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OPERATIONS, INFORMATION & TECHNOLOGY | RESEARCH ARTICLE

The impact of green entrepreneurial orientation, market orientation and green supply chain management practices on sustainable firm performance

Md. Ahashan Habib^{1,2*}, Yukun Bao¹ and Aboobucker Ilmudeen³

Abstract: This study attempts to examine the impact of green entrepreneurial orientation (GEO) and market orientation (MO) on the implementation of green supply chain management (GSCM) practices and subsequent sustainable firm performance. Further, the study identifies the mediating factor between green entrepreneurial orientation and sustainable firm performance and also explores whether market orientation plays a mediating role in the relationship between GEO and GSCM practices. The data collected from 246 Bangladeshi textile manufacturing firms were analyzed using the structural equation modeling with partial least square techniques, typifying that exploratory and quantitative research. The results revealed that GEO has a significant positive influence on MO and GSCM practices, which ultimately positively effects on all the three dimensions (economic, environmental, and social) of sustainable firm performance. Further, the study found that GSCM practices partially mediate the relationship between GEO and firm

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PUBLIC INTEREST STATEMENT

Nowadays, the liability towards sustainability performance by the manufacturing firms is an important issue and firms are taking effort to achieve this goal. Hence, the strategy of green entrepreneurial orientation (GEO) and market orientation (MO) can be the best approach for implementing green supply chain management (GSCM) practices that can lead to improve sustainability performance. GSCM practices not only reduce the environmental impact but also improve economic performance and organizational competitiveness. Usually, entrepreneurial orientation grasps the firm decision-making posture in the key firm-level task, strategy-making process, and managerial ideas to find out new opportunities for organizational growth and renewal. On the other hand, market orientation adds a new dimension of this study by aligning with customer and competitor orientation which motivates GEO firms to develop GSCM capabilities that improve sustainability performance. This study revealed that GEO and MO have positively influenced to adopt GSCM practices and subsequently sustainable firm performance.

performance while MO also partially mediate the relationship between GEO and GSCM practices. These findings indicate that organizations should emphasize on GSCM practices in their operations to reap sustainability performance. The theoretical and practical implications are also discussed.

Subjects: Environment & Business; Environment & Resources; Industrial Engineering & Manufacturing; Manufacturing Engineering; Industry & Industrial Studies

Keywords: green entrepreneurial orientation; green supply chain management; market orientation; sustainable performance; operation management; textile industry

1. Introduction

In the recent decade, rapid globalization and industrialization have caused to adverse impact on the environment such as global warming, air pollution, water pollution, chemical and toxic explosion (Geng et al., 2017). In response to rising the environmental awareness, green supply chain management (GSCM) has become one of the sustainability foundations among the researchers, government, NGOs, customers and industries in the past few years (Li & Huang, 2017; Saeed et al., 2018; Zhu et al., 2005). However, GSCM practices not only reduce the environmental impact but also improve economic performance and organizational competitiveness (Khan & Qianli, 2017). The benefit of GSCM practices has long been discussed in prior studies (Green et al., 2012; Zhu et al., 2005). Most of the prior studies in GSCM practices have focused on pressure, the importance of GSCM, identifying the basic constituents and performance outcomes of GSCM (Chan et al., 2012), but little research has attempted to identify the firm-level antecedents of GSCM (Sarkis et al., 2010; Zhu et al., 2005).

In comparison to the green entrepreneurial orientation (GEO), factors from where the organizational decision-making turns up regarding the resource deployment and strategic practices (e.g., GSCM) remain yet unexplored. This study explains the relationships among GEO, GSCM practices and sustainability performance from the dynamic capability perspective. Dynamic capabilities are the higher-order capability of the firm to integrate, develop, and reconfigure the organizational competencies to cope up with the quickly changing environments (Teece, 2007). Dynamic capability enhances the firm ability to learn, recombine resources in innovation to achieve competitive advantages and market position. Dynamic capabilities have three characteristics such as sensing, seizing and transforming capability (Teece, 2016). Similarly, GEO also undergirded by three types of characteristics such as green innovation, proactiveness, and risk-taking behavior. Thus, GEO seems to be related to the notion of dynamic capability (Jiang et al., 2018).

Although many research established the relationship of GEO and firm performance (Gast et al., 2017; Jiang et al., 2018), but how and what mechanism GEO effects on performance remain unclear (Hughes et al., 2017). For instance, Jiang et al. (2018) investigated in a most recent study and found that GEO has a positive effect on firm economic and environmental performance. Yet no study has measured how GEO influences organizational practices (such as GSCM practices) to achieve firm performance. So, there is a missing treatment that exists between entrepreneurial orientation and firm performance as without mediating effect, there would not possible to get superior firm performance from entrepreneurial orientation. Similarly, some researchers also suggested to examine in which process entrepreneurial orientation brings firm performance, instead of a simple direct effect (Hughes et al., 2017). Hence, this study effort to examine how the green entrepreneurial orientation approach influences the adaptation of GSCM practices which subsequently influences the firm performance.

Besides, market orientation (MO) has used to examine the mediating effect between GEO and GSCM practice adoption. According to resource advantage theory, market orientation is a valuable intangible resource that identifies the needs and demands of the customer which subsequently

enhances the customer value delivery. MO improved management knowledge to recognize market demands which effort to developing policies for sustainable business practice (Wilburn Green et al., 2015). Hence, this study addresses the following research questions:

- (1) How green entrepreneurial orientation, market orientation, and GSCM practices influence the sustainability performance?
- (2) How the GSCM practices and market orientation mediate between GEO and sustainability performance and GEO and GSCM practices, respectively?

This study contributes to the existing literature is threefold. First, drawing upon of dynamic capability view, this study makes a unique contribution to GSCM literature. From the inherent spirit and vision to change the society, the GEO firm goes ahead for green innovation, proactive steps to mobilize firm resources, and positive attitude to transform the traditional system into the green process. Secondly, prior research raised the issue that GEO alone cannot bring superior firm performance without the mediation effect. There is some missing linkage between GEO and firm performance (Hughes et al., 2017; Real et al., 2014). As a result, this study contributes to the extent literature by identifying the mediation role of GSCM practice between GEO and firm performance. Thirdly, demonstrating the resource advantage theory, market orientation (MO) contributes this research to another new dimension. Properly identifying and realizing the customer needs and demands of environment-friendly products, similarly systematically collecting, monitoring, and analyzing competitor strategy makes GEO firm more inclined on environmental actions and hence improve sustainability practices.

The remainder of the paper proceeds as follows: Next section discusses with a literature review (S2), followed by a research framework with hypothesis development (S3), methodology and the analyses (S4), results and findings (S5), discussion and implications (S6), conclusion and limitation (S7).

2. Literature review

2.1. Research context and background

In this globalization, most of the multinational corporation (MNC) are interested to outsource product from developing countries due to cost advantages (Geng et al., 2017; Köksal et al., 2018). With the byproduct of manufacturing a large amount of environmental pollution generated and gradually destroying the ecological system. GEO, MO, and GSCM practice can be the door for exporting companies in developing countries to the light of environmental and social performance improvement with the achieving of organizational goals and competitiveness (Jia et al., 2018). Till now GSCM already has been widely studied in developed countries, but there has been little research GEO and GSCM, particularly in developing and emerging Asian countries such as Bangladesh (Mitra & Datta, 2013). Bangladesh has been recognized for textile and apparel product sourcing hub among all the international apparel retailer, wholesaler, and customer due to good quality product with cheap price (Rahman & Qi, 2016). The country has been position second-largest textile and apparel product exporter in the world and emerging developing economy in south Asia (BGMEA, 2019). At present this sector has become the economic backbone of the country and rapidly transformed into the emerging developing country (Yadlapalli et al., 2018). In 2017–2018 FY the export value of textile and apparel products was 30.61 billion US dollars which are 83.49% of total export earnings of Bangladesh (BGMEA, 2019) and 5.1% export share of the global market (Yadlapalli et al., 2018). This sector provides 4.4 million jobs of which 82% are women and contributes 13% to GDP (BGMEA, 2019). With the growth of exporting it has been created the opportunity to develop many backward and forward linkage industries (BGMEA, 2019; BTMA, 2019). Recent studies found that many Bangladeshi textile firms are accused of human rights violations, less standard of living wages, negligence to follow the labor laws, gender discrimination, poor infrastructure, lack of fire and safety equipment and training in their practices

(Huq et al., 2016). In this momentum textile industry of Bangladesh has realized the importance of GEO and GSCM practices for the triple bottom line of sustainability success but until recently its adoption is still infancy (Reza et al., 2017). However, it not easy to practice GSCM without motivation, pressure, top management support, green infrastructure (Chu et al., 2017; Saeed et al., 2018; Q. Zhu et al., 2007b). Organizational culture, green knowledge, technological and financial capability, economic and social benefits from green practices may be the backdrop for GSCM adoption in the Bangladeshi textiles industry (Majumdar & Sinha, 2018).

2.2. Dynamic capability and green entrepreneurial orientation

The dynamic capability view has three characteristics sensing, seizing, and transforming activities. According to Teece (2016), sensing capabilities identify, develop and assess the technological opportunities for customer needs. Seizing capabilities bring into an action plan to the mobilization of resources to fulfill the current demand and opportunities. Transforming capabilities always keep organization updating and renewal its resources to capture the highest market value (Ilmudeen & Bao, 2018). Green entrepreneurial orientation associated with the notions of dynamic capabilities by undergirded by three sets of organizational processes: green innovativeness, proactive action plan, and risk-taking and vulnerability (Jiang et al., 2018).

GEO is one of the youngest and valuable researched topics in both entrepreneurship and environmental literature. The competitiveness in the business environment has been forcing the organization to remain exploring new opportunities. A strategic orientation, consequently, directs the businesses and finds them in identifying customer needs and wants proactively by introducing new products and services in advance of the competitor's actions (Altinay et al., 2016). In the entrepreneurship literature, businesses growth and value creation depending on entrepreneurial activities to identification and exploration of business opportunities through innovation, proactive behaviors, and risk-taking decisions (Altinay et al., 2016; Chan et al., 2012; Syrjä et al., 2019). Different research has given different names to green entrepreneurship, such as ecopreneurship, environmental entrepreneurship and sustainable entrepreneurship which stands different meanings (Dean & McMullen, 2007). Many researchers focus the entrepreneurial actions is to change the world instead of profit earning (Forouharfar et al., 2019; Harvey, 2007). Some other research means that green entrepreneurs are also earning profit and finding new opportunities with their aims to green innovation, risk-bearing and searching for new opportunities (Pacheco et al., 2010). According to Dean and McMullen (2007) green entrepreneurship is a predilection to identify potential opportunities that may create economic and ecological welfares by initiating green activities. Usually, entrepreneurial orientation grasps the firm decision-making posture in the key firm-level task, strategy-making process, and managerial ideas to find out new opportunities for organizational growth and renewal (Hughes et al., 2017).

2.3. Resource advantage theory and market orientation

Resource advantage theory suggests that market orientation is a rare and valuable resource of a firm to make differentiation and/or customer value delivery to enhance competitive advantage (Wilburn Green et al., 2015). According to this theory that firms can achieve superior performance by accurately capturing market knowledge and taking proper management decisions to convert firm indistinctive resources to the market offering which is creating value to one or more market segments (Frambach et al., 2003). GEO firm captures market knowledge and takes strategic decision-making to translate these comparative advantages to competitive advantages through GSCM practices. GSCM practices are the organizational key differentiation of environmental practices by which organizations can achieve economic, environment and social performance (Eltayeb et al., 2011). In this globalization and open market, there are more than thousands of competitors are offering the product to the market. But only the company who have a better knowledge of customer needs and wants, and can satisfy their customer may get competitive advantages. Market orientation (MO) can be defined that the ability to identify and satisfy customers' needs (Bamfo et al., 2019; Choi, 2014). In this study, we considered two behavioral views of market orientation as customer orientation and competitor

orientation. Recently, the growth of environmental concern, customers are more demanding environmental friendly product (Frambach et al., 2003). Market orientation firms capture such needs and mobilizing firm resources towards green initiatives (Jiang et al., 2018). MO orientated firms always systematically collect, monitor, analyze the competitor strategy and take green action to achieve competitive advantages (Frambach et al., 2003). Due to growing consumer awareness on eco-friendly textiles product (Hustvedt & Dickson, 2009), retailers are promoting and sourcing environmental friendly product to lower the environmental impact (Zsidisin & Siferd, 2001); hence, they strictly control their suppliers to confirm their products are manufactured and delivered in a sustainable manner (Petljak et al., 2018). For example, the world's largest garments retailer H&M reported that at present they collect 59% of their cotton product from a sustainable source and they have a goal to source 100% by 2020 (H&M, 2017). Prior research found market-oriented knowledge about customers and competitors is positively related to environmental and financial performance (Choi, 2014; Frambach et al., 2003). Market orientation enhances marketing advantages through the sustainable affiliation of GSCM practices. MO is an intangible resource that improves management knowledge about customer demand for the environmental product. MO manager utilizes this demand knowledge and takes strategy to satisfy both customer and owner through GSCM practices.

2.4. Green supply chain management (GSCM) practices

Since the last three decades, GSCM has been gained much attention in the business (Zhao et al., 2017). GSCM practices can be described as green initiatives right from design, procurement, manufacturing, delivery, up to product recovery (Kaur et al., 2017; Masudin et al., 2018; Zhu & Sarkis, 2007a), in the essence of reduce, reuse, recycling of resources and energy in order to improve the environmental impacts (Tippayawong et al., 2016). In prior research, there are different dimensions have been found as GSCM practice. Zhu et al. (2007b) have studied several research considering internal environmental management, eco-design, green purchasing, customer cooperation with environmental concerns, investment recovery as GSCM practices. Besides the above practices, some other variable has been developed by different researchers such as green information systems (Khan & Qianli, 2017), water and energy management, waste management (Petljak et al., 2018), reverse logistics (Y.-C. Huang & Yang, 2014). After an extensive literature study, we considered internal environmental management (IEM), eco-design (ED), cooperation with the customer (CC) as the GSCM practices.

Internal Environmental Management (IEM) refers to GSCM initiatives in the operations which incorporate the top management decision, middle management support for successful implementation, cross-departmental collaboration (Vanalle et al., 2017; Zhu & Sarkis, 2007a). Zhu et al. (2010) confirmed that top management commitment is the most significant among all the other practices towards GSCM implementation in the Chinese firm. The organization manager is the key driver to take strategies and goals to use green policy, standardize the process to minimize the risk, and develop the assessment system to monitor the environmental impacts (Vijayvargy et al., 2017; Zhu et al., 2005).

Eco-Design (ED) aims to design and develop an environment-friendly product to minimize the environmental impact through product life-cycle analysis (Al-Ghwayeen & Abdallah, 2018). Many researchers considered ED as GSCM practice which incorporates the environmental aspects from product idea to use and finally disposal (Vanalle et al., 2017; Vijayvargy et al., 2017; Zhu et al., 2007b). According to (Khan & Qianli, 2017), the enterprise is getting an early-mover advantage when they innovate eco-friendly product design, develop manufacturing capabilities and green marketing. To achieve early mover advantages and to gain order winners, many companies adopt ED practices into their operations. For example, Patagonia leading American outdoor textile retailer experienced 11% of annual sales growth when they introduce recycle polyester in the garments. Also, their sales increased when they introduce garments made from organic cotton even though the price was increased by more than 50% from normal cotton garments (Reinhard, 1998).

Cooperation with customer (CC) practices includes customer support and green training for eco-design, green production, and green packaging (Vijayvargy et al., 2017). Collaborative activities with environmental objectives such as joint planning, forecasting, replenishment, eco-design, process improvement, and waste reduction can enhance organizational performance (Vachon et al., 2006). Customers are the key driver for adoption and implement GSCM practices into the supplier firm (Susanty et al., 2019).

3. Research framework and hypothesis development

Based on extant literature review, we theoretically propose that with positively mediating effect of GSCM practices between the relationship of GEO and sustainable firm performance, and positively mediating effect of market orientation in between the relationship of GEO and GSCM practices, we conceptually develop a theoretical model (Figure 1) and proposed six hypotheses.

3.1. Green entrepreneurial orientation and green supply chain management practices

From the dynamic capability view, an organizational strategic orientation (e.g., GEO) can be considered as the highly valuable intangible capability to respond and implement strategic practices (e.g., GSCM) and consequently improve the firm performance (Altinay et al., 2016; Teece et al., 1997). Dynamic capabilities are poised of three attributes which can be conceptualized to have in GEO as; sensing, seizing and transforming capabilities (Teece, 2016). Simultaneously GEO also has three intrinsic characteristics; green innovativeness, proactiveness, and risk-bearing (Jiang et al., 2018), all of this has indistinct relationships to GSCM practices. GEO sensing capabilities identify the appropriate market opportunity and usually take proactive action to adopt green practices in order to meet the present and future challenges rising from environmental conscious customers and stakeholders (Nikolaou et al., 2018). In order to capture the customer value, GEO firm innovate, produce and deliver environmental friendly products and services. Studied found a significant relationship among GEO, innovation performance. Pérez-Luño et al. (2011) found entrepreneurial orientation positively influence the firm innovation. Similarly, Alegre and Chiva (2013) found innovation positively and significantly mediates the relationship between entrepreneurial orientation and firm performance. This finding directs GEO stressed on GSCM practice to design and manufacture of eco-friendly product and services to enhance competitive advantage. GEO seizing capabilities encourage the firm to mobilize the resource to adopt green technologies, green manufacturing which improve production efficiency with reducing energy consumption as well as pollution prevention (Jiang et al., 2018). GEO firm exploits the single opportunity as green practice such as sales of excess inventories, scrap and used materials (Zhu et al., 2005), harvesting the rainwater, wastewater reuse, recycle, use of energy-saving and solar light may enhance economic and environmental performance (J.-W. Huang & Li, 2015). To uphold the corporate reputation GEO firm undertakes internal environmental management practices such as ISO 14,000, EMS, environmental compliance and auditing programs (Zhu et al., 2013). GEO

Figure 1. Conceptual research model.

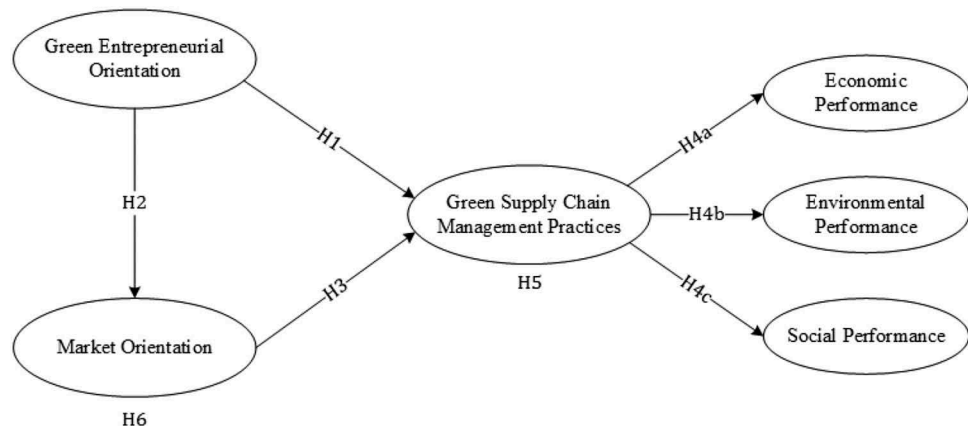
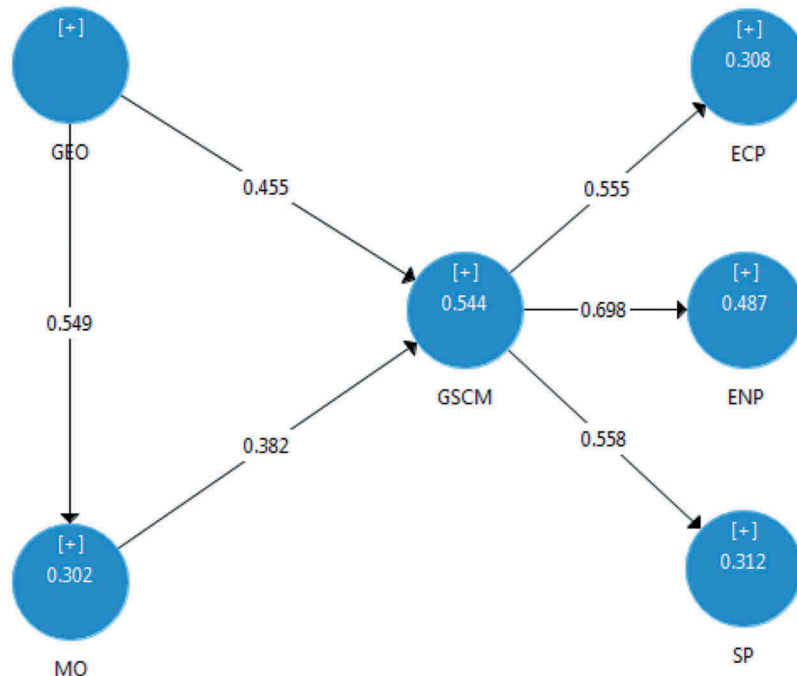


Figure 2. Structural model.



transforming capability encourages the firm to adopt green strategies in an uncertain environment. Traditional practices are transforming to green practices in the essence of GEO's foresight the market opportunity (Tece, 2016). From the above discussion we propose the following hypothesis:

H1. Green Entrepreneurial Orientation have positively influence to adopt green supply chain management practices.

3.2. Green entrepreneurial orientation and market orientation

Green Entrepreneurial Orientation is the firm decisions making behavior in style of adoption and practices to differentiate them from competitors (Montiel-Campos, 2018). According to the dynamic capability view, GEO firm identifies the potential market opportunity and take innovation initiative, proactive posture and risk-taking behavior to achieve competitive advantages (Jiang et al., 2018). Prior research found GEO has a direct positive relationship with firm performance (Jiang et al., 2018; Montiel-Campos, 2018; Rauch et al., 2009). In this study, we investigate the effect of GEO on market orientation. The market orientation (MO) is an important concept to many scholars, as it is the foundation for the identification of market knowledge and guideline for marketing practice (Montiel-Campos, 2018). According to resource advantage theory, MO is an intangible resource by which firms can achieve superior performance through precisely management decisions to occupy distinctive marketplace positions over their competitors and achieve competitive advantage (Wilburn Green et al., 2015). Market orientated firm needs to be systematically collect, monitor and analyze the rapid change of customer needs and demands, and analyze how to market delivery impact customer satisfaction, also how product innovation influence customer demand and take strategic marketing implementation plan to achieve competitive advantages (Rauch et al., 2009). The nexus between the relationship of GEO and MO is clear; the entrepreneurial strategic and tactical decision-making depends on the appropriate identification of needs and demands of the customer through proper marketing practices (Montiel-Campos, 2018). Thus, our proposed hypothesis is as follows:

H2. Green Entrepreneurial Orientation have positively influence on market orientation.

3.3. Market orientation and green supply chain management practices

Previous research has established the relationship between market orientation and environmental practice implementation such as GSCM practices (Choi, 2014; Wilburn Green et al., 2015). Recently growing concern of environmental issues, the customers are demanding eco-friendly products hence the MO firms are significantly adopted GSCM practices to meet customer demand through manufacturing their product in an environmental sustainable manner (Wilburn Green et al., 2015). Strong MO firm prioritizes the customer needs and wants, analyzing competitor strategies and developing the firm ability such as GSCM to satisfy the customer (Frambach et al., 2003). The resource advantage theory suggests that MO is an intangible resource that develops the firm ability to generate intelligence in the changes with customer demand and leverages the firm resource to satisfy the customer through green innovation and GSCM practice (Wilburn Green et al., 2015). Hence, our proposed hypothesis is as follows:

H3. Market orientation has positively influence to adopt green supply chain management practices.

3.4. Green supply chain management practices and sustainable firm performance

The relationship between GSCM practices and firm performance has been widely studied and empirically established in the literature of production and operations management (Mitra & Datta, 2013; Vanalle et al., 2017; Zhu et al., 2013). GSCM practices enhance economic performance through minimization in waste generation hence reduce the cost of waste treatment, reduce the environmental accident, saves energy. Empirically evidence from the top 100 sustainable global companies (Ameer and Othman, 2011) identified that long run internal environmental practices have a significant impact on firm sales growth, ROA, profit before taxation and cash flows. From the meta-analysis, Geng et al. (2017) confirmed that customer collaboration, GSCM practices achieved better economic performance. Eco-design significantly improves economic performance (Yildiz Çankaya & Sezen, 2019).

GSCM practices contribute to the environment performance through reduced consumption of water, energy, hazardous and toxic materials in the production as well as reduce the generation of wastes, effluents, air emissions, environmental accidents and improvement of the health and safety of worker and community (Eltayeb et al., 2011; Wilburn Green et al., 2015). Eco-design practices improve product functionality, reduce energy consumption and waste treatment cost and consecutively lessen lifecycle environmental effects (Zhu & Sarkis, 2004). GSCM practices can minimize the overall environmental impact by producing eco-friendly products via green marketing, green R&D, and green production (Peng & Lin, 2007).

In recent years, social sustainability gains much attention in the manufacturing firm due to growing awareness on safety, job security, equity, education and ethical practice in business (Eriksson & Svensson, 2015). Social sustainability primarily considers the health, safety, well-being of people and impact on society (Yadlapalli et al., 2018). Social sustainability practices make an organization more legislative and competitive benefits (Eriksson & Svensson, 2015). In terms of social performance, Zailani et al. (2012) studied in Malaysian manufacturing firms and found that GSCM practices have a significant effect on social performance. From the above discussion we propose the following hypothesis:

H4. Green supply chain management practices are positively associated with H4a-Economic performance, H4b-Environmental, and H4 c-social performance.

3.5. Mediation effect of green supply chain management practices between green entrepreneurial orientation and sustainable firm performance

GSCM practices are expected to pollution prevention and sustainable performance (Eltayeb et al., 2011), which required organizational initiatives and resource deployment that can be functionalized by GEO (Gast et al., 2017; Paulraj, 2011). The NRBV suggests that firms should implement green strategies to achieve competitive advantage (Hart, 1995), which are entrepreneurial dynamic efforts on sustainable performance (Paulraj, 2011). Green practices are valuable, contemporary entrepreneurial actions that reap as endowments firm and gain competitive advantages. It is certain that GEO is the combination of some entrepreneurial characteristics as a posture of decision-making efforts towards the strategy-making process (Hughes et al., 2017), which cannot directly achieve firm performance without its tactical actions such as GSCM practices. The researcher also argues that there is some missing mediation linkage between GEO and performance (Alegre & Chiva, 2013; Real et al., 2014). In the RBV framework found that organizational resource and capability often mediate entrepreneurial orientation and performance. For instant, Martin and Javalgi (2016) found that marketing capability mediates the relationship between entrepreneurial orientation and innovation performance. Alegre and Chiva (2013) explored that organizational learning capability is positively mediated between entrepreneurial orientation and innovation performance. Another study Wilburn Green et al. (2015) identified the positive mediation relationship of GSCM practice between market orientation and firm performance. The link between GEO, GSCM practice and firm performance has not been tested before. Thus, from the above discussion we propose the following hypothesis:

H5. Green supply chain management practices positively mediate the relation between GEO and sustainable firm performance.

3.6. The mediation effect of market orientation between green entrepreneurial orientation and GSCM Practices

Prior study has been established the relationship between market orientation and GSCM practices (Choi, 2014; Wilburn Green et al., 2015), but in this study, we investigate the mediation effect of MO between the relationship of GEO and GSCM practices. The firm's orientation depends on how they align with either customer or competitor, in particular, what extent firms are developing and introduce new products (Frambach et al., 2003). Managerial decisions making and practices are often influenced by market changes and needs. The heterogeneity of firms' adoption of GSCM practices depends on the level of market orientation. Under dynamic capability view, sensing capability of GEO firm can identify the market demand and take proactive environmental strategy and innovate environmental friendly products and services (Jiang et al., 2018). GEO orientated firm is seeking customer cooperation to produce the green product. When the customer's demand of the environmental friendly product is rising the GEO firm act quick responsive to fulfill market demand in an environmental sustainable manner such as GSCM practices to the satisfied environmental friendly customer (Wilburn Green et al., 2015). On the other hand, organizations are embedded within competitor and GEO firms always monitor competitor strategy. Systematically and continuous collecting, monitoring and analyzing of competitor strategy, GEO firm takes proactive environmental initiatives such as GSCM practice before their competitor action (Frambach et al., 2003). Hence, our conceptualize hypothesis as follows:

H6. Market orientation positively mediates the relationship between GEO and GSCM practices.

4. Research methodology and data analysis

4.1. Variable measurement and questionnaire design

The survey instrument is structured in three stages. In the first stage, the item of the variables was identified through an extensive literature study. In the second stage, items are pre-tested by two

senior academic experts and four textiles industry experts who know about the GSCM. Finally, a pilot study is employed involving 20 respondents who are sufficient knowledge about GSCM and hold a senior position in the industry. Expert opinions are carefully followed for improvement, appropriateness and content validity of the measurement items. All the first-order construct Cronbach alpha is found greater than 0.7, which means questions are reliable (Hair et al., 2014). The questionnaire was divided into two parts. Part one contains the demographic information of respondents and part two includes questions of the different constructs. All the items are measured using five-point Likert scale. All the measurement items scale are ranging from 1-“strongly disagree” to 5-“strongly agree”. For Green Entrepreneurial Orientation dimension (5-items) were adopted from Jiang et al. (2018). Three dimensions of green supply chain management (10-items) were adopted from Zhu et al. (2007b) including internal environmental management, Eco-design, cooperation with the customer. Sustainable firm performance dimension (15-items) mainly economic, environment and social performance were measured from Paulraj (2011). For details of variables measurement items are presented in Table 2 and appendix-1.

4.2. Sample and data collection

The population of this study is the textile manufacturing industry in Bangladesh. The study concentrates on textile industries due to these industries are the major source of environmental damage through the release of both toxic and hazardous wastes (Khan et al., 2009). Bangladesh has been positioned second-largest textile and garments product exporter in the world and emerging developing economy in south Asia (BGMEA, 2019). According to the Bangladesh Textile Mills Association (BTMA), there are 425 yarn manufacturing, 796 fabric manufacturing, 240 dyeing industry (BTMA, 2019), and according to Bangladesh Garments Manufacturing and Exporters Association (BGMEA), there are 4560 garments manufacturing industries in Bangladesh (BGMEA, 2019). Some of the industries are vertically orientated those have all the facilities from yarn production to garments manufacturing and those factories are listed in these two associations. Most of the textile industry located near the Dhaka city named Gazipur, Savar, and Narayanganj region. For this study, a total of 500 textile manufacturing industries were randomly selected. The survey includes a wide range of different types of textile manufacturing industry such a yarn manufacturing, fabric manufacturing, garments manufacturing, dyeing industry, printing industry, washing industry, home textiles, sweater manufacturing, textile chemical industry, and accessories industry.

The questionnaire in a hard copy was distributed to the manager of the manufacturing firms with a cover letter highlighting the objectives of this study. The participants are mainly engaged in the job related to supply chain management, production, marketing, and operations department. Most of the respondents are the director, manager, senior executive, and executive. All of the respondents are well-educated graduate, postgraduate level. Hence, it is reasonable that respondents are well understanding the questions. Data were collected from January to March 2019. After 3 weeks later follow-up calls and reminder emails were sent to the respondents, in the first phase 124 and second phase 142 and a total of 266 questionnaires were received, representing 53.6% of the response rate. From this record, 20 answers were excluded due to incomplete and the same answer to all questions and missing answers. Finally, a usable sample of 246 valid answers was kept for analysis which accounted for 91.7% valid response of this study.

Table 1 indicates that the majority of the respondents are doing job in the supply chain, production, and operation department. Approximately 55.7% of the respondent has more than 11–15 years of experience in the textiles industry, about 38% respondent is working as post of assistant manager. The highest number of the firm is higher size enterprise. Approximate employee ranges over 2000. The highest number of the firm was doing business more the 20 years. Most of the firm is ISO 9000 and ISO 14000 certified.

4.3. Data analysis procedure

For this study, partial least square structural equation modeling (PLS-SEM) software was used. It is reasonable that due to exploratory study PLS is appropriate software. The PLS structured equation

Table 1. Demographic profile of the sample

Category	Frequency (N)	Percentage (%)
Gender		
Male	220	89.4
Female	26	10.6
Education		
Undergraduate	33	13.4
Graduate	145	58.9
Postgraduate	66	26.8
Doctorate	2	0.8
Work experience		
Less than 5 years	31	12.6
5-10 years	48	19.5
11-15 years	137	55.7
16-20 years	28	11.4
More than 20 years	2	0.8
Position		
Executive officer	80	32.5
Senior executive officer	27	11
Assistant manager	93	37.8
Senior manager/Manager	26	10.6
General manager/DGM	12	4.9
Managing director/Director/CEO	8	3.3
Company type		
Yarn manufacturing	10	4.1
Fabric manufacturing	29	11.8
Garments manufacturing	102	41.5
Dyeing industry	73	29.7
Printing industry	7	2.8
Washing industry	7	2.8
Home textiles	2	0.8
Sweater manufacturing	6	2.4
Accessories industry	6	2.4
Textile chemical industry	4	1.6
Working department		
Production	91	37.0
Supply chain	91	37.0
Operations	30	12.2
Marketing	26	10.6
research and development	8	3.3
Age of company		
Less than 5 years	28	11.4
6 to 10 years	39	15.9
11 to 15 years	56	22.8
16 to 20 years	36	14.6
More than 20 years	87	35.4
Employees		

(Continued)

Table 1. (Continued)

Category	Frequency (N)	Percentage (%)
Under 200 employees	49	19.9
Over 200 to 500 employees	27	11.0
Over 500 to 1000 employees	29	11.8
Over 1000 to 2000 employees	33	13.4
Over 2000 employees	108	43.9
Is your company ISO 9000 certified?		
Yes	178	72.4
No	68	27.6
Is your company ISO 14001 certified?		
Yes	140	53.9
No	106	43.1
Total	246	100

modeling technique was used as it is a widely accepted model to validate theory with empirical data (Hair et al., 2014). Smart PLS 3.2.8 used for the data analysis purpose. The analysis includes two-steps. First, we evaluated the measurement model and the second step measures the structural model. Also, PLS offers valuable tools for GSCM research owing to the high grade of flexibility it offers for the relationships between theory and data (Vanalle et al., 2017), which appears directly necessary given the present state of research in green supply chain management. Structural Equation Modelling (SEM) method is used in this study. The SEM method can comprehensively analyze data both the relationship between latent variables and the relationship between manifest variables in each latent variable (Ilmudeen et al., 2019). The latent variable is an unobserved and unmeasured variable that needs indicators or manifest variables to its measure. While manifest variables or observed variables act as indicators in a model of SEM. In this study, there are six latent variables named green entrepreneurial orientation (GEO), market orientation (MO), green supply chain management practices (GSCM), economic performance (ECP), environmental performance (ENP), social performance (SP) and 36 manifest variables are used.

4.4. Measurement model

The measurement model was assessed by examining the construct reliability, convergent validity and discriminant validity (J. F. J. Hair et al., 2016). First, to measure the construct reliability, we assessed composite reliability and Cronbach alpha of the construct. From our measurement we found all the composite reliability of the first-order construct between 0.858 and 0.923 (see Table 2). And the range of Cronbach alpha values in between 0.805 and 0.908, which is above the threshold value of 0.7, which means our measurement model construct is reliable and fit for the model (Hair et al., 2014). Second, the average variance extracted (AVE) was used to assess the convergent validity (Fornell & Larcker, 1981). All the construct AVE values were found within the range of 0.547 to 0.604, which is above the threshold values of >0.50 and which indicates the convergent validity of our model is well accepted (Hair et al., 2019). Finally, discriminant validity is assessed through the cross-loading matrix and Fornell-larcker criterion. The cross-loading examination is evaluated by the outer loading of the measurement items on the associated construct should be greater than all of its loadings on other constructs. The results of the cross-loading matrix in our study found that the loading of all measurement items is higher on their intended construct (see appendix-2). Finally, Fornell-larcker criterion evaluated by the square root of each construct's AVE should be greater than its highest correlation with any other construct (Fornell & Larcker, 1981). In our study, the square root of AVE as the diagonal elements is greater than the off-diagonal correlation in the rows and columns, signifying the fulfillment of Fornell-larcker criterion (See Table 3). Thus, the joint results of the cross-loading and Fornell-larcker criterion confirm that the discriminant validity of the data is satisfied.

Table 2. Measurement model-quality criteria

Construct/Measures	Item	Loading	CA	CR	AVE
Green entrepreneurial orientation	GEO1	0.803	0.835	0.884	0.604
	GEO2	0.786			
	GEO3	0.732			
	GEO4	0.820			
	GEO5	0.740			
Green supply chain management Practices	IEM1	0.773	0.908	0.923	0.548
	IEM2	0.764			
	IEM3	0.764			
	IEM4	0.708			
Eco-design	ED1	0.742			
	ED2	0.712			
	ED3	0.705			
Cooperation with customer (CC)	CC1	0.722			
	CC2	0.791			
	CC3	0.743			
Market orientation (MO)	MO1	0.762	0.836	0.880	0.550
	MO2	0.777			
	MO3	0.737			
	MO4	0.720			
	MO5	0.703			
	MO6	0.747			

(Continued)

Table 2. (Continued)

Construct/Measures	Item	Loading	CA	CR	AVE
Environmental performance (EP)	ENP1	0.704	0.794	0.858	0.547
	ENP2	0.763			
	ENP3	0.708			
	ENP4	0.778			
	ENP5	0.779			
Economic performance (ECP)	ECP1	0.707	0.805	0.865	0.563
	ECP2	0.724			
	ECP3	0.811			
	ECP4	0.791			
	ECP5	0.712			
Social performance (SP)	SP1	0.772	0.823	0.876	0.587
	SP2	0.826			
	SP3	0.718			
	SP4	0.775			
	SP5	0.786			

Table 3. Latent variable descriptive, correlations and discriminant validity

	Mean	SD	ECP	ENP	GEO	GSCM	MO	SP
ECP	3.798	0.954	0.750					
EN	3.790	0.997	0.517	0.740				
GEO	3.619	1.098	0.496	0.658	0.777			
GSCM	3.758	1.031	0.555	0.698	0.665	0.740		
MO	3.854	0.946	0.558	0.532	0.549	0.632	0.742	
SP	3.828	0.918	0.513	0.556	0.461	0.558	0.702	0.766

Note: The diagonal (in italic) data represents the square root of AVE of the construct.

5. Results and findings

5.1. Structural model and hypothesis testing

The structural model was developed to analyze the path relationships of different constructs in the hypothetical model (Figure 2). The hypotheses are tested in two steps. First, we tested the significance of direct path analysis of the latent variables; in which we analyzed the significance of the path coefficient through bootstrapping of 5000 subsamples. Second, we analyzed the mediation effect of GSCM practice in between GEO and firm performance and the mediation effect of MO in between GEO and GSCM practices, respectively. We used R^2 value in the dependent variable to measure the explanatory power of the structural model. The structural model accounted for 30.8% of the variance in economic performance, 48.7% of the variance in environmental performance, and 31.2% of the variance in social performance which confirms the predictive validity (J. F. J. Hair et al., 2016). The study tests the association between the independent and dependent variables by path coefficient (θ) and t-statistics. According to Table 4, there is direct and positive significant relationship of GEO on GSCM practices ($t = 8.735$, $\theta = 0.455$, $p < 0.001$), and MO ($t = 12.791$, $\theta = 0.549$, $p < 0.001$) successively. Therefore, H1 and H2 are supported. Similarly, MO has positive relationship on GSCM ($t = 6.850$, $\theta = 0.382$, $p < 0.001$). So, hypothesis H3 is accepted. Thus, the firm with greater the GEO and MO capability will significantly have associated with the GSCM practices. Further, GSCM has found direct positive relationship with economic, ECP ($t = 10.059$, $\theta = 0.555$, $p < 0.001$), environmental, ENP ($t = 22.084$, $\theta = 0.698$, $p < 0.001$), and social performance, SP ($t = 11.004$, $\theta = 0.558$, $p < 0.001$). Therefore, H4a, H4b, H4 c is supported. Thus, greater the GSCM practice the greater the positive impact on sustainable firm performance.

5.2. Test for mediation effect

Following the guideline of (Preacher & Hayes, 2008) we tested the mediating effect of GSCM practices and market orientation. Path coefficient is determinant of mediating effect analysis which is measured by the direct path of the independent and mediating variable (i.e. iv-mv)

Table 4. Bootstrapping results for structural model evaluation

Hypothesis	Path	Path coefficient	T statistics	P values	Significant
H1	GEO → GSCM	0.455	8.735	0.000*	Yes
H2	GEO → MO	0.549	12.791	0.000*	Yes
H3	MO → GSCM	0.382	6.850	0.000*	Yes
H4a	GSCM → ECP	0.555	10.059	0.000*	Yes
H4b	GSCM → ENP	0.698	22.084	0.000*	Yes
H4 c	GSCM → SP	0.558	11.004	0.000*	Yes

Significant level $p < 0.001$.

and mediating and dependent variable (i.e. mv-dv). From the path coefficients of the bootstrapping the results found the significance of the mediating effect which has been calculated following the suggestions of (Hair et al., 2014). Further, the variance accounted for (VAF) has been calculated to determine the size of the mediating effects. The results of the mediating effects are shown in Table 5. The results indicate that there is a significant indirect effect of GEO on economic, environment, and social performance through the mediation of GSCM practices ($\beta = 0.341, p < 0.001$), ($\beta = 0.351, p < 0.001$) and ($\beta = 0.301, p < 0.001$). Similarly, GEO has a significant indirect effect on GSCM practices through the mediation of MO ($\beta = 0.211, p < 0.001$). This finding supports the hypothesis H5a, H5b, H5 c, and H6. This result demonstrates that GSCM practices partially mediate the relationship between GEO and environmental, economic and social performance. While MO also partially mediates the relationship of GEO and GSCM practices.

6. Discussion and implications

6.1. Discussion

The entrepreneur is the key decision-maker to take organizational initiatives. The entrepreneur is motivated through market orientation from customers and competitors towards environmental sustainability initiatives such as green innovation, risk-taking on green project development and proactive action before their competitor action. Drawing upon dynamic capability view and resource advantage theory, we develop a hypothetical model and to assess the relationship between 1. Green entrepreneurial orientation, market orientation, and green supply chain management practice on sustainable textiles firm performance 2. Analysis of the mediation effect GSCM practices between GEO and sustainable firm performance 3. To assess the mediation effect of market orientation in the relationship between GEO and GSCM practices.

First, the results revealed that GEO posited with GSCM practices relationship is significantly supported. In the previous study, evidence shows that GEO has a strong and significant relationship with cleaner production which is supported to our hypothesis (De Guimarães et al., 2018). Originally, GEO firms are encouraged from their core heart on sustainability performance hence their footprint lays on their green activities in thinking, creations, innovations, motivations, operations and all the supply chain activities which bring superior competitive advantages. Recent study also supports our proposition that green entrepreneurial orientation has a significant relationship both environmental and financial performance through sustainable environmental practices such as green innovation, eco-design, risk-taking (Jiang et al., 2018). Many studies have found GSCM practices improve firm economic, environmental and social performance (Eltayeb et al., 2011; Foo et al., 2018). Consistent with their findings our study revealed that GSCM practices have a significant relationship with the sustainable firm performance based on Bangladeshi textiles firm.

Second, this study is to find out the missing link between GEO and firm performance. Consistent with the argument raised by Hughes et al. (2017) and Real et al. (2014), our study revealed that GSCM practices act as an intermediary link between GEO and sustainable firm performance. We found GSCM practices partially mediate the link between GEO and firm economic, environmental, and social performance. This study revealed an important precursor of GSCM. Most of the prior study on GSCM practices have focused on different institutional pressure, recognizing the fundamental elements and the effects of GSCM (Chan et al., 2012), but little research has attempted to identify the firm-level antecedents of GSCM. Our study fulfills this glaring research gap by empirically validating that green entrepreneurial orientations stance an important antecedent for the organization to adopt GSCM practices.

Thirdly, Motivation from the market orientation, GEO firm are more intuitive actions towards GSCM practices. Consistent with the study of Jiang et al. (2018) our proposed hypothesis has significantly supported and proved the mediation relationship of MO between GEO and GSCM practices. According to Jiang et al. (2018) market knowledge is the facilitator of entrepreneurial activities such as new

Table 5. Summary of mediation results

Hypothesis	Indirect path						Total effect	VAF	Decision
	Path	θ	Path	θ	Mediation effect θ	t-value			
H5a	GEO → GSCM	0.762	GSCM → ECP	0.447	0.341	3.020*	0.601	0.567	Partial
H5b	GEO → GSCM	0.761	GSCM → ENP	0.462	0.351	3.868*	0.807	0.435	Partial
H5 c	GEO → GSCM	0.666	GSCM → SP	0.452	0.301	3.728*	0.462	0.652	Partial
H6	GEO → MO	0.549	MO → GSCM	0.384	0.211	4.511*	0.665	0.317	Partial

Notes: Bootstrapping (n = 1000). *p < 0.001.

ideas, green innovation which bring competitive sustainable advantages. Prior research found the significant direct relationship of MO on GSCM practice (Choi, 2014; Wilburn Green et al., 2015), but our study revealed the new dimension in the mediation effect of MO between GEO and GSCM practice which is the theoretical contribution of entrepreneurial and GSCM literature.

6.2. Theoretical implications

This study theoretically contributes to the GEO and GSCM literature in four ways. Firstly, drawing upon on dynamic capabilities perspective, firm strategic and decision-making orientation (i.e. GEO) is identified as a dynamic capability. Thus, this study illustrates that GEO and dynamic capability are intertwined with each other in three contemporary procedures and tasks such as a desire to take initiative in green innovation, proactive behavior towards capture new opportunities, and risk-taking a courageous attitude towards transforming to the ecological benefited economy.

Secondly, this study extends the existing GSCM literature by identifying a new antecedent of GSCM practices. Prior research of GSCM practice was either simple direct effect analysis (Foo et al., 2018) or institutional pressure antecedent based (Wang et al., 2018; Q. Zhu et al., 2013) or identify the components and their importance (Luthra et al., 2015). But this study is the first attempt to identify the firm-level antecedents of GSCM.

Thirdly, the mediation effect of GSCM practices fulfills the missing linkage between GEO and firm performance. The GEO firm can achieve superior performance through properly following and implementing GSCM practices in their organization. GSCM practices must consider the entire inter depended organizational environmental management, production responsibility, life-cycle assessment, and industrial ecosystems (Zhu et al., 2005). Interorganizational integration of sourcing, engineering, marketing, operational, logistics activities and their concern on environmental issues can be considered as effective GSCM and this integration improves organizational sustainability performance (Kazancoglu et al., 2018).

Fourthly, in the resource advantage theory market orientation adds a new dimension of this study by aligning with customers and competitors orientation which motivates GEO firm to initiate and develop GSCM capabilities that improve sustainability performance. According to resource advantage theory, the market-oriented firm can properly identify the actual customer demand and at the same time getting marketing advantages through affiliation of environmental practice, hence getting superior firm performance.

6.3. Managerial Implications

This study's findings bring the following practical implications. First, the business's growth and value creation of the firms depends on entrepreneurial dynamic capability in the form of innovation, proactive behaviors, and risk-taking decisions and finding new opportunities. GEO firm following dynamic capabilities to identify possible market opportunities. Dynamic capabilities strengthen the entrepreneurial strategies and decision-making power towards value delivery to the market and performing environmental friendly activities such as GSCM practices to achieve a sustainable goal. Now a day, growing global environmental concerns, customers' demand of environmental responsible process and product demand are increasingly rising. Hence, the GEO firm should keep on eye to the potential customer's eco-friendly product demand and then plan-source-make-delivery the product as meeting with sustainable practice.

Second, the GEO firm needs to closely cooperate with their customers to improve the overall environmental situation through GSCM practices. Further, the GEO firm may get competitive advantages through implementing internal environmental practices to make them socially legitimate firms. In addition to this, GEO firm may keep sharp eye on their competitor strategies and actions, and then can take proactive environmental initiatives such as GSCM practice

instead of traditional competitive strategy which ultimately achieving sustainable competitive advantages.

Third, most of the developed countries are importing textile and garment products from developing countries. Since developed countries already have environmental conscious import regulations so that export-oriented textile manufacturing firms need to emphasize their exporting country environmental friendly product demand and follow GSCM practice to minimize environmental impact. The study indicates that the manufacturing orientation of the firm needs to be aligned with the GSCM practices to uphold their environmental reputation.

Finally, this study gives a learning orientation to the entrepreneur and manager on how to develop an eco-friendly, profit-seeking firm to gain sustainable competitive advantages. GSCM practice can be the door for exporting companies in developing countries to the light of environmental and social performance improvement with the achieving of organizational goals and competitiveness. Moreover, for Bangladeshi textile industries, this study opens a milestone framework for proof of them an ecologically sustainable firm.

7. Conclusions and limitations

7.1. Limitations

This study has some limitations which are needed to be mention for future study. First, data were collected only a single textiles manufacturing sector and from a single country which may hinder the generalizability of the study. Future studies may include multiple sectors from different countries like China, India, Indonesia, Vietnam, etc. Secondly, the study measures from single informants and taking self-reported answers from each firm. Hence, in the future study may include multiple respondents from each firm from different levels of employee and manager. Thirdly, this study examines the mediation effect. Future research may include moderator in GEO and GSCM relationship such as environmental commitment environmental dynamism, etc., and also include moderator in the relationship of GSCM practice and firm performance relationship such as resource capability, environmental orientation, etc.

7.2. Conclusions

GSCM practices are the best way for the firm to minimize the adverse effect of their activities on the environment and GEO firm only can reduce this negative impact through GSCM practices; hence, GEO and GSCM have become a valuable research topic nowadays. In this study, the result indicates that the GEO firm has spirit, inspiration, and culture of innovative initiatives, proactive posture in their activities and risk-taking behavior to undertake new challenges to make the ecological society through GSCM practices. The study result found the positive relationship of GEO on GSCM practice. Similarly, GSCM practices also found a positive relationship on sustainable firm performance. Furthermore, the result indicates that market orientation accelerates the GEO firm activities towards GSCM practices implementation. So, finally, this study has made a unique contribution to the GEO, GSCM literature and providing a guideline for entrepreneurs and managers for developing an ecologically sustainable society and prove them a legitimate organization.

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Appendices

Appendix 1

Green Entrepreneurial Orientation (GEO)		Source
Please assess to what extent your company motivate to adopt Green Supply Chain Management practice from the following factors. <i>(1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree 4 = Agree, 5 = Strongly Agree)</i>		Jiang et al. (2018)
GEO1	In general, our firm favors a strong emphasis on green practices, such as R&D, technological leadership, and innovation	
GEO2	When facing uncertainty, we typically adopt a proactive posture in order to catch potential green opportunities	
GEO3	In dealing with competitors, we typically initiate green actions that competitors respond to	
GEO4	Our firm favors a tendency to be a leader, and always introduce green products, service, or technology first	
GEO5	In dealing with competitors, we typically adopt a competitive 'undo-the competitors' posture	
Market Orientation (MO)		Frambach et al. (2003)
MO1	Our organization is better than competitors in knowing the wants and needs of customers	
MO2	In our organization information about customers is regularly and systematically collected	
MO3	Information about customers is used in our organization to make technological improvements	
MO4	In our organization, information about competitors is regularly and systematically collected	
MO5	Employees in the sales and/or marketing department of our organization spend much time exchanging information on strategies of competitors	
MO6	We react quickly to competitors' actions	
Green Supply Chain Management Practice (GSCM)		Q. Zhu et al. (2007b)
Rate the extent to which your firm engages in the following practices. <i>(1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree 4 = Agree, 5 = Strongly Agree)</i>		
Internal environmental management (IEM)		
IEM1	Senior managers in our firm are committed to green supply chain management	
IEM2	Mid-level managers in our firm support for green supply chain management	
IEM3	Our firm emphasizes cross-functional cooperation for environmental improvements.	
IEM4	Our firm has Environmental Management Systems.	
Eco-Design		
ED1	Our firm emphasizes design of products for reduced consumption of material/energy.	
ED2	Our firm emphasizes design of products for reuse, recycle, recovery of material, component parts.	
ED3	Our firm emphasizes design of products to avoid or reduce use of hazardous products and/or their manufacturing process.	
Cooperation with Customer (CWC)		
CWC1	Our firm cooperates with customers for eco-design.	
CWC2	Our firm cooperates with customers for cleaner production.	
CWC3	Our firm cooperates with customers for green packaging.	

(Continued)

(Continued)		Source
Green Entrepreneurial Orientation (GEO)		Paulraj (2011)
Sustainable Firm Performance (SFP)		
Rate the extent to which your firm has made an improvement in its performance based on green supply chain practice adoption. (1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree 4 = Agree, 5 = Strongly Agree)		
Economic Performance (ECP)		
ECP1	Decrease of cost for materials purchased	
ECP2	Decrease of cost for energy consumption	
ECP3	Decrease of fee for waste discharge	
ECP4	Improvement in return on investment	
ECP5	Improvement in earnings per share	
Environmental Performance (ENP)		
ENP1	Reduction of air emission.	
ENP2	Reduction of waste (water and/or solid)	
ENP3	Decrease of consumption for hazardous/harmful/toxic materials.	
ENP4	Decrease of frequency for environmental accidents.	
ENP5	Increase in energy saved due to conservation and efficiency improvement	
Social Performance (SP)		
SP1	Improvement in overall stakeholder welfare or betterment	
SP2	Improvement in community health and safety	
SP3	Reduction in environmental impacts and risks to general public	
SP4	Improvement in occupational health and safety of employees	
SP5	Improved awareness and protection of the claims and rights of people in community served	

Appendix 2. Cross-loading matrix of the constructs

	GEO	MO	GSCM	ECP	ENP	SP
GEO1	0.803	0.389	0.525	0.394	0.550	0.347
GEO2	0.786	0.443	0.513	0.378	0.525	0.308
GEO3	0.732	0.347	0.477	0.33	0.443	0.317
GEO4	0.820	0.460	0.538	0.424	0.534	0.374
GEO5	0.740	0.479	0.524	0.393	0.496	0.434
MO1	0.404	0.762	0.457	0.431	0.387	0.456
MO2	0.414	0.777	0.474	0.369	0.412	0.524
MO3	0.418	0.737	0.481	0.404	0.419	0.623
MO4	0.384	0.720	0.452	0.354	0.369	0.533
MO5	0.396	0.703	0.424	0.42	0.388	0.505
MO6	0.425	0.747	0.517	0.496	0.390	0.481
IEM1	0.544	0.456	0.773	0.463	0.533	0.377
IEM2	0.512	0.434	0.764	0.432	0.504	0.368
IEM3	0.540	0.499	0.787	0.469	0.562	0.418
IEM4	0.455	0.509	0.708	0.430	0.451	0.423
ED1	0.462	0.464	0.742	0.378	0.575	0.421
ED2	0.439	0.394	0.712	0.329	0.507	0.416
ED3	0.520	0.420	0.705	0.438	0.499	0.468
CC1	0.402	0.428	0.722	0.364	0.509	0.388
CC2	0.540	0.511	0.791	0.379	0.519	0.442
CC3	0.488	0.551	0.743	0.411	0.500	0.408
ECP1	0.351	0.439	0.438	0.707	0.422	0.434
ECP2	0.314	0.429	0.407	0.724	0.398	0.369
ECP3	0.455	0.458	0.473	0.811	0.429	0.417
ECP4	0.419	0.422	0.415	0.791	0.375	0.380
ECP5	0.299	0.321	0.325	0.712	0.291	0.302
ENP1	0.427	0.419	0.629	0.367	0.704	0.451
ENP2	0.549	0.364	0.472	0.354	0.763	0.366
ENP3	0.364	0.353	0.396	0.349	0.708	0.394
ENP4	0.527	0.420	0.504	0.358	0.778	0.410
ENP5	0.544	0.384	0.510	0.468	0.779	0.407
SP1	0.398	0.515	0.445	0.409	0.479	0.772
SP2	0.407	0.547	0.470	0.377	0.408	0.826
SP3	0.311	0.483	0.390	0.381	0.406	0.718
SP4	0.337	0.579	0.438	0.429	0.467	0.775
SP5	0.299	0.566	0.387	0.366	0.364	0.786



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