

Contributions of Green Supply Chain Management on Perceived Firm Performance: An Empirical Investigation of the FMCG Industry in Bangladesh

Hasina Imam, Md. Hafizur Rahman, & Md. Hazrat Ali

Abstract

This study provides empirical evidence and guidelines for assessing the influence of green supply chain management (GSCM) techniques on organizational performance in the fast-moving consumer goods (FMCG) industry of Bangladesh. The study method is conducted to extract essential GSCM variables from field data, evaluate the factors that have a positive effect on organizational performance, and construct a model that connects both critical components and performance indicators. The data collection approach used in this study is survey method. A diagnostic research survey instrument has been developed and is being used to collect data from Bangladesh based FMCG firms that have installed or experienced GSCM. The authors not only constructed the model but also attempted to optimize it, ran a structural model analysis on it, and evaluated its predictive capacity for patterns and possible trends. The primary contribution of this work is the discovery, modeling, and validation of guiding elements that influence various manufacturing techniques and have a significant impact on organizational performance. The study provides valuable insights and recommendations on how industries should link essential GSCM elements and performance measurements to achieve perceived business success and improve overall organizational performance.



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Introduction

Green supply chain management (GSCM) strives to reduce the environmental issues caused by industrialization, therefore fitting in environmental concerns into supply chain management (Al-Ghwayeen & Abdallah, 2018). The conception of the Green Supply Chain Management can be considered as a scope of collective cost-effective improvement technique by the corporations, governments, and research scholars because of its variety of efficiency, productivity, and innovation-oriented activities (Geissdoerfer et al., 2017). GSCM techniques such as, 'minimization', 'renovation', 'restoration', 'recycling', reusing and 'industrial- synergy', have the prospect to subsidize the overall development of sustainability along with the organizational performance (Kazancoglu et al., 2018). According to GSCM, eliminating or minimizing the structural waste as the requirement for a new predictable material. Besides, by using the GSCM technique, the underutilized capability of resources may be exploited to create values for the company (Irani & Sharif, 2018). This study will lay out a foundation for a link between GSCM and firm performance through a variety of components.

To represent a few examples, the GSCM is credited with lower emissions, industrial pollution, bio - diversity and loss of habitat related to resource extraction have always had the opportunity to prevent, moderate, and neutralize annual values and annihilation (Schroeder et al., 2019). Scholars have been rather interested in the outcome of GSCM. Moreover, enterprises operating in the manufacturing and service sectors are focusing more on the increasing visibility, efficiency, and cost reduction capabilities of GSCM (Samad et al., 2021). Consumers are becoming more ecologically conscientious of the things they buy as awareness of environmental problems and global warming grows. GSCM is achieving long-term competitive advantages for stakeholders (Ghisellini et al., 2016). For improved environmental, economic, and strategic performances, most manufacturing and service companies have been persuaded to "green" their supply chain operations. Therefore, this research will evaluate the role of GSCM on selected multiple aspects of a firm's performance.

Although practitioners discussed a lot about the significance of GSCM to enhance firm performance, there has been minimal cross-cultural research on this topic (Kazancoglu et al., 2018). Particularly there has been hardly any research from the South-Asian context that explored how GSCM affects firms' performance (Ahmed et al., 2018 and Chen et al., 2021). Thus, this particular study will be conducted from a cross-cultural perspective to provide an integrated insight. However, the notion of firm performance has been studied before, and researchers and practitioners call for more advanced research to investigate this topic. Previously, most scholars used the financial or environmental indicators only to evaluate the firm performance (For example, Yook et al., 2018, Yu et al., 2019, and Al-Sheyadi et al., 2019). However, recently scholars are interested to check how firms are doing in terms of competitive, environmental, and financial aspects (Kristoffersen et al., 2021). Therefore, this study will look into how GSCM promotes a business's financial, ecological, and competitive performance.

Furthermore, prior studies have measured uni-dimensional items to measure the GSCM as a construct whereas, the multi-dimensional components or constructs of the present research represent multiple activities (Kazancoglu et al., 2018). Therefore, this study will consider GSCM in a multi-dimensional model. In this regard, this study will address a methodological gap in prior studies. To the best of the researcher's knowledge, no previous studies have looked into the combined effect of the GSCM components in South-East Asian country contexts such as Bangladesh.

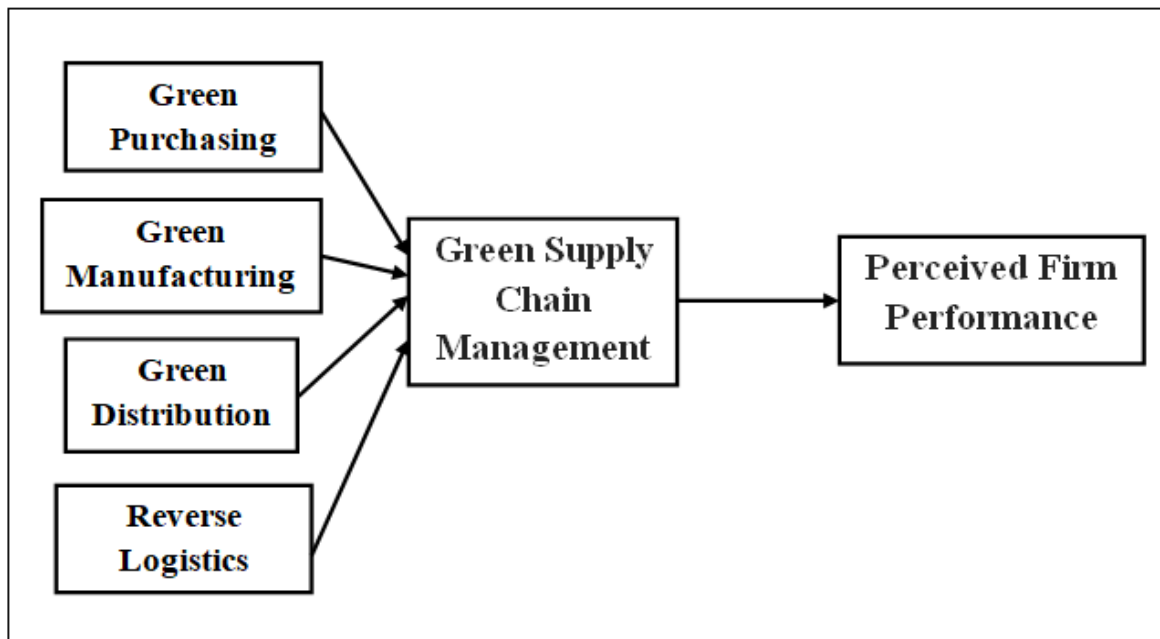


Figure 1: Conceptual Framework for the study

Literature Review

Green Supply Chain Management

In the literature, multiple core components of green supply chain management are explained explicitly. (Eltayeb & Zailani, 2014) but, it can be observed that the widely adopted three components of green supply chain management (Green Purchasing, Reverse Logistics, and Eco-friendly Design) have been explored while the inclusion for empirical examination of other components found significantly limited. Therefore, for this study, the above-mentioned components of GSCM will be examined. Increasing globalization and a shift towards competition among corporate networks are transforming industries. As a result, companies must use supply chain management as a key strategy for staying competitive. For this reason, GSCM emerged as a method of balancing these competing goals (Narasimhan and Carter, 1998).

A wide variety of definitions have been offered in an attempt to capture all of this topic's nuances. According to Beamon (1999), expanding current supply chains to incorporate efforts designed to decrease a product's environmental impact throughout its life cycle, such as sustainable innovation, ecological conservation, hazardous material reduction, and product reprocessing or remanufacturing". Environmental factors can be integrated into supply chain management to improve suppliers' and customers' sustainability impact. GSCM's characteristics, according to HMida and Lakhali (2007), focus on improving supply chain performance throughout a product's life cycle. A deeper comprehension of the GSCM concept and its identity necessitate the definition of the GSCM practices that make up it. These methods were gleaned from the vast body of knowledge on the subject that has already been penned.

Green Purchasing

Green purchasing is an eco-friendly buying strategy that seeks to ensure that the things or materials procured satisfy the purchasing firm's sustainability requirements, such as eliminating waste, encouraging reprocessing, regeneration, resource reduction, and recycled content (Yu et al., 2019). Green buying is primarily concerned with ensuring that suppliers' environmental performance is monitored. Adopting sustainability principles into the procurement, on the other hand, may add significant limits and complexity to the procurement

process, as purchasers need to assess environmental attributes along with price, waiting time, quality, and convenience when evaluating suppliers (Yook et al., 2018). Eco-friendly design and investment recovery are the three primary components of Zhu et al. (2013)'s green purchasing model. On the other hand, Mitra and Datta's (2014) "green purchasing techniques" include "external environmental management, customer engagement, and environmentally friendly product design".

Green Manufacturing

The terminology eco-design i.e., environmental-conscious design also known as green design or environmentally friendly design, states the measures undertaken while developing product with the intention of lessening a product's ecological impact during the course of its all-inclusive life-time (Al-Sheyadi et al., 2019). Moreover, this process included from material attainment to processing, uses, and finally dumping devoid of compromising other significant product principles such as, performance and cost (Suryanto et al., 2018). In the manufacturing phase, principles such as lean manufacturing, clean production, and remanufacturing may be implemented by firms (Rao and Holt, 2005).

Green manufacturing make up around 25% of overall emissions, with energy consumption being the most important element; hence, emissions reduction may be achieved through obtaining greater economies of scale as well as switching to lower carbon energy sources. This method ensures that the product's identity is not lost during the manufacturing process (Beamon, 1999). The automotive, electronics, and tire industries are the most notorious for engaging in this practice. In this pertinent Srivastava (2007) advocated that Lean supply chains may also enhance environmental performance through waste reduction and waste minimization strategies, in addition to typical cost-cutting measures. Additionally, the author argued that lean production strategies are an excellent complement to efforts to enhance environmental performance as organizations explore and discover possibilities for cost reduction in the manufacturing process (Rao and Holt, 2005).

Green Distribution

Carbon footprints and emissions are a major problem in supply networks. Transportation accounts for 89 percent of supply chain logistics' greenhouse gas discharges, which is the largest contributor to emissions. Road freights are responsible for at least 57% of these emissions, according to a closer look at the transportation industry (Simchi-Levi, 2010). In pertinent to that Simchi-Levi (2010) proposed a cost-benefit analysis of cost components, service needs, and carbon emissions in order to identify an ideal supply chain approach that balances these three elements. As a result the supply chain expenditures are at all times uniform around the optimal strategy, it is feasible to choose a strategy that does not considerably raise costs but is still ecologically benign. Additionally, because road freight is frequently less energy efficient than sea and air freight, minimizing reliance on road freight by shipping to facilities located closest to the destination of interest may result in cleaner and cheaper shipping options. Increased efficiency on inevitable road freights through delivery consolidation and the use of double deck trailers can also result in considerable cost savings. However, by consolidating more items per shipment, other methods like reducing unneeded packing materials can further lower shipping costs. By distributing laptops in their messenger bags, HP was able to cut its packing by 97%. According to Marshall (2011), transportation is responsible for a considerable proportion of greenhouse gas emissions, not often as the primary driver (Simchi-levi, 2010).

Reverse Logistics

Reverse logistics are largely concerned with the take-back of objects and ingredients from the view of intake to the frontward supply chain for reprocessing, reuse, renovation, restoration, or safe dumping (Masudin, 2019). The usual logistics functions of transportation and inventory management are included in reverse logistics, but the focus is on getting merchandise back from customers rather than sending stuff to consumers (Yu et al., 2018). On the contrary, in agreement with Azevedo et al. (2012), a theoretical framework is provided for analysing the impacts of sustainable and lean logistics management on sustainability of businesses. This study's findings show that three distinct categories can be used to categorise the reverse logistics: planning; operational; and communication. Packaging, raw materials, production, and transportation make up the majority of a packaged product's carbon footprint; distribution and logistics make up just 12 per cent of the total footprint. To get the most out of green efforts, companies should do life-cycle analyses of their goods before implementing them.

Perceived Firm Performance

Prior scholars revealed diversified outcomes from the effect of GSCM such as, GSCM improves brand reputation and customer satisfaction (Gusmerotti et al., 2019), it ensures existing and forthcoming legal acquiescence (Bansal et al., 2018), reduces environmental impact (Nuhholz, 2018), and increase competitive performance (Kalaitzi et al., 2018). On the other hand, the performance based result of GSCM was minimizing costs (Heras-Saizarbitoria, 2011) more efficient uses of resource (Hahn et al., 2014). However, while previous literature demonstrated that GSCM can increase company performance, the current research intended to evaluate the environmental, financial, and competitive performance of the organizations to generalize the overall performance. In this pertinent, environmental performance will be measured by reducing energy consumption, waste generation, atmospheric pollution, carbon emission, and environmental pollution. Similarly, financial performance will be evaluated through the decreasing manufacturing or operating costs on the other hand, by increasing annual turnover, market share, profit margin, and return on investment. However, competitive performance will be examined by enhanced proficiency to acquaint with pioneering goods/services; better-quality and brand value of goods/services; increasing accessibility in new markets; and increased performance outcomes more than the competitors.

Social identity theory

According to the Social Identity Theory (SIT), societies build a positive self-concept by first categorizing themselves into groups and then identifying themselves as members of that particular group. Belonging to a group that promotes a good self-image is also helpful. Those who belong to a group realize that they share similar views and behaviors (Stets and Burke, 2000). Social identity theory is commonly used to explain how an organization's social context affects employee identification (Kim et al., 2019). A company's employees are committed to the company's principles, take pleasure in the company's work, and are devoted to the company. As a result, employees are more likely provide their best effort which leads to extreme company performance. Company's GSCM can facilitate better work output for the company itself according to the current study. As a result, all stakeholders in the team is more likely to identify with and practice environmentally friendly activities for better outcome. According to our hypothesis, GSCM can assist reducing social uncertainty. According to previous research, employee sustainability behavior is linked to social identification (Carmeli et al., 2017). We assume that GSCM encourages stronger employee support for better company performance. Last but not least is an atmosphere that encourages all members of the company to practice their sustainability concerns and to pay more attention to resulting maximum productivity and performance for the company.

Development of Hypothesis

Green Purchasing and Organizational Performance

According to Wang et al. (2018), businesses who follow environmental regulations and adopt environmentally friendly practices face higher costs, lowering their competitiveness. Businesses spend resources away from their principal business to enhance their performance, resulting in a drop in profitability (Akter et al. 2016). Greening a company's supply chain has a number of benefits, ranging from cost savings to including suppliers in a participatory decision-making process that encourages environmental innovation (Rao and Holt, 2005). Sroufe (2003) presents a framework for evaluating suppliers that includes performance indicators and metrics. Environmental activities including strategic environmental sourcing and eco-friendly green project creation have been proved to boost a company's competitiveness and reduce market risks. When environmental concerns are at the forefront, consumer and organizational stakeholder disagreements have a negative impact on regional and global collaboration, resulting in conflicts across several domains.

H1. *Green Purchasing has a positive relationship with Organizational Performance.*

Green Manufacturing and Organizational Performance

Today, a growing number of business executives feel that maintaining sustainability will help them compete even more successfully in the future. Green manufacturing companies gain not just from long-term cost reductions, but also from higher brand awareness, better regulatory interactions, and increased investor interest (Dubey et al., 2015). The management and financial systems of the corporate system are affected by environmental behavior. Regardless of industry size or sector, recognizing Green Manufacturing as a crucial feature is important for global competitiveness. According to various studies, companies that successfully implement GSCM strategies generate more money and achieve more internal success (Roy and Khastagir, 2016; Zhang et al., 2008). Green and waste reduction methods typically assist both the environment and the financial line, and sustainable performance represents an organization's environmental responsibilities (Zhan et al., 2016). The ability to form environmental partnerships with companies of all sizes and sectors has a positive impact on a company's product market and reputation (Dangelico and Pontrandolfo, 2015). Recent research (Laari et al., 2016; Zhu et al., 2013; Yang et al., 2013) found strong links between environmentally friendly supply chain practices and financial performance, while also pointing to the need for more research. Green Manufacturing has evolved as a corporate philosophy aiming at boosting profit and market share by promoting environmental stewardship. Hajmohammad et al. (2013) investigated the quantity of green practices used in lean management and supply chain management strategies, as well as the mediation effect on environmental performance. Green performance and excellence, staff development, and lean approaches all assist a company and its competitors when it comes to maintaining competitiveness (Azevedo et al., 2013). Cleaner practices such as lean, quality, and innovation have boosted organizations' competitive edge, according to Subramanian and Gunasekaran (2015). Green Manufacturing adoption is linked to enhanced performance results in industrial sectors to a larger extent (Zhu et al., 2007). Additional study on the relationships between several facets of sustainable and commercial success is needed (Yang et al., 2013). GSCM allows industrial operations to have a smaller environmental impact without losing quality, affordability, reliability, or performance, all while assuring equitable financial consequences (Srivastava, 2007). Several researchers identified the barriers and blockades to Green Manufacturing, and discovered that some significant barriers, such as a lack of ecological consciousness and green concerns, senior management commitment, and temporary policymaking orientation, are impeding the use of Green Manufacturing programs (Govindan et al., 2014; Ravi, 2015).

H2. Green Manufacturing has a positive relationship with Organizational Performance

Green Distribution and Organizational Performance

According to Murphy (2012), industrial companies are under increasing pressure to implement more environmentally friendly strategies. A number of nations currently have projects targeted at minimizing the quantity of packaging that enters the waste stream in order to address packaging's environmental effect (Hasan, 2013). As a result, many governments have incorporated environmental laws and regulatory frameworks into their decision-making processes. As a result, many companies are implementing more environmentally friendly practices, such as incorporating environmental design into their products (Murphy, 2012) and using sustainable distribution methods. As a result, producers must be aware of the regulations and ensure that their goods meet those requirements. The ability to advertise and sell environmentally friendly products is the fundamental benefit of greening a supply chain. Through case studies, Hasan (2013) came to the conclusion that green distribution is crucial in the relationship between environmental innovation and economic advantage. Businesses benefited from higher productivity, cost savings, risk management improvements, improved service, and more revenue, according to the report. Many firms, however, may be unable to profit from this image advantage due to customers' inability to identify the sustainability of items in their supply chain (Delmas & Montiel, 2009). Improved packaging and reorganized loading patterns related with green distribution, according to Amemba et al. (2013), reduce material consumption while increasing warehouse and trailer utilization. Additionally, the quantity of handling required is reduced. Both studies show that green packaging requires breaking down things into smaller bits in order to save space and resources while also improving warehouse efficiency.

H3. Green Distribution has a positive relationship with Organizational Performance

Reverse Logistics and Organizational Performance

Green manufacturing comprises incorporating green resources into industry, which may lead to a long-term competitive advantage by increasing efficiency by improving product quality and output at the lowest feasible cost. Green manufacturing refers to industrial production procedures that use more environmentally friendly resources and generate the greatest quantity of product with the least amount of waste and pollution possible. Green manufacturing, according to Khan and Qianli (2017), can result in lower raw material consumption, lower energy consumption, fewer production stages, lower environmental and occupational safety expenses, and a more positive corporate image. Reverse logistics, as described by Green et al. (2004), is the process of adding value to clients while decreasing supply chain costs. Cost, quality, flexibility, and delivery components of the supply chain should all reflect the enhanced value. Reverse logistics services, according to Oliver and Delbridge (2002), promote client loyalty and allow organizations to create strong customer connections. Reverse logistics, on the other hand, according to Carter and Narasimhan (1996), places a financial pressure on supply chain performance and decreases product quality. Wisner (2003) investigated manufacturing and service organizations in the United States and Europe, evaluating a model that includes supplier management and customer relationship strategies as antecedents to supply chain management strategy and future firm performance. Additional research on UK manufacturing enterprises found a robust and favourable link between supply chain integration and manufacturing performance perceptions. In a survey of factory sales managers, Green et al. (2004) revealed a link between reverse logistics, environmental performance, and financial success. The connection between reverse logistics and competitive advantage was investigated by Green et al. (2006). According to the research, reverse logistics is significantly and positively linked to organizational performance, and it also allows

businesses to differentiate themselves via social services, reliability, and strong customer connections.

H4. Reverse Logistics has a positive relationship with Organizational Performance

Methodology

Research design

This study examines the possible relationship between the variables using suitable and relevant data. This study gathered data for this aim at the same time and performed a cross-sectional analysis (Sekaran & Bougie, 2016). All lower to higher level decision makers in consumer goods firms in Bangladesh are explained using data acquired from respondents who work as executives. This primary data was collected using a structured questionnaire. When exploring the potential link between the specified variables and constructs, this questionnaire survey approach is applicable (Salkind, 2012).

Measurement

The four activities of GSCM system evaluated as the independent constructs in this study including the dependent or focused variable i.e. Perceived Firm Performance have been conceptualized from Roy & Khastagir (2016) and Çankaya & Sezen (2019). The measurement items of these constructs were adapted from prior similar study such as, green manufacturing five items, green purchasing four items, and Green Distribution four items from Çankaya & Sezen (2019). On the other hand green transport & warehousing four items and green competition management four items adapted from Roy & Khastagir (2016). Moreover, the dependent variable Perceived Firm Performance was assessed with a five-item measurement developed also from Çankaya & Sezen (2019). In this pertinent, using the argument that many organizations do not want to reveal their precise objective financial data, this study evaluated respondents' subjective perceptions of Perceived Firm Performance (economic, social, and environmental). Furthermore, both the independent and dependent constructs were measured using a 5-point Likert scale i.e. from 'strongly agree' to 'strongly disagree'.

Reliability and validity of the Items

The items' reliability was determined using composite reliability in short, CR, whereas construct validity was determined using item loadings and the test of average variance extracted in short, AVE using the Chin (2010)'s parameter. Furthermore, the Fornell-Larcker criterion proposed by Hair et al. (2013) was used to assess discriminant validity.

Target population, Sample, and Unit:

Target population: The target population is the employees who are working as executives in selected consumer product organizations of Bangladesh.

Sampling Unit: Employees who are working as executives and specially positioned in the head offices of the selected consumer product organizations of Bangladesh. In addition, the total job experience of the sample respondent participant should have more than one year in existing organization.

Extent: The head offices of twenty selected consumer product organizations which are located in Dhaka.

Time: Data has been collected within January 2022 to March 2022.

Sampling technique and sample size

Sampling Technique: The respondents for this study were chosen using a convenient sampling procedure. In this respect, because convenient sampling is a non-probability sampling method, Malhotra and Dash (2016) advised that non-probability sampling be utilized

in the situation of unlisted populations. Furthermore, this sampling approach is used to collect data from individuals who can only contribute what the researchers are seeking for, or who can only meet the researchers' needs (Sekaran and Bougie, 2016). The following are the reasons for utilizing a non-probability sampling approach, i.e. convenient sampling, in this study:

- i. It is less costly, easy to access and quick (Malhotra and Das, 2016);
- ii. Circumspect use of non-probability sampling leads to dependable results (Cooper and Schindler, 2011);
- iii. During this COVID-19 the entire country of Bangladesh is in pandemic situation. So, it was difficult to collect data using complex sampling techniques.

Sample Size: The researchers first circulated 400 questionnaires, of which 293 were returned and 266 were determined to be filled and correct, however the remainder were not deemed to be legitimate. As a result, the overall sample size for the current investigation was set at 266. According to this, Hair et al. (2013) stated that a sample size of 200 in a PLS-SEM study is sufficient for any usual research. Furthermore, 266 surveys with a response rate of 66.50 percent were considered complete for data analysis because past researchers discovered a response rate of 29 percent in Bangladesh (Rubel et al., 2018). As a result, based on existing research support, sample size 266 for this current study is adequate.

Data analysis technique

For data analysis, two software techniques are employed. To prepare the data for analysis and get descriptive statistics, the Statistical Package for Social Sciences is utilized. Confirmatory factor analysis, composite reliability (CR), item validity, discriminant validity for constructs, and hypothesis testing are all investigated using SMART-PLS suggested by Hair et al. (2013).

Results:

Profile of the Respondents

The following table 1 shows the demographic characteristics of respondents:

Table 1: Profile of the Respondents

Characteristic	Category	Frequency	Percentage
Gender	Male	184	69%
	Female	82	31%
Last Academic Degree Achieved	Fifth Grade	15	6%
	Tenth Grade	27	10%
	Twelfth Grade	38	14%
	General Bachelors	97	36%
	BBA Degree	42	16%
	General Masters	28	11%
	MBA Degree	19	7%
Job Experience in Existing Organisation till December 2019	1-5 Years	64	24%
	5-10 Years	43	16%
	10-15 Years	39	15%
	15-20 Years	91	34%
	Above 20 Years	29	11%

Measurement Model

Through measurement model, this research evaluated confirmatory factor analysis to determine reliability and validity of the scales. Reliability was measured based on composite reliability (CR) and construct validity by item loadings and AVE test. Furthermore, discriminant validity was also measured based on Fornell-Larcker (Hair et al., 2013) criterion. Based on the

parameter of Chin (2010), minimum criteria for finalizing the items to use for the research would be the value of individual item loadings greater than 0.60; AVE > 0.50; and CR > 0.70. Table 2 of this study showed that except GP3 (0.380) and RL2 (0.320) all items has greater or bigger score than the required value or in other words, fulfilled the requirement according to Chin (2010). Hence, the measurement model resulted from the analysis of the present study has completed the criteria of convergent validity as the values of AVE is greater than 0.50 and values of CR is greater than 0.70 in Table-2. The following Table-2 is given with the results from the measurement model:

Table 2: Results from the measurement model

Constructs	Item Code	Item Loadings	AVE	CR	Cronbach's Alpha
Green Manufacturing (GM)	GM1	0.774	0.664	0.873	0.807
	GM2	0.739			
	GM3	0.879			
	GM4	0.844			
	GM5	0.832			
Green Purchasing (GP)	GP1	0.771	0.616	0.827	0.882
	GP2	0.703			
	GP4	0.871			
Green Distribution (GD)	GD1	0.674	0.679	0.838	0.811
	GD2	0.871			
	GD3	0.887			
	GD4	0.847			
Reverse Logistics (RL)	RL1	0.867	0.624	0.832	0.803
	RL3	0.783			
	RL4	0.712			
Perceived Firm Performance (PFP)	PFP1	0.831	0.669	0.875	0.798
	PFP2	0.858			
	PFP3	0.797			
	PFP4	0.838			
	PFP5	0.760			

Note: The items like, GP3 (0.380) and RL2 (0.320) had to be removed from the final output of the result from the measurement model because of poor loading (item score < 0.60).

In comparison, the present study have used the test based on the Fornell-Larcker 's guideline (Hair et al., 2013) to determine discriminant validity. In line with, the Fornell-Larcker parameters suggest that the square root of the values of AVE would be greater than the connectivity of the latent constructs of the actual non-diagonal variables. This research successfully meets the requirements of the test that demonstrates discriminant validity which can be accepted according to Hair et al. (2013). Furthermore, the composite reliability (CR) of the unnoticed variables was higher than the cut-off value (CR > 0.70). Therefore, in table 3 the results from the discriminant validity are given below:

Table 3: Results from the discriminant validity

	GD	GM	GP	RL	PFP
GD	0.824				
GM	0.449	0.815			
GP	0.134	0.219	0.878		
RL	0.283	0.517	0.111	0.789	
PFP	0.500	0.601	0.192	0.491	0.818

Note: The bold lettered values represented 'the squire root' of the AVE, and the other values signified the correlation between the constructs.

Green Manufacturing = Green Manufacturing, GP = Green Purchasing, GD = Green Distribution, RL = Reverse Logistics, PFP = Perceived Firm Performance

After measuring the 'reliability' and 'validity' scale of the items, the study formulated the structural model with four constructs of GSCM acting as the independent variables, and Perceived Firm Performance (PFP) treated as the dependent variable. From the connectivity among the five dimensions of Green Manufacturing and uni-dimensional PFP, four latent constructs have direct positive contributions on PFP, for instance, GD ($\beta = 0.229$, $p < 0.05$), Green Manufacturing ($\beta = 0.345$, $p < 0.05$), and RL ($\beta = 0.164$, $p < 0.05$) which found supported result with the assumption. On the other hand, one latent construct i.e. GP ($\beta = 0.077$, $p > 0.05$) has insignificant effect on PFP. The results of the direct effects are shown in Table 4 below.

Table 4: Results of the hypothesis tests from the structural model

Paths	Path Coefficient	T Statistics	P Values	2.5% LLCI	97.5% ULCI	Decisions
GREEN MANUFACTURING -> PFP	0.345	6.193	0.000	0.234	0.450	Supported
GP -> PFP	0.077	1.599	0.110	-0.016	0.159	Not Supported
GD -> PFP	0.229	3.936	0.000	0.116	0.335	Supported
RL -> PFP	0.164	3.080	0.002	0.058	0.261	Supported

Discussion on findings

Green purchasing, green manufacturing, green distribution, and reverse logistics were all included in GSCM's activities. According to the findings on the impact of GSCM on perceived firm performance, GSCM practices such as green manufacturing, green purchasing, green distribution, and reverse logistics result in increased sales, product quality, and delivery, as well as lower transportation costs, resulting in higher profit margins. Businesses that coordinate their distribution networks, according to Ninlawan et al. (2010) and Olga (2012), gain from higher load and hence transportation efficiency. According to Toke et al. (2010), having easy access to information lowers operational costs by minimizing storage and retrieval movements. Technology has transformed distribution strategies, with more firms using the internet as a means of delivery, according to the statistics. This has made information more readily available. This is in line with Okello & Were's (2014) conclusion that technology has a big influence on food producing businesses. Green distribution techniques indicate managers' commitment to adopt green manufacturing and distribution by taking control of their distribution pattern, cutting production costs (Hasan, 2013). This conclusion is in line with Muma et al. (2014) that green distribution has a favourable relationship with perceived firm performance (Muma et al., 2014). Green manufacturing, distribution, and reverse logistics, as a result, have a significant influence on a company's competitiveness. However, because the latent components had a negative score, the study did not support the firm's performance.

Conclusion

Today's competitive scenario necessitates that FMCG firms concentrate on both their business and their environmental performance. Higher performance leads to a competitive advantage, and it is expected that manufacturing companies would be watchful and review their performance in light of green issues on a regular basis in order to stay competitive. Bangladesh's industries are moving beyond performance standards and committing to comprehensive sustainable production, not only pollution reduction. According to a study by

Zhao et al. (2015) on environmental standards, GSCM may play a critical role in assisting organizational culture transformations toward green practices. Green supply chain management, on the other hand, goes beyond regulation; it is a comprehensive process that reduces both environmental and economic consequences by minimizing left-over products, pollution, toxics, and energy conservation throughout operations and influences many aspects of the firm. This study explores the links between Green Supply Chain Management success criteria and performance metrics through the use of analysis. The study finds that the majority of components have a significant connection with organizational results, and so it pays out for and influences outcomes when discussing correlation analysis. This research and its conclusions can help firms figure out which areas need more attention. According to the structural model study, performance indicators have a greater impact on business performance than other elements. The research's dependent variables are properly predicted. The sensitivity analysis confirms the model's robustness and also focuses management's attention to the parts that need to be addressed.

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