SMEs. International Journal of Production Economics, 113(2), 706-720.

Wiengarten, F., Li, H., Singh, P. J., & Fynes, B. (2019). Re-evaluating supply chain integration and firm performance: linking operations strategy to supply chain strategy. Supply Chain Management: An International Journal.

Wiengarten, F., & Longoni, A. (2015). A nuanced view on supply chain integration: a coordinative and collaborative approach to operational and sustainability performance improvement. Supply Chain Management: An International Journal.

Williams, B. D., Roh, J., Tokar, T., & Swink, M. (2013). Leveraging supply chain visibility for responsiveness: The moderating role of internal integration. Journal of operations management, 31(7-8), 543-554.

Winter, M., & Knemeyer, A. M. (2013). Exploring the integration of sustainability and supply chain management: Current state and opportunities for future inquiry. International Journal of Physical Distribution & Logistics Management.

Wong, C. Y., & Boon-Itt, S. (2008). The influence of institutional norms and environmental uncertainty on supply chain integration in the Thai automotive industry. International Journal of Production Economics, 115(2), 400-410.

Wong, C. Y., Boon-Itt, S., & Wong, C. W. (2011). The contingency effects of environmental uncertainty on the relationship between supply chain integration and operational performance. Journal of Operations management, 29(6), 604-615.

Wood, D. J. (1991). Corporate social performance revisited. Academy of management review, 16(4), 691-718.

Wu, G. C. (2013). The influence of green supply chain integration and environmental uncertainty on green innovation in Taiwan's IT industry. Supply Chain Management: An International Journal.

Wu, L., Chuang, C.-H., & Hsu, C.-H. (2014). Information sharing and collaborative behaviors in enabling supply chain performance: A social exchange perspective. International Journal of Production Economics, 148, 122-132.

Yadav, G., Luthra, S., Jakhar, S. K., Mangla, S. K., & Rai, D. P. (2020). A framework to overcome sustainable supply chain challenges through solution measures of industry 4.0 and circular economy: An automotive case. Journal of Cleaner Production, 254, 120112.

Yang, J., Han, Q., Zhou, J., & Yuan, C. (2015). The influence of environmental management practices and supply chain integration on technological innovation performance—Evidence from China’s manufacturing industry. Sustainability, 7(11), 15342-15361.

Yang, Y., Jia, F., & Xu, Z. (2019). Towards an integrated conceptual model of supply chain learning: an extended resource-based view. Supply Chain Management: An International Journal.

Younis, H., Sundarakani, B., & Vel, P. (2016). The impact of implementing green supply chain management practices on corporate performance. Competitiveness Review.

Yu, W., & Ramanathan, R. (2015). An empirical examination of stakeholder pressures, green operations practices and environmental performance. International Journal of Production Research, 53(21), 6390-6407.

Yu, Y., Zhang, M., & Huo, B. (2019). The impact of supply chain quality integration on green supply chain management and environmental performance. Total Quality Management & Business Excellence, 30(9-10), 1110-1125.

Yusliza, M., Yong, J. Y., Tanveer, M. I., Ramayah, T., Faezah, J. N., & Muhammad, Z. (2020). A structural model of the impact of green intellectual capital on sustainable performance. Journal of Cleaner Production, 249, 119334.

Zaid, A. A., Bon, A., & Jaaron, A. (2018). Green human resource management bundle practices and manufacturing organizations for performance optimization: a conceptual model. International Journal of Engineering & Technology, 7(3.20), 87-91.

Zhang, C., Gunasekaran, A., & Wang, W. Y. C. (2015). A comprehensive model for supply chain integration. Benchmarking: An International Journal.

Zhang, M., & Huo, B. (2013). The impact of dependence and trust on supply chain integration. International Journal of Physical Distribution & Logistics Management.

Zhao, L., Huo, B., Sun, L., & Zhao, X. (2013). The impact of supply chain risk on supply chain integration and company performance: a global investigation. Supply Chain Management: An International Journal.

Zhu, Q., Geng, Y., Fujita, T., & Hashimoto, S. (2010). Green supply chain management in leading manufacturers: Case studies in Japanese large companies. Management Research Review.

Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. Journal of operations management, 22(3), 265-289.

Zhu, Q., & Sarkis, J. (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance. International journal of production research, 45(18-19), 4333-4355.

Zhu, Q., Sarkis, J., & Geng, Y. (2005). Green supply chain management in China: pressures, practices and performance. International journal of operations & production management.

Zhu, Q., Sarkis, J., & Lai, K.-h. (2008). Green supply chain management implications for "closing the loop". Transportation Research Part E: Logistics and Transportation Review, 44(1), 1-18.

Zhu, Q., Sarkis, J., & Lai, K.-h. (2013). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. Journal of Purchasing and Supply Management, 19(2), 106-117.