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Impact of knowledge management capability and green supply chain management practices on firm performance

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ABSTRACT

Knowledge management is one of the most important strategic resources of the firm which has been ascertained to many organizations to acquire and apply it before their competitor for achieving competitive advantages. Similarly, due to rising environmental awareness among customers, governments, NGOs, and researchers, firms are facing increasing pressure to implement environmental management practices in their operations. The purpose of this paper is to identify the influence of knowledge management capability (KMC) on green supply chain management (GSCM) practices adoption of the manufacturing firm and subsequently the impact on firm performance. The data were collected from 262 Bangladeshi textile manufacturing firms and analyzed using structural equation modeling, typifying that exploratory and quantitative research. Drawing upon the resource-based view the study revealed that KMC has a significant positive effect on internal and external-GSCM practices adoption. Further, the study revealed that internal-GSCM practices have significantly positive effects on both economic and environmental performance while the external-GSCM practice has positive effects on environmental performance but negatively affects the economic performance. Finally, this study indicates that KMC is an intuitive resource of a firm that can bring sustainable performance through GSCM practices.

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Introduction

Organizations are facing challenges of rapid customer demand change, technological development, and higher competition (Attia & Essam Eldin, 2018) in the global business era. To sustain in this competitive environment organizations must improve their capability to know the market insight, customer and as well as adopt technology and sustainability practices to progressively improve their performance. In the resource-based view, a resource is stated to a firm tangible or intangible assets which develop its capability to maximum use of the resources to accomplish the necessary tasks or activities (Weldy & Gillis, 2010). A resource is the rare and valuable assets which required to achieve superior benefits for the firm. The benefits can be achieved over a longer period to which extent the firm can manage their resource and protect it from imitation, transfer or substitution. If the resource can be made into the capabilities it will create competitive advantages and that leads to superior firm performance(Wade & Hulland, 2004).

Knowledge has been known as a strategic resource which is ascertained to be the notion of an organization to properly manage this resource to achieve competitive performance. So that, to successes in the long run organization would need to develop their knowledge-based assets (Bolisani & Bratianu, 2017). Knowledge has been considered of an organizational strategic resource, were obtaining, assimilating, storage, share and apply knowledge which are essential elements to develop them sustainable competitive advantages (Zaim, Keceli, Jaradat, & Kastrati, 2018). Knowledge is valuable, rare, inimitable and non-substitutable resources of an organization that would not easily be copied by other competitors. Knowledge-based resource generates value creation subsequently to achieve outstanding sustainable performance (Attia & Essam Eldin, 2018). Nasir Uddin (2010) stated that knowledge management is a rare and valuable asset for the firm to develop organizational learning and consequently contribute to competitive performance.

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In knowledge-based organizations are cooperate and share information among employees, capable of making the right decision and enhance firm productivity (Attia & Essam Eldin, 2018; Gharakhani & Mousakhani, 2012). Knowledge management improves organization competitive position through sharing knowledge and information among supply chain partners and take strategic decisions by knowing their competitor action (Kyobe, 2010).

End of the twentieth century, just-in-time and lean production considered for firms to gain maximizing the production benefit through on-time delivery, less waste, synchronize production and integration (Womack, Jones, & D, 1990). Nowadays, supply chain collaboration gains much attention to get knowledge about the suppliers and customers to gain competitive advantages through coordination and integration of the product and information flow within the supply chain network (Verwaal & Hesselmans, 2004). In a competitive business, many firms develop collaborative knowledge sharing with their partners in the supply chain network for long term benefits. They closely work together in planning, information sharing, joint decision making, risk-bearing to get win-win benefits (Cao, Vonderembse, Zhang, & Ragu-Nathan, 2009). In the GSCM practices, the firm closely works with its supplier and customer for improvement of overall environmental impact (S. A. R. Khan & Qianli, 2017).

In a competitive business environment, the organization is giving the effort to produce their product in a sustainable manner and manage their supply chain link to shorten the product time to market (Cao et al., 2009). In the essence of knowledge management and share information among the supply chain partner can only be possible to reach a sustainable competitive goal (Halley & Beaulieu, 2005). Green supply chain management practices emerged into sustainable business to work closely with supply chain partners to achieve sustainable competitive advantages (Attia & Essam Eldin, 2018). Nowadays, GSCM practices gain much attention on to the researchers, NGOs, practitioners (Namagembe, Ryan, & Sridharan, 2019; Saeed, Jun, Nubuor, Priyankara, & Jayasuriya, 2018). Many researchers identified GSCM not only improve environmental performance but also improve economic performance (Eltayeb, Zailani, & Ramayah, 2011; Qinghua Zhu, Sarkis, & Lai, 2007). Prior research established the importance of GSCM practices for sustainable firm performance. Most of the prior research emphasized on direct simple effect (Foo, Lee, Tan, & Ooi, 2018), some of them are identified as the components or drivers of GSCM practices (S. A. R. Khan & Qianli, 2017). Most of the researchers emphasized institutional pressure for the adoption of GSCM practice. But till now there is a lack of research that exists in knowledge management as the antecedent of GSCM practice. Thus, our study focuses on the impact of knowledge management on the implementation of green supply chain management practices and subsequently the firm performance. KMC develop the internal and external business environmental knowledge to adopt sustainability practices to gain competitive advantage. KMC is an intuitive resource of a firm to identify the possible opportunity and reconfigure the firm resource to abreast the opportunity. Hence GSCM to build outperform practices for the firm in the essence of sustainable competitive advantages. Many organizations lagging of GSCM practice due to lack of knowledge and owing to its importance. Only KMC oriented firms are aware of the importance of GSCM and leverage their internal resources to produce their product in a sustainable manner. By fulfilling the above research gap, this study is the early attempt to identify the impact of knowledge management, GSCM practices on firm performance. This study addresses the following research questions:

1. How knowledge management capability influence firms to adopt green supply chain management practices?

2. What is the impact of green supply chain management practices on firm environmental and economic performance?

Based on the research questions above, this study develops a conceptual framework, validates it based on the data from the textile industry in Bangladesh. The study specifically examines the relationship of KMC, GSCM practice and firm performance. Relevant literature is reviewed and described in Section two, hypotheses for empirical testing are developed in section three. In Section four, the research methodology, instrument development, and analysis procedure are discussed. Data analysis and results are presented in section five followed by the discussion, conclusion, and limitations.

Literature review

Resource-based view and knowledge management capability

In this study, we employed the resource-based view (RBV) of the firm as the theoretical background and hypothesis development process. Wernerfelt (1984) stated that RBV views are the bundle of resources and capabilities of the firm. The resource is the combination of tangible and intangible assets. Tangible components include property, plant, equipment, and whereas intangible components such as human capital, technology know-how (Barney, 1991). Capabilities are "invisible assets", such as information and knowledge which need to be developed over a period of time (Nath, Nachiappan, & Ramanathan, 2010). The firm's resources and capabilities are the two valuable assets to make organizational performance development (Sarkis, Zhu, & Lai, 2011). According to the resource-based view, firms possessing rare, valuable and inimitable resources are the important assets that can make them sustainable competitive advantages (Barney, 1991 ; Yu, Chavez, & Feng, 2017). RBV suggests that firm internal resources such as assets, capabilities, information, and knowledge can bring competitive advantages and sustained over time (Eisenhardt & Martin., 2000). Firm's competitive advantages can be achieved through the creation of new resources, develop its capabilities platform, and makes the capabilities stronger and inimitable so that it is difficult for the competitor to duplicate (Barney, 1991 ; Peteraf, 1993). Knowledge-based resources and capabilities are important assets for organizational learning which can create a superior firm performance as well as achieve sustainable competitive advantages. (Attia & Essam Eldin, 2018). KM is the capability of an organization to “acquire, create, transfer, integrate, share and apply knowledge-based resources and activities” into the internal and

external environment of the firm to generate new knowledge (Attia & Essam Eldin, 2018; Chuang, 2004). KM is a powerful asset and strategic resource for organizational survival, growth, and development. KM is developing organizational capabilities to sustain in the competitive environment and improve the organizational ability in innovation and efficiency (Darroch, 2005). The OECD (2003) defines KM as "any intentional and systematic process or practice of acquiring, capturing, sharing and using productive knowledge, wherever it resides, to enhance learning and performance in organizations". Many organizations undertake the KM initiative due to it makes them quicker in the innovation, sharing knowledge among business partners, improvement in the decision-making process, minimizing the duplication of work and enhancing the overall business process (Hassan & Raziq, 2019). Thus, KM possesses in discovering, capturing, sharing and applying knowledge to improve innovation and creativity in strategies and practices of the organization for enhancing sustainability performance (López-Torres et al., 2019). So, KM helps the firms to effective way incorporate the sustainability practices in operations. Organizational sustainability practices such as green supply chain management is a well-recognized practice to improve the overall environmental situation (Eltayeb et al., 2011; S. A. R. Khan & Qianli, 2017; Qinghua Zhu et al., 2007).

Green supply chain management practices

Since the last three decades, GSCM has been gained much attention in the business (Zhao, Liu, Zhang, & Huang, 2017). Organizations are investing in GSCM practices to increase profit, market share, develop a brand image, and acquire a competitive advantage. Peng and Lin (2007) stated that GSCM practices can minimize the overall environmental impact by producing eco-friendly products via green marketing, green R&D, and green production. Foo et.al (2018) studied ISO14001 certified manufacturing organization and found GSCM practice has positive economic, environmental and social performance. In the GSCM context, developing environmental cooperation among suppliers and customers is related to better sustainability performance (Yu et al., 2017). KMC of the organization can identify the importance of environmental demand and adopt sustainability practices such as GSCM to prove them a sustainable firm and consequently achieve the competitive advantages (López-Torres et al., 2019). In prior research, there are different dimension has been found as GSCM practice. Consistency with Qinghua Zhu et al. (2007) we consider the internal environmental management, eco-design as internal-GSCM practices and green purchasing, investment recovery, cooperation with customers as external-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 , ISO 14001 certification, cross-departmental collaboration, environmental management system, and environmental compliance and auditing program (Vanalle, Ganga, Godinho Filho, & Lucato, 2017; Qinghua Zhu & Sarkis, 2007). Qinghua Zhu, Tian, and Sarkis (2012) highlight that top management initiative is most important to adopt GSCM practices in the Chinese firm. Top management perception likely influences their behavior to sustainability practice (Vijayvargy, Thakkar, & Agarwal, 2017; Qinghua Zhu, Sarkis, & Geng, 2005). The firm with a higher environmental management system, compliance, and auditing practices can lessen the environmental impact of their manufacturing (Qinghua Zhu et al., 2007).

Eco-design (ED) consider that design of the product required less material and energy consumption during production and those can be reuse, recycle, and recovery of component parts and materials, also consider the minimize or avoid the use of toxic and harmful materials during production process (Q. Zhu, Sarkis, Cordeiro, & Lai, 2008). ED emphasizes to design of the product those are manufactured considering the product lifecycle analysis to minimize the environmental impact. Many researchers focused on ED as a GSCM practice which incorporates the environmental aspects from product idea to usage and finally disposal (Vanalle et al., 2017; Vijayvargy et al., 2017; Qinghua Zhu et al., 2007).

Green Purchasing (GP) is referred to environmental aware purchasing practices that considering waste reduction, free from hazardous and toxic (Vijayvargy et al., 2017), and the ability to reuse, recycle of purchased materials with maintaining its required performance (Min & P, 2001). Due to growing consumer awareness on eco-friendly clothing 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, Zulauf, Štulec, Seuring, & Wagner, 2018). For example, the world's largest clothing retailers H&M reported that at present they collect 59% of their cotton products from a sustainable source and they have a goal to source 100% by 2020 (H&M, 2017). As a major exporter, Bangladeshi clothing supplier needs to improve its sustainability practice in their operation.

Investment recovery (IR) refers to the effective, efficient and profitable recycling, recovery, reselling and disposal of waste, excess inventory, scrap, defective, obsolete product in order to economic benefit for firm and improve environmental impact (Vijayvargy et al., 2017; Q. Zhu et al., 2008). IR in terms of the entire supply chain system manager must focus on the closed-loop system to reuse, recycle, remanufacture of initial materials (Q. Zhu et al., 2008). The company manager is on the pressure to reduce the waste and sales of excess inventories, scrap for economic benefit. The textile industry generated a huge volume of waste in different stages of production (Saeidi & Wimberley, 2017).

Cooperation with customer (CC) refers to collaboratively work together to design and develop an environmentally friendly product, cooperate with the supplier to maintain cleaner production in the manufacturing plant and finally maintain green packaging (Qinghua Zhu et al., 2007). Customers are the key driver and can directly influence their suppliers to implement GSCM practices into their manufacturing plant (S. A. R. Khan & Qianli, 2017). Research emphasizes that collaborative work with the upstream and downstream

supply chain can bring sustainable competitive advantages (Stephan Vachon, Co-Editors: Benn Lawson, & Klassen, 2006).

Research framework and hypothesis development

Following the resource-based view, the firm knowledge management capability is hypothesized as a resource that leads to improving the green supply chain management practice and subsequently improves the firm economic and environmental performance. Based on the extant literature review, we theoretically propose that KMC has a positive influence of GSCM practices adoption which leads to firm performance, and conceptually develops a theoretical model (Fig. 1) and proposed six hypotheses.

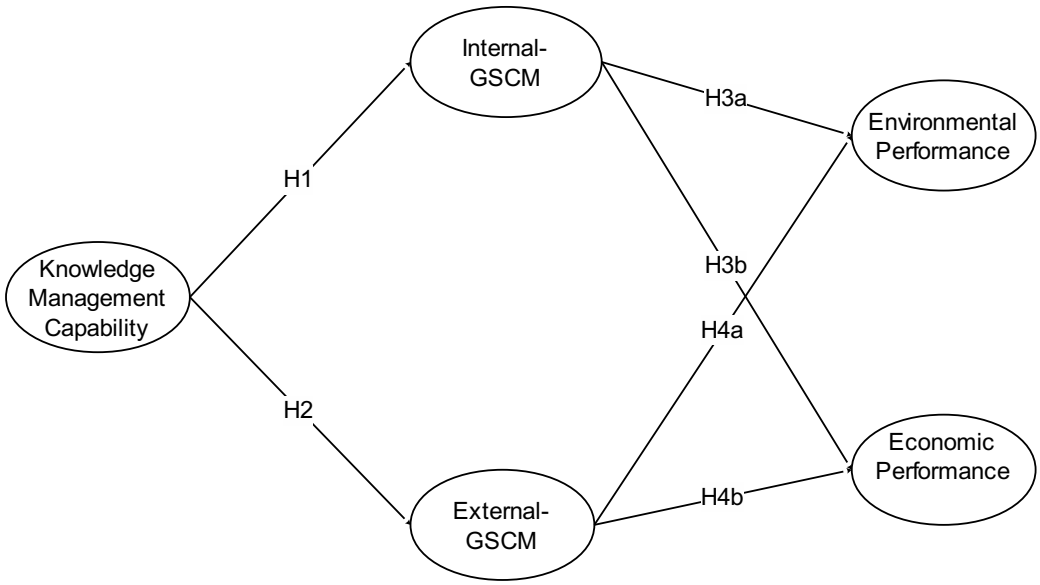

Figure 1: Conceptual research model

Knowledge management capability and internal green supply chain management practices

Knowledge management capability is the valuable organizational resources that acquire, generate, transferal, share knowledge-oriented activities within different functional areas of the organization (Attia & Essam Eldin, 2018). Internal-GSCM practice is the set of activities that encompasses organizational internal environmental management, eco-design practice (Qinghua Zhu et al., 2007). Recently, knowledge management capability gains much attention to organizational green initiatives. In a recent study de Guimarães, Severo, and de Vasconcelos (2018) identified that knowledge management orientation has a positive effect on cleaner production and subsequently enhance organizational competitive advantages. Disseminate of knowledge within the different segments of the organization may only the source of organizational learning capability (Q. Zhu et al., 2008). Generally, there are two kinds of knowledge can be identified. One is managing technology orientated which can be easily copied, stored and distributed. Another is human capital knowledge which is difficult to copied, stored and distributed. Tactical knowledge has in the internal human which generate from their activities, brainstorming, and experience. This is inimitable assets of the organization (Zaim et al., 2018).

Internal environmental management of an organization depends on the top management and senior manager decision. They are generally acquiring knowledge from the external environment and taking the strategic and policy-making decision for internal operations (Ye, Zhao, Prahinski, & Li, 2013). Top management act as a contingent role in implementing diverse strategies and practices to achieve organizational performance. Knowledge management capability of top management is the inception of organizational learning which ultimately reflects on organizational cultures, practices, norms, and routines (Yeung, Lai, & Yee, 2007). Particularly the top management knowledge is vital to initiate GSCM practices in their internal environmental process. Environmental monitoring and impact assessment can minimize environmental damage (Qinghua Zhu et al., 2007).

Prior research emphasis on the strategic importance of KM for the successful implementation of GSCM practices in the organization (López-Torres et al., 2019). Internal-GSCM required inter-organizational knowledge of product and process development (Zaim et al., 2018). Prior research establishes the KM enhances organizational innovation performance. Innovation performance depends on accurately identify the customer demand and accumulate the internal process to innovate the required product (du Plessis, 2007). Iqbal, Latif, Marimon, Sahibzada, and Hussain (2019) stated that knowledge management has a direct and indirect positive effect on organizational performance through innovations. Recently raising environmental awareness customers are willing to prefer eco-friendly product. The KMC oriented firm grasp this opportunity to identify the environmental friendly customer demand and innovate eco-design product to meet such requirement (Jiang, Chai, Shao, & Feng, 2018). From the above discussion we can assume the following hypothesis:

Hypothesis H1: Knowledge management capability has a positive and significant influence to adopt internal GSCM practices.

Knowledge management capability and external green supply chain management practices

External green supply chain management composed of green purchasing, investment recovery, and cooperation with customer (Qinghua Zhu et al., 2007). Knowledge management capability ascertains the information link of the organization within its supplier and customer. Tseng (2014) mentions that the knowledge management capability orientated firms are continuous communicating, improving and maintain good relationships with their suppliers for enhancing the business performance. Halley and Beaulieu (2005) stated that real knowledge management processes always incorporation of internal organization management system with external suppliers and customers. Many researchers have argued environmental oriented knowledge sharing and cooperation within the supply chain member has significant benefits for firm performance (du Plessis, 2007; Gharakhani & Mousakhani, 2012). GSCM oriented firm needs to appropriately choose their supplier and then maintain a good relationship and monitor their activities through a collaborative mindset. KMC helps to improve environmental performance through environmental knowledge dissemination among supply partners (Paulraj, 2011). Similarly, knowledge management capability can identify how customer needs and wants change and how the firm needs the allocation of its resources to meet customer demand. According to Wilburn Green, Toms, and Clark (2015) knowledge of the customer is a valuable resource for the firm to develop its capability to meet the current requirement. Due to the raising of environmental concern, the customers are more demanding environmental friendly product hence firm strategic are on GSCM orientation are increasing (Jiang et al., 2018). The firm is willing to cooperate with their customer to produce their product in an ethical and environmentally sustainable way. KMC is an intuitive characteristic of the firm to acquire knowledge of external agency's interests such as government, NGOs to minimize the environmental impact. (S. A. R. Khan & Qianli, 2017). KMC determines the importance and benefits of the reuse, recycle and re-selling of scrap, surplus product (Q. Zhu et al., 2008), to protect the environment and subsequently gain financial benefit (Nasir Uddin, 2010). Hence, our proposed hypothesis is as follows:

Hypothesis H2: Knowledge management capability has a positive and significant influence to adopt external green supply chain management practices.

Internal green supply chain management practices and firm performance

Internal-GSCM practice consists of internal environmental management and eco-design. According to the resource-based view, firm GSCM practices develop a higher-order capability to systematically maintain environmental aspects into their production (Yu et al., 2017). Previous research established a positive relationship between internal-GSCM practices and firm performance (Saeed et al., 2018; Qinghua Zhu, Sarkis, & Lai, 2013). Economic performance (ECP) can be achieved through GSCM practices by cost minimization in material purchasing, energy consumption, waste treatment, and waste discharge. ED practice reduces material consumption which improves economic performance. GSCM practices contribute to the environment performance through reduce the consumption of water, energy, hazardous and toxic materials in the production as well as reduce the generation of wastes, effluent, air emission, environmental accidents and improvement of the health and safety of worker and community (Eltayeb et al., 2011; Wilburn Green et al., 2015). Environmental performance (ENP) can be achieved from the internal environmental management system by implementing the environmental management program such as adopting 14001 environmental certification system, information technology, and total quality environmental management (Namagembe et al., 2019). Qinghua Zhu et al. (2007) conducted an empirical study in the Chinese automotive industry, and revealed that internal environmental management such as top management commitment, middle management support, environmental compliance, and auditing programs, the environmental management system has a significant positive impact on environmental performance. From the above discussion we can assume the following hypothesis:

Hypothesis H3: Internal green supply chain management practices are positively associated with firm H3a-environmental performance (ENP), and H3b-economic performance (ECP).

External green supply chain management practices and firm performance

External-GSCM practices such as investment recovery contribute economic performance (ECP) through reselling and reusing of unused, scrape and surplus material (Qinghua Zhu et al., 2007), and at the same time contribute to the environmental performance by minimize the waste generation, remanufactured and recycled (Namagembe et al., 2019). Some researchers argue that green purchasing and cooperation with customers do not directly earn economic benefits rather in the long run they bring sustainable competitive advantages (Green, Zelbst, Meacham, & Bhadauria, 2012; Qinghua Zhu et al., 2007). Collaboratively work with suppliers and customers in the upstream and downstream supply chain may gain competitive advantages(Attia & Essam Eldin, 2018).

GSCM practices improve environmental performance (ENP) through reducing the energy consumption, carbon emissions, waste of water and solid, minimize the use of toxic and hazardous materials, and minimize the environmental accidents (Green et al., 2012). External GSCM practices such as IR and GP are common environmental management which reduces the environmental impact through reuse, remanufacturing, recycling, repairs, and refurbishing of manufacturing materials (Q. Zhu et al., 2008). Customer cooperation may bring positive environmental performance by providing necessary instruction for developing eco-product innovation and minimizing the inbound and outbound logistics activities in the supply chain may reduce the environmental impact (S. Vachon & Klassen, 2008). Hence our conceptualize hypothesis is as follows:

Hypothesis H4: External green supply chain management practices are positively associated with firm H4a-environmental

performance (ENP) and H4b-economic performance (ECP).

Research and Methodology

Sample and data collection

We tested our theoretical model in the context of the Bangladeshi textile industry for several main reasons. First, textile manufacturing industries are the major source of environmental damage through the release of both toxic and hazardous wastes (M. S. Khan, Ahmed, Evans, & Chadwick, 2009). Particularly the textile dyeing industry has been recognized as the highest polluter of freshwater after agriculture production. To lessen the environmental impact, the new regulation has placed on the textile industry to properly treat their effluents before discharge to the ecosystem (Hussain & Wahab, 2018). For example; zero discharge of hazardous chemicals (ZDHC) programme has been formed by 24 signatory brands, 59 value chain affiliates and 15 associates to eliminate hazardous chemicals as well as to ensure the wastewater quality from global textile, leather and footwear industries to improve the environment and human well-being (ZDHC, 2016). But in practice, some of the industries in Bangladesh unethically discharge untreated effluent, sludge, and solid waste directly to the environment, hence surrounding river, irrigation and even drinking water became highly polluted (Islam, Mahmud, Faruk, & Billah, 2011). Secondly, Bangladesh is the second-largest readymade garment exporter in the world for the last eight years (BGMEA, 2019). At present this textile sector has become the economic backbone of the country and rapidly transformed into the emerging developing country (Yadlapalli, Rahman, & Gunasekaran, 2018). Recent studies found that many Bangladeshi textile firms are accused of cleaner production, less environmental concern, higher water and air pollution, violation of laws in water and solid waste management in their practices (Ahmed, Akter, & Ma, 2018). In this situation, Bangladeshi textile industries need to realize the necessity of GSCM practices for sustainable firm performance but until recently it's adoption is still infancy (Reza, Islam, & Shimu, 2017). However, without knowledge management, stakeholder pressure, top management support it is not easy to adopt GSCM practices (Chu, Yang, Lee, & Park, 2017; Saeed et al., 2018; Qinghua Zhu et al., 2007).

Data were merely collected from textile industries in Bangladesh. There are a variety of textile industry from yarn production to garments manufacturing. From the Bangladesh Textile Mills Association (BTMA) list there are 425 yarn manufacturing, 796 fabric manufacturing, 240 dyeing industry (BTMA, 2019), and from the Bangladesh Garments Manufacturing and Exporters Association (BGMEA) list 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 association. To obtain a representative sample, a random sampling of 500 textile manufacturing industries were selected. The survey includes a wide range of different types of textile manufacturing industries such a yarn manufacturing, fabric manufacturing, garments manufacturing, dyeing industry, printing industry, washing industry, home textiles, sweater manufacturing, and textile chemical industry.

We collected the data from currently employed managers in Bangladeshi textiles firm. The sampling frame of this study is the textile industry manager of the different cities of Bangladesh (Dhaka, Savar, Gazipur, Narayanganj, Narsingdi, Munshiganj, Chittagong). The questionnaire in a hard copy was distributed to the manager of the different textile firms with mentioning the objectives of the study in the cover letter. The participants in the survey are mainly doing the job in the operations, supply chain, marketing, and production department. The majority of the respondents are the general manager, manager, and executive. It is expected that respondents are well understanding the questionnaire because all the respondents are well educated studied at the graduate and postgraduate levels. Data were collected from March to June' 2019. To improve the response rate, after three weeks later follow up calls and reminder emails were sent to the respondents, in the first phase 124 and second phase 138 and a total of 286 questionnaires were received, representing 57.2% of response rate. From this record, 24 answers were excluded due to incomplete and the same answer to all questions and missing answers. Finally, a usable sample of 262 valid answers was kept for analysis which accounted for 91.6% valid response of this study.

Table-1 indicates that the majority of the respondent doing jobs in the supply chain, production and operation department. Approximately 53.8 % of the respondent has more than 11-15 years of experience in the textiles industry, about 37% respondent are working as post of assistant manager. The highest number of the firm are higher size enterprise. Approximate employee ranges over 2000. The highest no of the firm was doing business more the 20 years. Most of the firm is ISO 9000 and ISO 14000 certified.

Table 1: Demographic profile of the sample

Category	Frequency (N)	Percentage (%)
Gender		
Male	231	88.2
Female	31	11.8
Education of respondent		
Undergraduate	33	12.6
Graduate	155	59.2
Post Graduate	72	27.5
Doctorate	2	0.8
Work experience (in years) of respondent:		
Less than 5 years	38	14.5
5-10 years	52	19.8
11-15 years	141	53.8
16-20 years	29	11.1
More than 20 years	2	0.8
What is your current position?		
Executive Officer	83	31.7
Senior Executive Officer	28	10.7
Assistant Manager	97	37.0
Senior Manager/Manager	28	10.7
General Manager/DGM	14	5.3
Managing Director/Director/CEO	12	4.6
What is the type of your company?		
Yarn manufacturing	10	3.8
Fabric manufacturing	32	12.2
Garments manufacturing	112	42.7
Dyeing industry	75	28.6
Printing industry	7	2.7
Washing industry	7	2.7
Home textiles	2	0.8
Sweater manufacturing	7	2.7
Accessories industry	6	2.3
Textile chemical industry	4	1.5
Which department you are working on?		
Production	93	35.5
Supply chain	101	38.5
Operations	31	11.8
Marketing	29	11.1
Research and Development	8	3.1
What is the age of your company?		
Less than 5 years	29	11.1
6 to 10 years	43	16.4
11 to 15 years	58	22.1
16 to 20 years	38	14.5
More than 20 years	94	35.9
How many employees work at your company?		
Under 200 employees	51	19.5
Over 200 to 500 employees	28	10.7
Over 500 to 1000 employees	32	12.2
Over 1000 to 2000 employees	37	14.1
Over 2000 employees	114	43.5
Is your company ISO 9000 certified?		
Yes	190	72.5
No	72	27.5
Is your company ISO 14001 certified?		
Yes	147	56.1
No	115	43.9
Total	262	100

Variable measurement and questionnaire design

Initially, to developing the questionnaire we conduct an extensive literature study to find out the appropriate questions and measurement scale. The survey questionnaire is designed into three sections namely knowledge management capability, GSCM practices, and firm performance. To ensure the reliability and validity of the measurement, we consider the scale exists in the relevant literature. We invited two academicians and four textile industry experts who have good knowledge about GSCM to ensure the logical consistency, appropriateness, content, and questions clarity of the measurement. A pilot test was conducted from 20 persons of industry experts who have sufficient knowledge about GSCM and hold a senior position in the industry. Questions were divided into two-part. Part-A describes the demographic information of the respondent including gender, year of experience, working type, industry age, etc. Part-B consists of questions for different constructs. Each item is measured on a five-point Likert scale ranging from (1) "strongly disagree" to (5) "strongly agree". The eight measurement items of knowledge management capability are adopted from (Attia & Essam Eldin, 2018). These items have considered evaluating the influence of knowledge management capability to employ a significant influence on the firm to adopt GSCM practices. Eighteen items are used to measure GSCM practices adopted from Qinghua Zhu et al. (2007) including internal-GSCM practices (internal environmental management, Eco-design) and external-GSCM practices (green purchasing, investment recovery, cooperation with customer). These items are used to determine the firms existing GSCM practices to enhance firm performance. Finally, the scale of firm performance consists of ten items, which are adopted from Paulraj (2011) that consists of economic and environmental performance. The constructs and items have given in Table -2 and appendix-I.

Common method bias

Our study is the kind of self-reported type of data collection technique, so that, there is a possibility of common method bias present in this study. The characteristics of the item and the single methodological nature of the study are to be the thread of CMB and the test is required to the validity of the data. Two methods we test the CMB. First, we test Harman's one-factor test. We have completed the principal axis factor analysis (PAF) (Harman, 1976). From the test result we found that a single construct is responsible for 33.20 percent of the total variance which is lower value then suggested 50 percent (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Second, from the full collinearity test, we found the CMB in variance inflation factors (VIF) values (Table-2) of the constructs. Here VIF values were lower than the suggested 3.3 (Kock, 2015). Thus, CMB might not be an issue for this study.

Table 2: Variance inflation factors (VIF)

	KMC	Internal-GSCM	External-GSCM	ENP	ECP
KMC		1	1		
Internal-GSCM				1.551	1.551
External-GSCM				1.551	1.551

Data Analysis Procedure

In this study, data were analyzed using SPSS 23.0 and SmartPLS 3.2.8 version software. SEM technique was to measure the reliability and validity of the construct and to test our proposed model and hypotheses(W.W. Chin, 1998). The SEM technique is the most appropriate method to examine a series of relationships simultaneously (J. F. J. Hair, Hult, Ringle, & Sarstedt, 2016). PLS is a useful software for GSCM research due to it provides a high degree of flexibility between theory and data (W.W. Chin, 1998b). In this study, we completed the test in two steps. First, we tested the measurement model for proper psychrometric properties. Second, we measure the structural model (Wang, Xu, Zhang, & Chen, 2016).

Measurement Model

We assessed the measurement model by examining internal reliability, convergent validity and discriminant validity criteria (J. F. J. Hair et al., 2016). For the assessment of the reliability of the construct, we used the value of cronbach's α and composite reliability. For internal reliability, the value of cronbach's α and composite reliability should exceed the value 0.7. (J. Hair, Anderson, Tatham, & Black, 2006). In our study, we found cronbach's α value range from 0.785 to 0.900 and composite reliability value range from 0.853 to 0.918. This result indicates the strong internal reliability of our study. To assessed the convergent validity, we use the average variance extracted (AVE) and item loading. As can be seen in table table-3, all AVE is exceeded the threshold value > 0.5 (Fornell & Larcker, 1981). The square root of AVE value higher than all other cross-correlations determines the discriminant validity (Henseler, Ringle, & Sarstedt, 2014). In this study, we found the square root of AVE of each construct is higher than the corresponding cross-correlation construct (see Table-4). This confirms that our study has satisfactory discriminant validity.

Table 3: Measurement model-quality criteria

Construct/Measures		ITEM	Loading	CA	CR	AVE
Knowledge Management Capability		KM1	0.743	0.873	0.900	0.539
		KM2	0.738			
		KM3	0.762			
		KM4	0.752			
		KM5	0.787			
		KM6	0.705			
		KM7	0.643			
		KM8	0.691			
Internal GSCM Practices	Internal Environmental management	IEM1	0.738	0.900	0.918	0.556
		IEM2	0.727			
		IEM3	0.754			
		IEM4	0.759			
		IEM5	0.805			
		IEM6	0.766			
	Eco-Design	ED1	0.726			
		ED2	0.728			
		ED3	0.705			
External GSCM Practices	Green Purchasing	GP1	0.705	0.877	0.901	0.504
		GP2	0.645			
		GP3	0.671			
	Cooperation with Customer (CC)	CC1	0.717			
		CC2	0.776			
		CC3	0.7.02			
	Investment Recovery	IR1	0.685			
		IR2	0.737			
		IR3	0.735			
Environmental Performance (ENP)		ENP1	0.731	0.785	0.853	0.539
		ENP2	0.708			
		ENP3	0.782			
		ENP4	0.635			
		ENP5	0.804			
Economic Performance (ECP)		ECP1	0.839	0.888	0.918	0.691
		ECP2	0.845			
		ECP3	0.877			
		ECP4	0.778			
		ECP5	0.814			

Table 4: Discriminant Validity (Fornell-Larcker matrix)

	ENP	ECP	Ex-GSCM	In-GSCM	KM
ENP	***0.734***				
ECP	0.334	***0.831***			
Ex-GSCM	0.568	0.310	***0.710***		
In-GSCM	0.674	0.371	0.596	***0.746***	
KMC	0.577	0.384	0.677	0.592	***0.729***

Note- The diagonal (in italic) data represent the square root of AVE of the construct

Data analysis and results

Structural model and hypothesis testing

The structural model was developed to analyze the path relationships of different constructs in the hypothetical model. To test the hypothesis a bootstrapping technique was used at a significant level 0.005 ($p<0.005$) as well as path coefficient. The number of bootstrapping procedure was set at 5000 subsamples to analysis the significance of the path coefficient (J. F. Hair, Sarstedt, Ringle, & Mena, 2012). The relationship between the dependent and independent variables was determined by path coefficient (β) and t-statistics above 1.96 at a 5 percent level of significance. We used R^2 value of the dependent variable to measure the explanatory power of the structural model. The model explains 35.1 percent of the variance in the adoption of internal-GSCM practices, 45.8 percent of the variance in the adoption of external-GSCM practices, 49.7 percent variance for environmental performance and 15 percent variance for economic performance. The bootstrapping results are presented in table-5. The result support the proposed hypothesis H1 ($t = 12.007$, $\beta = 0.592$, $p<0.001$) and H2 ($t = 20.878$, $\beta = 0.677$, $p<0.001$). Thus, a firm with higher KMC will significantly associated with internal and external-GSCM practices. Further, the result support the hypothesis H3a ($t = 9.514$, $\beta = 0.520$, $p<0.001$), H3b ($t = 4.263$, $\beta = 0.289$, $p<0.001$). Thus, a firm with grater internal-GSCM practices is significantly associated with environmental and economic performance. Furthermore, the result support the hypothesis H4a ($t = 4.243$, $\beta = 0.258$, $p<0.001$) but, not support the hypothesis H4b ($t = 1.739$, $\beta = 0.137$, $p>0.005$). Thus, a firm with higher external-GSCM practices is positively associated with environmental performance but a negative association with economic performance. Table-5 presents structural analysis with their results (Figure-2).

Table 5: Structural Model

Hypothesis	Path	Path Coefficient	T Statistics	P Values	Significant
H1	**KMC → In-GSCM**	0.592	12.007	**0.000*** **	**Yes**
H2	**KMC→ Ex-GSCM**	0.677	20.878	**0.000*** **	**Yes**
H3a	**In-GSCM → ENP**	0.520	9.514	**0.000*** **	**Yes**
H3b	**In-GSCM → ECP**	0.289	4.263	**0.000*** **	**Yes**
H4a	**Ex-GSCM → ENP**	0.258	4.243	**0.000*** **	**Yes**
H4b	**Ex-GSCM → ECP**	0.137	1.739	**0.082**	**No**

***significant level p<0.001

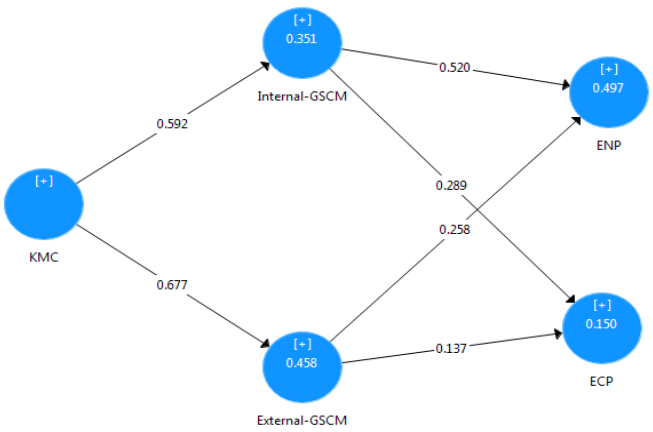

Figure 2: Structural Model

Discussion

Drawing upon the resource-based view, we developed a hypothetical model to examine the relationship between knowledge management capability and green supply chain management practices and the impact on firm performance in the context of the Bangladeshi textile industry. The results show that KMC posited a relationship with internal and external GSCM practices is significantly supported. This proposition is supported from the prior study (du Plessis, 2007; Gharakhani & Mousakhani, 2012) that, knowledge management has a significant positive relationship with innovation performance which gains competitive advantages of the firm. Another study López-Torres et al. (2019) found KM has a significant positive relationship with sustainable operations performance. Similarly, our study indicates that collecting, monitoring, and analysis the external and internal environmental knowledge along with getting customer needs and demands information, also acquiring the knowledge of competitor strategy, the KMC oriented firms are more inclined to adopt GSCM practices to achieve sustainable competitive advantages. Prior research in GSCM practices focused on the pressure as antecedent, basic component, factors of GSCM practices but our research is the first attempt to identify the new antecedent of GSCM practices that is knowledge management capability. This study has unique contribution to the GSCM and KM literature through identifying the new antecedent.

Further, this research significantly supported the hypothesis of internal-GSCM practices with environmental and economic performance. Other propositions external GSCM practice found a positive relationship with environmental performance but negative relationship found with economic performance. Consistent with prior research Qinghua Zhu et al. (2013) found GSCM practice has negative economic performance. This is because external-GSCM practices such as green purchasing increase the cost of materials which ultimately impact negative economic performance. Similarly, customer cooperation for environmental concern imposes an extra cost for maintaining the internal environment, sustainable manufacturing, waste management and disposal which lead to the extra cost of production. Moreover, external-GSCM practices do not bring economic benefits in a short run period rather, in the long run, the organization can achieve a good reputation and gain sustainable competitive advantages (Qinghua Zhu et al., 2013).

In addition, to study in the specific textile industry, this study highlights the managers and practitioners to understand the importance of GSCM practices for sustainability performance. Textiles and leather industry are considering a heavy polluter industry; those need to adopt the GSCM practice to lessen the environmental impact.

Conclusions

This research advances the impact of knowledge management capability to adopt GSCM practices and support the role of firm performance. We adopt the resource-based view to examine the performance outcomes of knowledge management capability in the implementation of internal and external-GSCM practices in terms of internal environmental management, eco-design, green purchasing, investment recovery, and customer cooperation for environmental concern. We provide empirical evidence to account for the influence of KMC on successful adoption and implementation of internal and external-GSCM practices and subsequently positive effects on economic and environmental performance from internal-GSCM practices. Further, the study found that external-GSCM has positive effects on environmental performance but negative effect on economic performance. We provide managerial insights into the necessity of KMC and GSCM practices adoption for achieving sustainable competitive advantages. This study lays the foundation for the managers, practitioners, and researchers to highlight the importance of GSCM practice to improve sustainability performance. The limitation of the study can be said that this study focused only on the specific textile industry in Bangladesh. Future studies can be added to more countries to cross-comparison with more leading textile processing countries such as China, India, Pakistan, Vietnam, etc. This study is the simple direct effect of KMC on GSCM practices adoption and subsequently impact on firm performance. Future research could be added mediation effect of GSCM practices and the moderation effect of some variables such as institutional pressure, environmental dynamism, and innovation, etc.

References

Ahmed, S., Akter, T., & Ma, Y. (2018). Green Supply Chain Management (GSCM) Performance Implemented by the Textile Industry of Gazipur District, Dhaka. *Logistics, 2*(4), 21. doi: 10.3390/logistics2040021

Attia, A., & Essam Eldin, I. (2018). Organizational learning, knowledge management capability and supply chain management practices in the Saudi food industry. *Journal of Knowledge Management, 22*(6), 1217-1242. doi: 10.1108/jkm-09-2017-0409

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management, 17*, 99–120.

BGMEA. (2019). About Garment Industry of Bangladesh.Retrieved March 7, 2019, from http://www.bgmea.com.bd/home/about/AboutGarmentsIndustry.

Bolisani, E., & Bratianu, C. (2017). Knowledge strategy planning: An integrated approach to manage uncertainty, turbulence, and dynamics. Journal of Knowledge Management*., 21(20*, 233–253.

BTMA. (2019). Retrieved March 9, 2019, from http://www.btmadhaka.com/.

Cao, M., Vonderembse, M. A., Zhang, Q., & Ragu-Nathan, T. S. (2009). Supply chain collaboration: conceptualisation and instrument development. *International Journal of Production Research, 48*(22), 6613-6635. doi: 10.1080/00207540903349039

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *ModernMethods for Business Research,, 295*, 295-336.

Chin, W. W. (1998b). Commentary: issues and opinion on structural equation modelling. *MIS Q., 22*(1), xii-xvi.

Chu, S., Yang, H., Lee, M., & Park, S. (2017). The Impact of Institutional Pressures on Green Supply Chain Management and Firm Performance: Top Management Roles and Social Capital. *Sustainability, 9*(5), 764. doi: 10.3390/su9050764

Chuang, S.-H. (2004). A resource-based perspective on knowledge management capability and competitive advantage: an empirical investigation. *Expert Systems with Applications, 27*(3), 459-465. doi: 10.1016/j.eswa.2004.05.008

Darroch, J. (2005). Knowledge management, innovation and firm performance. . *Journal of Knowledge Management., 9*(3), 101-115.

de Guimarães, J. C. F., Severo, E. A., & de Vasconcelos, C. R. M. (2018). The influence of entrepreneurial, market, knowledge management orientations on cleaner production and the sustainable competitive advantage. *Journal of Cleaner Production, 174*, 1653-1663. doi: 10.1016/j.jclepro.2017.11.074

du Plessis, M. (2007). The role of knowledge management in innovation. *Journal of Knowledge Management, 11*(4), 20-29. doi: 10.1108/13673270710762684

Eisenhardt, K., & Martin., J. (2000). Dynamic Capabilities: What are They? *Strategic Management Journal, 21 (10–11)*, 1105–1121.

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. doi: 10.1016/j.resconrec.2010.09.003

Foo, P.-Y., Lee, V.-H., Tan, G. W.-H., & Ooi, K.-B. (2018). A gateway to realising sustainability performance via green supply chain management practices: A PLS–ANN approach. *Expert Systems with Applications, 107*, 1-14. doi: 10.1016/j.eswa.2018.04.013

Fornell, C., & Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: algebra and statistics. . *J. Mark. Res.*, 382–388.

Gharakhani, D., & Mousakhani, M. (2012). Knowledge management capabilities and SMEs' organizational performance. *Journal of Chinese Entrepreneurship,, 4*(1), 35-49.

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, 17*(3), 290-305. doi: 10.1108/13598541211227126

H&M. (2017). H&M group Sustainability Report. Retrieved 26/9/2018, 2018, from https://about.hm.com/content/dam/hmgroup/groupsite/documents/masterlanguage/CSR/reports/HM_group_SustainabilityReport_2017_FullReport.pdf

Hair, J., Anderson, R., Tatham, R., & Black, W. (2006). Multivariate Data Analysis, 6th ed., . *Prentice Hall, NJ.*

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the Academy of Marketing Science, 40*(3), 414-433.

Hair, J. F. J., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2016). A Primer on Partial Least Squares Structural Equation Modeling (Pls-Sem). *Sage Publications, Thousand Oaks, CA.*

Halley, A., & Beaulieu, M. (2005). Knowledge management practices in the context of supply chain integration: the Canadian experience. *Supply Chain Forum: An International Journal, 6*(1), 66-81.

Harman, H. H. (1976). Modern Factor Analysis, . *University of Chicago Press.*

Hassan, N., & Raziq, A. (2019). Effects of knowledge management practices on innovation in SMEs. *Management Science Letters*, 997-1008. doi: 10.5267/j.msl.2019.4.005

Henseler, J., Ringle, C. M., & Sarstedt, M. (2014). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science, 43*(1), 115-135.

Hussain, T., & Wahab, A. (2018). A critical review of the current water conservation practices in textile wet processing. *Journal of Cleaner Production, 198*, 806-819. doi: 10.1016/j.jclepro.2018.07.051

Hustvedt, G., & Dickson, M. A. (2009). Consumer likelihood of purchasing organic cotton apparel. *Journal of Fashion Marketing and Management: An International Journal, 13*(1), 49-65. doi: 10.1108/13612020910939879

Iqbal, A., Latif, F., Marimon, F., Sahibzada, U. F., & Hussain, S. (2019). From knowledge management to organizational performance. *Journal of Enterprise Information Management, 32*(1), 36-59. doi: 10.1108/jeim-04-2018-0083

Islam, M. M., Mahmud, K., Faruk, O., & Billah, M. S. (2011). Textile Dyeing Industries in Bangladesh for Sustainable Development. *International Journal of Environmental Science and Development*, 428-436. doi: 10.7763/ijesd.2011.v2.164

Jiang, W., Chai, H., Shao, J., & Feng, T. (2018). Green entrepreneurial orientation for enhancing firm performance: A dynamic capability perspective. *Journal of Cleaner Production, 198*, 1311-1323. doi: 10.1016/j.jclepro.2018.07.104

Khan, M. S., Ahmed, S., Evans, A. E. V., & Chadwick, M. (2009). Methodology for Performance Analysis of Textile Effluent Treatment Plants in Bangladesh. *Chemical Engineering Research Bulletin, 13*(2). doi: 10.3329/cerb.v13i2.3939

Khan, S. A. R., & Qianli, D. (2017). Impact of green supply chain management practices on firms' performance: an empirical study from the perspective of Pakistan. *Environ Sci Pollut Res Int, 24*(20), 16829-16844. doi: 10.1007/s11356-017-9172-5

Kock, N. (2015). Common method bias in PLS-SEM: a full collinearity assessment approach. *International Journal of e-Collaboration, 11*, 1-10.

Kyobe, M. (2010). A knowledge management approach to resolving the crises in the information systems discipline. *Journal of Systems and Information Technology, 12*(2), 161-173.

López-Torres, G. C., Garza-Reyes, J. A., Maldonado-Guzmán, G., Kumar, V., Rocha-Lona, L., & Cherrafi, A. (2019). Knowledge

management for sustainability in operations. *Production Planning & Control, 30*(10-12), 813-826. doi: 10.1080/09537287.2019.1582091

Min, H., & P, G. W. (2001). Green purchasing practice of US firms. *International Journal of Operations &Production Management, 21*(9), 1222-1238.

Namagembe, S., Ryan, S., & Sridharan, R. (2019). Green supply chain practice adoption and firm performance: manufacturing SMEs in Uganda. *Management of Environmental Quality: An International Journal, 30*(1), 5-35. doi: 10.1108/meq-10-2017-0119

Nasir Uddin, M. (2010). *Impact of knowledge management and inter-organizational system on supply chain performance: the case of Australian Agri-food industry",* . (Ph.D), Curtin University.

Nath, P., Nachiappan, S., & Ramanathan, R. (2010). The impact of marketing capability, operations capability and diversification strategy on performance: A resource-based view. *Industrial Marketing Management, 39*(2), 317-329. doi: 10.1016/j.indmarman.2008.09.001

OECD. (2003). Measuring Knowledge Management in the Business Sector. *Canada: OECD/Minister of Industry.*

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.

Peng, Y.-S., & Lin, S.-S. (2007). Local Responsiveness Pressure, Subsidiary Resources, Green Management Adoption and Subsidiary's Performance: Evidence from Taiwanese Manufactures. *Journal of Business Ethics, 79*(1-2), 199-212. doi: 10.1007/s10551-007-9382-8

Peteraf, M. A. (1993). The Cornerstones of Competitive Advantage: A Resource-based View. *Strategic Management Journal, 14*(3), 179–191.

Petljak, K., Zulauf, K., Štulec, I., Seuring, S., & Wagner, R. (2018). Green supply chain management in food retailing: survey-based evidence in Croatia. *Supply Chain Management: An International Journal, 23*(1), 1-15. doi: 10.1108/scm-04-2017-0133

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. . *The Journal of Applied Psychology,, 88*(5), 879.

Reza, A. K., Islam, M. S., & Shimu, A. A. (2017). Green Industry in Bangladesh: An Overview. *Environmental Management and Sustainable Development, 6*(2), 124. doi: 10.5296/emsd.v6i2.11027

Saeed, A., Jun, Y., Nubuor, S., Priyankara, H., & Jayasuriya, M. (2018). Institutional Pressures, Green Supply Chain Management Practices on Environmental and Economic Performance: A Two Theory View. *Sustainability, 10*(5), 1517. doi: 10.3390/su10051517

Saeidi, E., & Wimberley, V. S. (2017). Precious cut: exploring creative pattern cutting and draping for zero-waste design. *International Journal of Fashion Design, Technology and Education, 11*(2), 243-253. doi: 10.1080/17543266.2017.1389997

Sarkis, J., Zhu, Q., & Lai, K. H. (2011). An Organizational Theoretic Review of Green Supply Chain Management Literature. . *International Journal of Production Economics, 130*(1), 1-15.

Tseng, S. (2014). The impact of knowledge management capabilities and supplier relationship management on corporate performance. *Int. J. Prod. Econ, 15*(4), 39-47.

Vachon, S., Co-Editors: Benn Lawson, P. D. C., & Klassen, R. D. (2006). Extending green practices across the supply chain. *International Journal of Operations & Production Management, 26*(7), 795-821. doi: 10.1108/01443570610672248

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.

Vanalle, R. M., Ganga, G. M. D., Godinho Filho, M., & Lucato, W. C. (2017). Green supply chain management: An investigation of pressures, practices, and performance within the Brazilian automotive supply chain. *Journal of Cleaner Production, 151*, 250-259. doi: 10.1016/j.jclepro.2017.03.066

Verwaal, E., & Hesselmans, M. (2004). Drivers of supply network governance: an explorative study of the Dutch chemical industry. *European Management Journal, 22*(4), 442–451.

Vijayvargy, L., Thakkar, J., & Agarwal, G. (2017). Green supply chain management practices and performance. *Journal of Manufacturing Technology Management, 28*(3), 299-323. doi: 10.1108/jmtm-09-2016-0123

Wade, M., & Hulland, J. (2004). The Resource-Based View and Information Systems Research: Review, Extension,and Suggestions for Future Research. *MIS Quarterly, 28*(1), 107-142.

Wang, C. M., Xu, B. B., Zhang, S. J., & Chen, Y. Q. (2016). Influence of personality and risk propensity on risk perception of Chinese construction project managers. *International Journal of Project Management and Organization Review, 34*(7), 1294-1304.

Weldy, T., & Gillis, W. (2010). The learning organization: variations at different organizational levels. *The Learning Organization, 17*(5), 455-470.

Wernerfelt, B. (1984). A resource-based view of the firm. . *Strategic Management Journal, 5*(2), 171 −180.

Wilburn Green, K., Toms, L. C., & Clark, J. (2015). Impact of market orientation on environmental sustainability strategy. *Management Research Review, 38*(2), 217-238. doi: 10.1108/mrr-10-2013-0240

Womack, J., Jones, D., & D, R. (1990). The machine that changed the world. . *New York: Harper Perennial.*

Yadlapalli, A., Rahman, S., & Gunasekaran, A. (2018). Socially responsible governance mechanisms for manufacturing firms in apparel supply chains. *International Journal of Production Economics, 196*, 135-149. doi: 10.1016/j.ijpe.2017.11.016

Ye, F., Zhao, X., Prahinski, C., & Li, Y. (2013). The impact of institutional pressures, top managers' posture and reverse logistics on

performance—Evidence from China. *International Journal of Production Economics, 143*(1), 132-143. doi: 10.1016/j.ijpe.2012.12.021

Yeung, A. C. L., Lai, K., & Yee, R. W. Y. (2007). Organizational learning, innovativeness, and organizational performance: A qualitative investigation. . *Int. J. Prod. Res., 45*, 2459–2477.

Yu, W., Chavez, R., & Feng, M. (2017). Green supply management and performance: a resource-based view. *Production Planning & Control, 28*(6-8), 659-670. doi: 10.1080/09537287.2017.1309708

Zaim, H., Keceli, Y., Jaradat, A., & Kastrati, S. (2018). The effects of knowledge management processes on human resource management. *Journal of Science and Technology Policy Management, 9*(3), 310-328. doi: 10.1108/jstpm-02-2018-0011

ZDHC. (2016). Annual report of Zero Discharge of Hazardous Chemicals Programme.

Zhao, R., Liu, Y., Zhang, N., & Huang, T. (2017). An optimization model for green supply chain management by using a big data analytic approach. *Journal of Cleaner Production, 142*, 1085-1097. doi: 10.1016/j.jclepro.2016.03.006

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. doi: 10.1080/00207540701440345

Zhu, Q., Sarkis, J., Cordeiro, J., & Lai, K. (2008). Firm-level correlates of emergent green supply chain management practices in the Chinese context☆. *International Journal of Management Science, 36*(4), 577-591. doi: 10.1016/j.omega.2006.11.009

Zhu, Q., Sarkis, J., & Geng, Y. (2005). Green supply chain management in China: pressures, practices and performance. *International Journal of Operations & Production Management, 25*(5), 449-468. doi: 10.1108/01443570510593148

Zhu, Q., Sarkis, J., & Lai, K.-h. (2007). Green supply chain management: pressures, practices and performance within the Chinese automobile industry. *Journal of Cleaner Production, 15*(11-12), 1041-1052. doi: 10.1016/j.jclepro.2006.05.021

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. doi: 10.1016/j.pursup.2012.12.001

Zhu, Q., Tian, Y., & Sarkis, J. (2012). Diffusion of selected green supply chain management practices: an assessment of Chinese enterprises. *Production Planning & Control, 23*(10-11), 837-850. doi: 10.1080/09537287.2011.642188

Zsidisin, G. A., & Siferd, S. P. (2001). Environmental Purchasing: A Framework for Theory Development. *European Journal of Purchasing & Supply Management, 7*(1), 61-73.

Appendix

1. Knowledge Management Capability (KMC)		Source
Please assess to what extent of knowledge management capability of your organization influence to adopt Green Supply Chain Management Practices. ***(1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree 4= Agree, 5=Strongly Agree)***		
KMC1	Our organization has clear rules for formatting or categorizing its product Knowledge.	(Attia & Essam Eldin, 2018)
KMC2	Our organization has clear rules for formatting or categorizing process knowledge.	
KMC3	Our organization members use technology to cooperate with other persons inside the organization.	
KMC4	Our organization structure facilitates the discovery of new knowledge	
KMC5	Our organization structure facilitates the creation of new knowledge.	
KMC6	Our organization facilitates knowledge exchange across functional boundaries.	
KMC7	Our organization members are encouraged to interact with other groups.	
KMC8	Our organization members can communicate well not only with their department members but also with other department members.	

Green Supply Chain Management (GSCM) Practice		Source
Rate the extent to which your firm engages in the following practices. ***(1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree 4= Agree, 5=Strongly Agree)***		
	Internal environmental management (IEM)	(Qinghua Zhu et al., 2007)
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 total quality environmental management.	
IEM5	Our firm emphasizes environmental compliance and auditing programs.	
IEM6	Our firm has Environmental Management Systems.	
	Eco-Design (ED)	
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.	
	Green Purchasing (GP)	
GP1	Our firm emphasizes purchasing eco-friendly materials	
GP2	Our firm cooperates with suppliers for environmental objectives.	
GP3	Our firm evaluates suppliers based on specific environmental criteria	
	Cooperation with Customer (CC)	
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.	
	Investment Recovery (IR)	
IR1	Our firm emphasizes investment recovery (sale) of excess inventories/materials.	
IR2	Our firm emphasizes sale of scrap and used materials.	
IR3	Our firm emphasizes sale of excess capital equipment.	

Firm Performance		Source
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)***		
	Environmental Performance (ENP)	
EP1	Reduction of air emission.	
EP2	Reduction of waste (water and/or solid).	
EP3	Decrease of consumption for hazardous/ harmful/ toxic materials.	
EP4	Decrease of frequency for environmental accidents.	(Paulraj, 2011)
EP5	Increase in energy saved due to conservation and efficiency improvement	
	Economic Performance (ECP)	
ECP1	Decrease of cost for materials purchasing	
ECP2	Decrease of cost for energy consumption	
ECP3	Decrease of fee for waste treatment	
ECP4	Decrease of fee for waste discharge	
ECP5	Decrease of fine for environmental accidents.	