

# Factors Influencing Green Performance in Manufacturing Industries

Md. Harun Ur Rashid<sup>1</sup>, Shah Asadullah Mohd. Zobair<sup>1</sup>, Md. Jafar Shaddek<sup>2</sup>, Md. Ariful Hoque<sup>3</sup> & Afzal Ahmad<sup>3</sup>

<sup>1</sup> Dept. of Economics & Banking, International Islamic University Chittagong (IIUC), Bangladesh

<sup>2</sup> Adjunct Faculty, Dept. of Economics & Banking, International Islamic University Chittagong (IIUC), Bangladesh

<sup>3</sup> Dept. of Business Administration, International Islamic University Chittagong (IIUC), Bangladesh

Correspondence: Md. Harun Ur Rashid, Lecturer of Accounting, Dept. of Economics & Banking, International Islamic University Chittagong (IIUC), Kumira, Sitakunda, 4318, Chattogram, Bangladesh.

Received: July 17, 2019

Accepted: August 27, 2019

Online Published: September 4, 2019

doi:10.5430/ijfr.v10n6p159

URL: <https://doi.org/10.5430/ijfr.v10n6p159>

## Abstract

The study aims to examine the factors that influence green performance in the manufacturing industry as it has become a burning topic in recent times. Structural Equation Modeling (SEM) has been used as a tool to analyze the data collected from different management levels of employees from the manufacturing industries in Bangladesh. The study shows that environmental performance (ENP) is the most significant factor affecting green performance (GP) in the manufacturing industry. Moreover, economic performance (ECP), operational performance (OP), social performance (SP) and corporate governance performance (CGP) are also significant influential factors of green performance. However, the study found no significant relationship between innovation performance (IP) and GP. The findings of this study provide policymakers as well as the industries' authority valuable insight and help take necessary actions regarding green performance.

**Keywords:** green performance, manufacturing industries, SEM, Bangladesh

## 1. Introduction

Human generations of the earlier world have experienced a dependency on a life-support system for existence that was naturally prevailing on the earth. Due to such dependency, they spontaneously acknowledged the significance of careful use of natural resources. However, recent generations are tremendously using technological advancements to use natural resources without heeding consideration to the negative impacts on the environment (Ngowi, 2001). Such a journey of the current entities of society compromises the sustainability of our future generation. Environmental issues have become very critical threats to perusing sustainable development (Lin & Ho, 2011). Therefore, it has become the regulatory compliance to concentrate on the protection of the environment all over the world. Environmental damage could happen in three ways such as reduction of energy, changes in global climate, and pollution due to the dumping of toxic waste (Kashiwagi, 1996). Unfortunately, most of the business industries are directly or indirectly working as perils of such environmental damage.

However, in recent time, business organizations are recognizing a need for sustainable earth for future generations. For this purpose, firms are designing business process and practice in a way that supports the enhancement of eco-system. Business practices that take into account environmental wellbeing are referred to as green performance. Though some ethically enriched organizations try to ensure green practice, some other organizations are concentrating on green performance to comply with regulatory compliance. Though the investment in the green project is costly as it's payback period is high than the regular investment, adoption of green performance by business has become the claim of consumer pressure groups, the environmental organization, and government regulatory bodies (Rashid & Uddin, 2018). Such a scenario results in a concentration of development of policy by business firms to protect environment worldwide (Brunoro, 2008). Green practicing business is being considered as sustainable business which is defined as an economic enhancement that results in wealth maximization by satisfying current generation's need while not compromising the environment for the upcoming generation (Daft, 2008). Contemporary business organizations are being faced regulatory, social and economic pressures for being lean and green in conducting regular business practices such as raw materials sourcing, distribution, operation and management of logistics (Van den Broek & Van den Broek-Serlé 2010). Green practices include green lean six sigma, balanced green scorecard, green supply management process (Theyel, 2000) and green purchase, customer

support to green concerns and eco-design (Zhu et al., 2010). Mentioned green practices result in enhanced organizational and green performance (Zelbst et al., 2012).

The green practice in Bangladesh was tremendously questioned by the Rana Plaza tragedy when 1129 people were killed due to the collapse of a house with five garments. Poor safety standard and working conditions were considered as main perils for this tragedy (Huq & Stevenson, 2018). But some contemporary evidences claim the emergence of green practice among business industries of Bangladesh. For instance, as a part of green supply chain management, Bangladeshi leather industries are concentrating on execution of sustainable practices in the manufacturing process (Moktadir et al., 2018). Concentration on sustainability in the manufacturing process is being increased day by day. The main reasons behind such growing trend of green practice in Bangladesh are market pressure, awareness of customers, regulatory pressures, economic benefits realization, DFI attraction and understanding the significance of circular economy (Lieder & Rashid, 2016).

Some RMG firms are willingly going green and some other firms are being compelled to go green for retaining skilled employees and complying requirement of western buyers. Since going green in business is a burning issue of the manufacturing industry in Bangladesh, understanding the factors that shape the green practices of such industry carries colossal significance. Though some researches focused on examining the green practices of different sectors of Bangladesh, none has concentrated on investigating the factors affecting green practice in the manufacturing industry. Thus, this study aims to fill this gap by exploring the drives or factors that making Bangladeshi manufacturing firms green in business practice.

Moreover, a limited number of studies in the context of developing countries have encouraged the authors to conduct this study for the measurement of green performance, especially from the angle of legitimacy and institutional theories. Though many researchers merely explore the CSR end environmental disclosures in Bangladesh (Ahmad et al., 2017; Sobhani et al., 2012), no study has been found in measuring the green performance in manufacturing industries of Bangladesh. Though the manufacturing industries are concerned about green performance regarding social and environmental aspects and discharged their social responsibilities for the well-being of society (Imam, 2000; Jones et al. 2007), finding a few studies to focus on green performance is the major gap of existing literature. Based on the gap, the present study explores the following researcher questions:

1. Which factors do influence the green performance in the manufacturing industries?
2. Is there any relationship between the independent variables ENP, ECP, OP, IP, CGP and SP and dependent variable GP?

This study attempts to find out the answer to the questions. For this purpose, it is crucial to investigate the factors that influence green performance. Hence, the study aims to examine Bangladeshi manufacturing industries' contribution to green performance.

## **2. Literature Review, Theories and Hypotheses Development**

Many researchers identified different factors that shape green practice in business. The magnitude of going green by business firms directly linked with environmental and social performance (Galeazzo et al., 2014; Govindan et al., 2015; Digalwar et al., 2013; Zhu et al., 2008). Operational and economic efficiency, mostly facilitated by environment-friendly manufacturing process, are keys determinants of making a firm green (Dornfeld, 2014; Rusinko, 2007; Woo et al., 2016). Along with these, innovative effort to find an environment friendly solution and characteristics of corporate governance are also contributing to the enhancement of green business across the world (Ar, 2012; Conding et al., 2013; Muthuri & Gilbert, 2011; Rodrigue et al., 2013).

The institutional theory suggests that the firms should follow the social rules and regulations to survive in their business environment at a certain level (Frynas & Yamahaki, 2016; Hotho & Pedersen, 2012). This theory allows us to explore wider societal and economic governance responsibility, which is considered as the significant advantage over other theories (Brammer et al., 2012; Gond et al., 2011). On the other hand, legitimacy theory suggests that the firms should operate their activities based on the social contract between organization and society (Aslam et al., 2018; Deegan et al., 2002; Dowling & Pfeffer, 1975; Frynas & Yamahaki, 2019). Since society permits the organizations to use its natural resources and hire workers from society, as legal entities, the industries pollute the environment through its wastage. Therefore, the study is based on institutional and legitimacy, as the theories state that it is the responsibility of the industries to protect the environment as well as the society through green practice and performance, providing health and safety to workers and community and ensuring social accountability and investment (Aslam et al., 2018). Thus a conceptual model could be produced for this research in which dependent variable is a green practice which depends on independent variables such as environmental performance, economic

performance, operational performance, innovation performance, social performance and corporate governance performance of firms. Based on the discussion, the study proposes the following model:

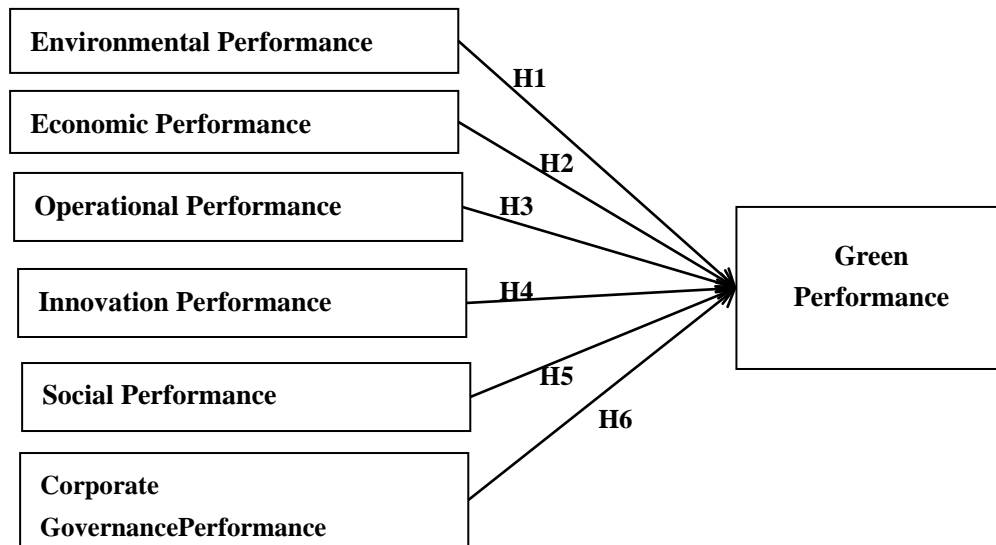


Figure 1. Proposed model

### 2.1 Green Performance

Green performance concentrates on controlling of harmful impact on the environment by undertaking environmental management initiatives (Lee et al., 2018). Green practices consist of green consideration in purchase decision by customers, green purchasing and eco-friendly business process design (Zhu et al., 2010). Green practices focus on the commitment of minimizing the negative impacts of business process on the environment and green performance as the enhancement of sound management of the environment (Condong et al., 2013). Recycling of product and compliance of environmental demand are also parts of green practice (Mahmood et al., 2011). Green performance by a business firm is the outcomes of green practice (Lin, 2013). Some remarkable green performance indicators such as reduced cost, enhanced customer response time, efficacy, reduced hazardous materials usage, waste generation, and energy consumptions are the outcomes of adoption of green practices (Bergmiller & McCright, 2009).

### 2.2 Environmental Performance (ENP)

Since environmental quality conservation is getting importance throughout the world (Govindan et al., 2015), the green in business process is oriented to attain the sound environmental efficacy of firms (Zhu et al., 2008). Thinking green in practice saves the natural environment from probable deleterious impacts of business process to be used for the production of products (Galeazzo et al., 2014). Along with some other indicators, environmental management and performance is a crucial one demonstrating green in the business process (Shang et al., 2010). Green practice is preceded by some initiatives linked with environment such as monitoring of environment while deciding about suppliers, selecting ethical and environmentally friendly source of raw material, a sound system of environment management, eco-design, logistics for collecting and using packages and unused portion of products for recycling purpose, minimization of natural resources consumption (Galeazzo et al., 2014; Paulraj, 2009; Shang et al., 2010; Zhu et al., 2008). Reducing excessive usage of power and water, proper usage of resources and controlling rubbish production and pollution, consideration of negative impacts of eutrophication and greenhouse effects are vital issues to be considered in the green approach of business practice (Verrier et al., 2014). Regulatory pressure to ensure environmental management results cost efficiency and green product innovation that ultimately results in profitability (Chan et al., 2016). Since environmental performance is a crucial indicator of sustainable performance, it should be incorporated in crucial decision making to make the business process green (Chin et al., 2015).

H1: ENP has a positive relationship with GP in the manufacturing industry.

### 2.3 Economic Performance (ECP)

Pollution prevention practice, synonymous to green practice is considered to be consistently linked with manufacturing cost minimization among manufacturers of commercial carpet in the US (Rusinko, 2007). Since green practice concentrates on recycling and reuse of waste product and other resources, it reduces the cost level of manufacturers (Porter & Van der Linde, 1995). The green practice is the result of successful implementation of 6 Rs related with manufacturing such as remanufacturing, recycle, redesign, reduce, recover and reuse, which ultimately result in cost-effectiveness (Jawahir et al., 2006). Many countries launched a campaign to enhance green manufacturing practices emphasizing on recycled materials use and controlling consumption of energy (Woo et al., 2016). Financial benefit, derived from reuse and recycle of waste product, is a crucial driver of green manufacturing (Govindan et al., 2015).

H2: ECP has a positive relationship with GP in the manufacturing industry.

### 2.4 Operational Performance (OP)

A survey on hundred plus electronic manufacturers identified process, materials, work environment, packaging and waste system as critical determinants of success of green management of business performance (Udomleartprasert, 2004). Some key aspects of operational performance such as training and involvement of employees, design of process and product, information and supplier management should have been prioritized to make the business performance green (Soo Wee & Quazi, 2005). Effective utilization of resources and amassed resources productivity would be considered a key driver of green manufacturing implementation (Dornfeld, 2014). An essential dimension of green practice in business is green manufacturing, which facilitates product take-back system, preservation of energy use in the manufacturing process to enhance the operational efficiency of the firms (Gutowski et al., 2005).

H3: OP has a positive relationship with GP in the manufacturing industry.

### 2.5 Innovative Performance (IP)

Many characteristics of green practices which are linked to the integration of technology, management of environmental issues and logistics, supplier management and customer's concentration (Ar, 2012; El-Kassar & Singh, 2019). Green practice results in green performances; sometimes, such output is derived through the development of some green innovation (Conding et al., 2013). Green innovation is a contemporary solution that controls environmental pollutions, facilitates society with dynamic solutions with a lower price (Carrión-Flores & Innes, 2010). Green innovation often termed as eco-innovation helps bring sustainability in the environment through enhancement of ecology (Halila & Rundquist, 2011). Green innovation results business process, techniques, systems, practices and new solution (products or services) that reduces environmental damages (Beise & Rennings, 2003). Green innovation could contribute to three forms such as green product innovation, green managerial innovation and green business process innovation (Chen et al., 2006). Green innovation exists when all the relevant stakeholders work consistently to develop a new business solution and management system to minimize the negative impact on environments (Ar, 2012).

H4: IP has a positive relationship with GP in the manufacturing industry.

### 2.6 Social Performance (SP)

A crucial determinant of green performance is environmental management that claims an empowered workforce trained with contemporary knowledge and skills to comply not only with dynamic regulatory issues but also to satisfy the firm's aim to have the efficient environmental workforce (Digalwar et al., 2013). Management of environmental pressures and challenges regularly claims numerous collaborations between firms and their linkage among regulators, supply chain and other stakeholders (Vachon & Klassen, 2008; Wasko & Faraj, 2005). During green management implementation, strong social networks work as a source of motivation for partners to exchange and share knowledge (Lin et al., 2009; Phelps, 2010). Green initiatives undoubtedly demand a collaborative effort from internal stakeholders such as designers, environmental technicians and R&D personnel to examine the environmental and health impacts on society (Noori & Chen, 2003; Pujari, 2006).

H5: SP has a positive relationship with GP in the manufacturing industry.

### 2.7 Corporate Governance Performance (CGP)

Theoretically, political capital, a determinant of corporate governance, facilitates simply-available subsidies, supporting policies and tax benefits which promote firms to invest in green business practice (Xie, Zeng, & Tam, 2010). In green management, compliance of environmental regulations keep significant positive role, but political capital plays a significantly and negative role (Lin et al., 2014). Impact of compliance with regulations is dictated as

pivotal determining factors of some green performance such as green innovation (Costantini & Mazzanti, 2012; King & Lenox, 2000). Since the larger board of directors has connections with diversified stakeholders and facilitates sharing and communication of environmental information, firms with such board of directors are expected to get access to critical financial assets to ecological lunch edges (Villiers et al., 2011). The directors hold the principal responsibility of implementing policies regarding the environmental issue since they are responsible for the governance of a firm (Rodrigue et al., 2013). Important environmental disclosures such as GHG disclosures are significantly influenced by corporate governance characteristics such as ownership of directors, size of the board, the concentration of ownership, etc. (Tauringana & Chithambo, 2015). A board of director consisting independent director, contributes to undertake environment-friendly practices and initiative by facilitating checks-and-balance mechanism, exercising pressure on management, advising regarding external disclosures (Brammer & Pavelin, 2008; Khan et al., 2013; Tauringana & Chithambo, 2015). Institutional investor, also termed as social actor contributes to the firm's performance on the environmental and social issue by monitoring and collection of responsiveness (Matten & Moon, 2008; Muthuri & Gilbert, 2011). Substantial ownership provides institutional investors with a legitimate and powerful position to play a crucial role in designing the firm's strategic decisions regarding environmental disclosures (Cotter & Najah, 2012).

H6: CGP has a positive relationship with GP in the manufacturing industry.

Table 1. Definition of variables

Measure	Definition
Environmental Performance	“Environmental performance relates the ability of manufacturing plants to reduce air emissions, effluent waste, and solid wastes and the ability to decrease consumption of hazardous and toxic materials” (Montabon et al., 2007; Zhu et al., 2008).
Economic Performance	“Economic performance relates to the manufacturing plant’s ability to reduce costs associated with purchased materials, energy consumption, waste treatment, waste discharge, and fines for environmental accidents” (Conding et al., 2012; Zhu et al., 2008).
Operational Performance	“Operational performance relates to the manufacturing plant’s capabilities to more efficiently produce and deliver products to customers” (Montabon et al., 2007; Zhu et al., 2008).
Innovation Performance	“Innovation performance can be defined as measures of green practices in developing new ideas and behavior to produce product and processes and at the same time can contribute to a reduction of environmental burdens” (Sanni, 2018; Wagner, 2008).
Social Performance	“Social performance provides social accountability, reduces social risk, maximizes of social wealth (Fuzi et al., 2013), and enables involvement of the local community and improves the quality of the workforce and the local community, and responsibilities towards society” (Blomgren, 2011; Fuzi et al., 2015).
Corporate Governance Performance	: Corporate governance performances comply with the standards set, enhance risk control, increase transparency and accountability, improve the set of rules and regulations, increase effective governance, provide board characteristic and board structure, to increase the capital, and promote best practices and codes” (Fuzi et al., 2015).
Green Performance	“Green performance focuses on the improvement of environmental management to the industry (Digalwar et al., 2013).

### 3. Methodology

#### 3.1 Sample and Data Collection Procedure

Data has been collected from a sample of 250 employees of Bangladeshi manufacturing industries by using a structured close-ended questionnaire. During the period of data collection, three hundred (300) questionnaires were served based on random stratified sampling; of which 250 were received with the response rate of 83% after filtering out the missing data. There was no univariate issue in this research.

#### 3.2 Measurement Instrument

A closed-ended structured questionnaire for measuring the green performance was served to the respondents of Bangladeshi manufacturing industries. The questionnaire was prepared using a 7-point Likert scale where one

indicates strongly disagree and seven indicates strongly agree. The questionnaire was developed based on previous literatures related to green practices and performance. However, the questionnaire was translated into Bangeli to make a proper understanding of the local situation. The questionnaire was split into two segments; one segment contains demographic variables while other includes items related variables. Beside demographic information, thirty-one (31) items with seven (7) latent variables were included in this study. Prior to surveying the questionnaire among the respondents, the study runs a pilot survey to ten respondents to evaluate the questionnaire. The main purpose of such a pilot survey was to ensure whether the respondents are able to understand each of the items that they were asked. After having feedback from the pilot survey, the questionnaires were served to the respondents with necessary corrections. To make the questionnaire more reliable, the study conducted reliability and validity test presented in the results section.

### 3.3 Data Analysis Tools

In this study, data were analyzed in two steps. In the first step, only the demographic profile was analyzed with frequency and percentage which consists of manufacturing industry types, the number of their employees, employees' status and the number of years in business. In step two, the items with latent variables were analyzed. The Confirmatory Factor Analysis (CFA) was run to find out each item's loading score as well as the most influencing factors of green performance. The Cronbach's alpha coefficient (CA), average variance extracted (AVE), composite reliability (CR) were also run to test the reliability and validity of the data. Finally, structural equation modeling (SEM) was conducted to examine whether the hypothesis is significant. Both the SPSS version 22.0 and Amos 22.0 were used to compute the result of the study.

Table 2. Demographic profile of the respondents

Items	Categories	Frequency	Percent
Types of manufacturing industry	Steel	70	28.0
	Cement	53	21.2
	Glass	67	26.8
	Textile	60	24.0
	Total	250	100
Number of total employees	Below 20	1	0.4
	20-50	20	8.0
	50-100	10	4.0
	More than 100	219	87.6
	Total	250	100
Employee status	Top-level	81	32.4
	Middle level	148	59.2
	Lower level	21	8.4
	Total	250	100
Age of firms	Less than ten years	27	10.8
	10-20 years	88	35.2
	More than 20 years	135	54
	Total	250	100

## 4. Results

### 4.1 Descriptive Statistics

Table 2 shows the demographic profile of respondents used in the present research. The sample includes 28 percent respondents from steel industry, 21.2 percent from cement industry, 26.8 percent from glass industry and 24 percent from textile industry. Most of the manufacturing industries of Bangladesh are substantial as the study shows 87.6 percent of the responses are from the industries which have more than 100 employees. 59.4 percent of the surveyed responses are from mid-level employees while 8.4 percent are from lower-level. Moreover, 54 percent firms are in operation for more than 20 years.

### 4.2 Examination of the Correlation Matrix

Pearson's correlation matrix is a technique which is used to measure the relationship between variables. Table 3 shows the means, standard deviation (SD) and the correlation among variables in the diagonal elements. The common factors are existed among data and fit for factor analysis; Table 3 represents that all correlation is significant at a p-value of 0.01 levels which means there is a strong relationship among the variables. The dependent variable green performance (GP) is significantly and positively correlated with all independent variables-environmental performance (ENP), economic performance (ECP), operational performance (OP), innovative performance (IP), corporate governance performance (CGP) and social performance (SP).

Table 3 also represents that most correlations are above 0.30 recommended by Hair et al. (1998). The correlation matrix indicates that the data share the common factors and is therefore appropriate for factor analysis. Before data analysis, the issue of multicollinearity was checked. If the Pearson correlation matrix (r) value is above 0.90, then multicollinearity problem exists (Hair et al., 2010). Moreover, the highest value of Pearson correlation between corporate governance performance (CGP) and social performance (SP) is 0.713 which is less than 0.90. Hence, no multicollinearity issue exists among the seven consisting variables.

Table 3. Mean, SD and Pearson correlations

	Mean	SD	ENP	ECP	OP	IP	CGP	SP	GP
ENP	5.83	0.52	1						
ECP	5.79	0.54	.653**	1					
OP	5.85	0.46	.578**	.700**	1				
IP	5.90	0.45	.495**	.533**	.511**	1			
CGP	5.79	0.50	.593**	.605**	.541**	.564**	1		
SP	5.86	0.47	.605**	.644**	.648**	.578**	.713**	1	
GP	5.88	0.48	.672**	.709**	.673**	.563**	.683**	.731**	1

Correlation \*\* and \* significant at 0.01 and 0.05 level respectively

### 4.3 Reflective Measurement Model

The study used factor analysis to measure the loading values as it evaluates the internal consistency of each of the items. As per the observation of Table 4, almost all the factor loadings are higher than the threshold value of 0.70 (Hair et al., 2017) except SP 23 (0.683) and GP 31 (0.611). Furthermore, under the model, the convergent validity is measured. The factor loadings and average variance extracted (AVE) are tested to measure the convergent validity. The composite reliability (CR) and AVE of the reflective model are shown in Table 5, where all six factors of green performance exceeded the recommended value for CR and AVE. After the process of item deletion, the study shows that all values of CR and AVE are greater than 0.7 and 0.5 respectively (Hair et al., 2017). It is concluded that the constructs meet reliability and convergent validity requirement at this stage.

Table 4. Factor loadings with items

Item code	Constructs and question design	Item loading
<b>Environmental Performance (ENP)</b>		
ENP1	Reduction of air emissions.	.819
ENP2	Reduction of effluent/solid waste.	.808
ENP3	Reduction of hazardous/harmful/toxic materials consumption.	.791
ENP4	Reduction of environmental accident.	.867
<b>Economic Performance (ECP)</b>		
ECP5	Reduction of materials purchasing cost.	.814
ECP6	Reduction of energy (e.g., electricity, gas, oil) consumption cost.	.880
ECP7	Reduction of waste treatment fee.	.881
ECP8	Reduction of fine for environmental accidents.	.800
<b>Operational Performance (OP)</b>		
OP9	Effeciciency of timely delivery of goods.	.700
OP10	Increase in product quality.	.783
OP11	Improvement of capacity utilization.	.846
OP12	Reduction of inventory.	.759
OP13	Reduction of defect rate.	.734
<b>Innovation Performance (IP)</b>		
IP14	Improvement of customer satisfaction level with product design and development.	.765
IP15	The designed and developed product is easy to recycle, reuse, and decompose.	.775
IP16	Continual introduction of new product ideas into the production process.	.734
IP17	High probability of success for new products being tested.	.735
<b>Corporate governance performance (CGP)</b>		
CGP18	Compliance with the standards set.	.732
CGP19	Improvement of environmental compliance.	.784
CGP20	Imposing required rules and regulations.	.803
CGP21	The enhanced risk control mechanism.	.794
CGP22	Transparency and accountability.	.708
<b>Social Performance (SP)</b>		
SP23	Employee training and development.	.683
SP24	Employee occupational health and safety	.843
SP25	Employee job security and satisfaction	.789
SP26	Community and society satisfaction	.807
SP27	Supplier commitment and initiative	.769
<b>Green performance (GP)</b>		
GP28	Reduction of energy consumption while enhancing economic development.	.726
GP29	Increasing capacity for innovation in green technology development and enhance competitiveness in the global arena.	.782
GP30	Ensuring sustainable development and preserving the environment for future generations.	.715
GP31	Promoting best practices and increasing public awareness of the GP.	.611



Table 5. Construct reliability and validity

Constructs	CA	AVE	CR
Environmental Performance (ENP)	0.89	0.68	0.92
Economic Performance (ECP)	0.91	0.71	0.91
Operational Performance (OP)	0.87	0.59	0.88
Innovation Performance (IP)	0.84	0.57	0.84
Social Performance (SP)	0.89	0.61	0.89
Corporate Governance Performance (CGP)	0.87	0.59	0.88
Green Performance (GP)	0.80	0.51	0.86

CA= Cronbach Alpha, AVE= Average Variance Extracted and CR= Composite Reliability

#### 4.4 Confirmatory Factor Analysis (CFA)

The study further applied the Confirmatory Factor Analysis (CFA) with the final measurement model. The effectiveness of the CFA model highly depends on the good fitness of the conceptual model. Table 6 represents the goodness of fit indices where the proposed model soundly fits as the threshold of CMIN/df value is less than 2 (1.924 at  $p < 0.01$ ) as per Tabachnick and Fidell (2007). Moreover, the Comparative Fit Index (CFI = 0.928) at  $P > 0.95$  exceeded the threshold level of 0.90 (Hu & Bentler, 1999) representing a good fit. The Root Mean Square Error of Approximation (RMSEA) and SRMR are 0.061 and 0.015 which are less than the threshold of 0.07 and 0.08 respectively (Steiger, 2007).

Table 6. CFA model fit indices

Indices	Final Model	Recommended Level
$\chi^2(DF)$	792.770 (412)	
CMIN/DF (P-value)	1.924 (.000)	<2
CFI	0.928	>0.9
SRMR	0.015	<0.08
RMSEA (P-close)	0.061 (.003)	<0.07

Table 7. SEM hypotheses

Hypothesis	Paths	Coefficient (B)	S.E.	C.R.	P	Decisions
H1	GP <--- ENP	.168	.059	2.838	.005	Supported
H2	GP <--- ECP	.172	.077	2.216	.027	Supported
H3	GP <--- OP	.201	.089	2.255	.024	Supported
H4	GP <--- IP	.028	.077	.360	.719	Not Supported
H5	GP <--- SP	.250	.105	2.390	.017	Supported
H6	GP <--- CGP	.199	.086	2.315	.021	Supported

Table 7 represents the relative significance of the exogenous variables ENP, ECP, OP, SP and CGP in predicting the dependent variable, green performance (GP). When examining the endogenous variables of GP, it is evident that all of hypotheses are significant except H4. The most crucial predictor is ENV (B= 0.168;  $p = .005$ , followed by SP (B=0.250;  $p = .017$ ), CGP (B=0.199;  $p = .021$ ), OP (B=0.201;  $p = .024$ ) and ECP (B=0.172;  $p = .027$ ) while insignificant predictor is only IP (B=0.028;  $p = .719$ ). Therefore, the study confirms the hypothesis H1 at 1% level and H2, H3, H5 and H6 at 5% level.

## 5. Discussion and Implications

The study mainly focuses on the measurement of the factors that influence green performance in the manufacturing industries. From the findings of the study, environmental, economic, operational, corporate governance and social performance are the significant crucial factors which influence the green performance.

As per the observation of the study, ENP is the most influential factor for manufacturing industries as it strongly influences the GP performance. ENP helps to reduce the carbon emission, solid waste, toxic materials and frequency of environmental accident. The result suggests the management take necessary steps to reduce carbon dioxide; create environmental awareness; reduce environmental pollution; enhance environmental management system and ensure sustainable development of environment (Castelló & Lozano, 2009; Husser et al., 2012). Moreover, the regulatory bodies should implement necessary actions to promote environmental rules and regulations to ensure green performance in the manufacturing industries. All stakeholders should be aware of whether their industries following the green performance to protect the environment and ensure sustainability (Aslam et al., 2018).

The study also found a significant positive relationship between economic performance and green performance. This finding offers an insight that the industries should emphasize more on the reduction of material cost, energy consumption and cost of waste treatment. Moreover, proper action should be taken so check involvement with environmental hazard to reduce fine and penalty. The management should have a proper plan on how to deal with the financial issues to implement a sound green performance.

Additionally, the study found that operational performance significantly and positively influences the green performance. The result recommends that the management of the industries should build up their capacity to improve product quality by reducing large inventory and defect rate. For utilizing their capacity to deliver their goods on time, the management may follow the JIT system, which in turn, reduces the cost of goods and maximizes profit and ensures green performance.

Interestingly, the study found no relationship between innovative performance and green performance. This happens in the manufacturing industries in Bangladesh because they do not emphasize on the customers' friendly design of products. However, the findings provide valuable information on how industries develop their new products and how they measure the green performance concerning their estimated financial performance competing with other products in the market. Therefore, the management should pay more attention to create new product ideas, product design and development to increase customer satisfaction. Moreover, they should take strategies to create products which are easy to recycle, reuse, and decompose for product development or design through innovative performance (Ar, 2012).

From the observation of the findings, social performance has also a significant and positive effect on green performance. This result indicates that more the industries emphasize on employee development, community and society satisfaction, greater the industries achieve green performance. Therefore, the management should take necessary training programs to develop their employees' skills and efficiency. They should also ensure employees job satisfaction providing job security, healthy and safe working environment as well as provide social benefits to the community and stakeholders for the betterment of the future generations.

Finally, the study found a strong association between corporate governance performance and green performance. The investors of the industries who contribute to the profitability of their firm may act as a monitor of whether their firms are complying the standard set of environmental rules and regulation (Matten & Moon, 2008; Muthuri & Gilbert, 2011). In addition to improving environmental compliance, the board of directors should maintain transparency and accountability in every event of the organizations which ensure good governance and accelerate green performance ultimately. Moreover, the management of the manufacturing industries should be careful in implanting decisions regarding the risk-control instruments.

## 6. Conclusion

The main objective of the study is to investigate what factors influence the green performance of the manufacturing industries. The study found environmental, social, economic, operational performance and corporate governance performance as the significant factors. This study entirely focuses on green performance for environmental protection and sustainability because environmental resources and raw materials are limited. In the age of globalization, researchers, economists, different kinds of national and international organizations and government and non-government organizations are concerned about how to improve production process, reduce air emission and solid waste through innovative green technology. Moreover, the study provides an insight into the government, community, business organizations and other stakeholders to make collaborations among them to successfully

achieve the green performance in the industries. For this purpose, they can take a strategic plan for the setting up of a common set of corporate rules and regulations for all types of manufacturing industries in such a way so that they can apply unique rules for environmental resource management; quality production process, waste management, CSR contribution. Additionally, the management of the industries should emphasize more on the sustainable development and protection of the environment for future generations by promoting best practices to increase social awareness on green performance.

The study has several limitations. First, the sample size is small due to the unwillingness of the employees to provide data as well as the restriction imposed by the firms to get access to the employees. Secondly, the study surveyed only the employees while other important stakeholders of the manufacturing industries are not considered. Therefore, future research may take into account other stakeholders to make the findings robust. Thirdly, the study considers only a few variables related to green performance, while some other crucial factors like CSR performance remains uncounted for. Besides, the findings of the study may not be universalized as it was conducted in a developing country. Thus, the future researchers may think of investigating other industries or cross-country analysis.

## References

- Ahmad, A., Khan, M. A., Abdullah, A. A. M., & Rashid, M. H. U. (2017). Environmental disclosures: A study on some selected pharmaceutical and chemical companies in Bangladesh. *IJUC Business Review*, 6, 9-24.
- Ar, I. M. (2012). The impact of green product innovation on firm performance and competitive capability: the moderating role of managerial environmental concern. *Procedia-Social and Behavioral Sciences*, 62, 854-864. <https://doi.org/10.1016/j.sbspro.2012.09.144>
- Aslam, S., Ahmad, M., Amin, S., Usman, M., & Arif, S. (2018). The impact of corporate governance and intellectual capital on firm's performance and corporate social responsibility disclosure. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, 12(1), 283-308.
- Beise, M., & Rennings, K. (2003). *Lead markets of environmental innovations: a framework for innovation and environmental economics*. <https://doi.org/10.2139/ssrn.428460>
- Bergmiller, G. G., & McCright, P. R. (2009). Parallel models for lean and green operations. *Paper presented at the Proceedings of the 2009 industrial engineering research conference*.
- Blomgren, A. (2011). Is the CSR craze good for society? The welfare economic approach to corporate social responsibility. *Review of Social Economy*, 69(4), 495-515. <https://doi.org/10.1080/00346764.2011.592329>
- Brammer, S., & Pavelin, S. (2008). Factors influencing the quality of corporate environmental disclosure. *Business strategy and the Environment*, 17(2), 120-136. <https://doi.org/10.1002/bse.506>
- Brammer, S., Jackson, G., & Matten, D. (2012). Corporate social responsibility and institutional theory: New perspectives on private governance. *Socio-Economic Review*, 10(1), 3-28. <https://doi.org/10.1093/ser/mwr030>
- Brunoro, S. (2008). An assessment of energetic efficiency improvement of existing building envelopes in Italy. *Management of Environmental Quality: An International Journal*, 19(6), 718-730. <https://doi.org/10.1108/14777830810904939>
- Carrión-Flores, C. E., & Innes, R. (2010). Environmental innovation and environmental performance. *Journal of Environmental Economics and Management*, 59(1), 27-42. <https://doi.org/10.1016/j.jeem.2009.05.003>
- Castelló I., & Lozano, J. (2009). From risk management to citizenship corporate social responsibility: analysis of strategic drivers of change. *Corporate Governance: The International Journal of Business in Society*, 9(4), 373-385. <https://doi.org/10.1108/14720700910984927>
- Chan, H. K., Yee, R. W., Dai, J., & Lim, M. K. (2016). The moderating effect of environmental dynamism on green product innovation and performance. *International Journal of Production Economics*, 181, 384-391. <https://doi.org/10.1016/j.ijpe.2015.12.006>
- Chen, Y.-S., Lai, S.-B., & Wen, C.-T. (2006). The influence of green innovation performance on corporate advantage in Taiwan. *Journal of Business Ethics*, 67(4), 331-339. <https://doi.org/10.1007/s10551-006-9025-5>
- Chin, T. A., Tat, H. H., & Sulaiman, Z. (2015). Green supply chain management, environmental collaboration and sustainability performance. *Procedia Cirp*, 26, 695-699. <https://doi.org/10.1016/j.procir.2014.07.035>

- Condong, J., Zubir, A. F. M., Hashim, S., Lanang, N. A. S., & Habidin, N. F. (2012). The investigation of green practices, green innovation and green performance in Malaysian automotive industry. *Environmental Management and Sustainable Development*, 2(1), 1-13. <https://doi.org/10.5296/emsd.v2i1.2683>
- Condong, J., Zubir, A. F. M., Hashim, S., Lanang, N. A. S., & Habidin, N. F. (2013). The investigation of green practices, green innovation and green performance in Malaysian automotive industry. *Environmental Management and Sustainable Development*, 2(1), 1. <https://doi.org/10.5296/emsd.v2i1.2683>
- Costantini, V., & Mazzanti, M. (2012). On the green and innovative side of trade competitiveness? The impact of environmental policies and innovation on EU exports. *Research Policy*, 41(1), 132-153. <https://doi.org/10.1016/j.respol.2011.08.004>
- Cotter, J., & Najah, M. M. (2012). Institutional investor influence on global climate change disclosure practices. *Australian Journal of Management*, 37(2), 169-187. <https://doi.org/10.1177/0312896211423945>
- Daft, L. (2008). *New Era of Management* (13th ed.). Mason, O.H: Thomson South-Western.
- De Villiers, C., Naiker, V., & Van Staden, C. J. (2011). The effect of board characteristics on firm environmental performance. *Journal of Management*, 37(6), 1636-1663. <https://doi.org/10.1177/0149206311411506>
- Deegan, C., Rankin, M., & Tobin, J. (2002). An examination of the corporate social and environmental disclosures of BHP from 1983-1997: A test of legitimacy theory. *Accounting, Auditing & Accountability Journal*, 15(3), 312-343. <https://doi.org/10.1108/09513570210435861>
- Dornfeld, D. A. (2014). Moving towards green and sustainable manufacturing. *International Journal of Precision Engineering and Manufacturing-Green Technology*, 1(1), 63-66. <https://doi.org/10.1007/s40684-014-0010-7>
- Dowling, J., & Pfeffer, J. (1975). *Organizational legitimacy: Social values and organizational behavior*. <https://doi.org/10.2307/1388226>
- El-Kassar, A.-N., & Singh, S. K. (2019). Green innovation and organizational performance: the influence of big data and the moderating role of management commitment and HR practices. *Technological Forecasting and Social Change*, 144, 483-498. <https://doi.org/10.1016/j.techfore.2017.12.016>
- Frynas, J. G., & Yamahaki, C. (2016). Corporate social responsibility: Review and roadmap of theoretical perspectives. *Business Ethics: A European Review*, 25(3), 258-285. <https://doi.org/10.1111/beer.12115>
- Frynas, J. G., & Yamahaki, C. (2019). *Corporate Social Responsibility: An Outline of Key Concepts, Trends, and Theories Practising CSR in the Middle East* (pp. 11-37). Springer. [https://doi.org/10.1007/978-3-030-02044-6\\_2](https://doi.org/10.1007/978-3-030-02044-6_2)
- Fuzi, N. M., Habidin, N. F., Desa, A., Zamri, F. I. M., & Hibadullah, S. N. (2013). Corporate social responsibility practices, ISO 26000 efforts and CSR performance in Malaysian automotive industry. *International Journal of Managerial and Financial Accounting*, 5(3), 277-293. <https://doi.org/10.1504/IJMFA.2013.058550>
- Fuzi, N. M., Habidin, N. F., Hibadullah, S. N., Zamri, F. I. M., & Desa, A. (2015). Critical success factors of corporate social responsibility practices for the Malaysian automotive industry. *International Journal of Critical Accounting*, 7(2), 142-156. <https://doi.org/10.1504/IJCA.2015.069950>
- Galeazzo, A., Furlan, A., & Vinelli, A. (2014). Lean and green in action: interdependencies and performance of pollution prevention projects. *Journal of Cleaner Production*, 85, 191-200. <https://doi.org/10.1016/j.jclepro.2013.10.015>
- Gond, J.-P., Kang, N., & Moon, J. (2011). The government of self-regulation: On the comparative dynamics of corporate social responsibility. *Economy and Society*, 40(4), 640-671. <https://doi.org/10.1080/03085147.2011.607364>
- Govindan, K., Diabat, A., & Shankar, K. M. (2015). Analyzing the drivers of green manufacturing with fuzzy approach. *Journal of Cleaner Production*, 96, 182-193. <https://doi.org/10.1016/j.jclepro.2014.02.054>
- Green, K. W. Jr., 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. <https://doi.org/10.1108/13598541211227126>
- Gutowski, T., Murphy, C., Allen, D., Bauer, D., Bras, B., Piwonka, T., . . . Wolff, E. (2005). Environmentally benign manufacturing: observations from Japan, Europe and the United States. *Journal of Cleaner Production*, 13(1), 1-17. <https://doi.org/10.1016/j.jclepro.2003.10.004>

- Hair, J. Jr., Black, W., Babin, B., Anderson, R., & Tatham, R. (2010). SEM: An introduction. *Multivariate Data Analysis: A Global Perspective*, 629-686.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (1998). *Multivariate data analysis* (Vol. 5). Prentice hall Upper Saddle River, NJ.
- Hair, J., Hollingsworth, C. L., Randolph, A. B., & Chong, A. Y. L. (2017). An updated and expanded assessment of PLS-SEM in information systems research. *Industrial Management & Data Systems*, 117(3), 442-458. <https://doi.org/10.1108/IMDS-04-2016-0130>
- Halila, F., & Rundquist, J. (2011). The development and market success of eco-innovations: A comparative study of eco-innovations and “other” innovations in Sweden. *European Journal of Innovation Management*, 14(3), 278-302. <https://doi.org/10.1108/14601061111148807>
- Hotho, J. J., & Pedersen, T. (2012). Beyond the ‘rules of the game’: three institutional approaches and how they matter for international business. *Handbook of Institutional Approaches to International Business*, 236. <https://doi.org/10.4337/9781849807692.00016>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55. <https://doi.org/10.1080/10705519909540118>
- Huq, F. A., & Stevenson, M. (2018). Implementing Socially Sustainable Practices in Challenging Institutional Contexts: Building Theory from Seven Developing Country Supplier Cases. *Journal of Business Ethics*, 1-28. <https://doi.org/10.1007/s10551-018-3951-x>
- Husser, J., André J.-M., Barbat, G., & Lespinet-Najib, V. (2012). CSR and sustainable development: are the concepts compatible? *Management of Environmental Quality: An International Journal*, 23(6), 658-672. <https://doi.org/10.1108/14777831211262936>
- Jawahir, I., Dillon, O., Rouch, K., Joshi, K. J., Venkatachalam, A., & Jaafar, I. H. (2006). Total life-cycle considerations in product design for sustainability: A framework for comprehensive evaluation. *Paper presented at the Proceedings of the 10th International Research/Expert Conference*, Barcelona, Spain.
- K. Digalwar, A., R. Tagalpallewar, A., & K. Sunnapwar, V. (2013). Green manufacturing performance measures: an empirical investigation from Indian manufacturing industries. *Measuring Business Excellence*, 17(4), 59-75. <https://doi.org/10.1108/MBE-09-2012-0046>
- Kashiwagi, T. (1996). *Technological breakthrough and global cooperation. Global environmental security*(pp. 25-69). Berlin: Springer.
- Khan, A., Muttakin, M. B., & Siddiqui, J. (2013). Corporate governance and corporate social responsibility disclosures: Evidence from an emerging economy. *Journal of Business Ethics*, 114(2), 207-223. <https://doi.org/10.1007/s10551-012-1336-0>
- Khan, H.-U.-Z. (2010). The effect of corporate governance elements on corporate social responsibility (CSR) reporting: Empirical evidence from private commercial banks of Bangladesh. *International Journal of Law and Management*, 52(2), 82-109. <https://doi.org/10.1108/17542431011029406>
- King, A. A., & Lenox, M. J. (2000). Industry self-regulation without sanctions: The chemical industry's responsible care program. *Academy of Management Journal*, 43(4), 698-716. <https://doi.org/10.2307/1556362>
- Lee, J. W., Kim, Y. M., & Kim, Y. E. (2018). Antecedents of adopting corporate environmental responsibility and green practices. *Journal of Business Ethics*, 148(2), 397-409. <https://doi.org/10.1007/s10551-016-3024-y>
- Lieder, M., & Rashid, A. (2016). Towards circular economy implementation: a comprehensive review in context of manufacturing industry. *Journal of Cleaner Production*, 115, 36-51. <https://doi.org/10.1016/j.jclepro.2015.12.042>
- Lin, C.-Y., & Ho, Y.-H. (2011). Determinants of green practice adoption for logistics companies in China. *Journal of Business Ethics*, 98(1), 67-83. <https://doi.org/10.1007/s10551-010-0535-9>
- Lin, H., Zeng, S., Ma, H., Qi, G., & Tam, V. W. (2014). Can political capital drive corporate green innovation? Lessons from China. *Journal of Cleaner Production*, 64, 63-72. <https://doi.org/10.1016/j.jclepro.2013.07.046>
- Lin, M.-J. J., Hung, S.-W., & Chen, C.-J. (2009). Fostering the determinants of knowledge sharing in professional virtual communities. *Computers in Human Behavior*, 25(4), 929-939. <https://doi.org/10.1016/j.chb.2009.03.008>

- Lin, R.-J. (2013). Moderating effects of total quality environmental management on environmental performance. *African Journal of Business Management*, 5(20), 8088-8099. <https://doi.org/10.5897/AJBM10.1399>
- Mahmood, W. H. W., Ab Rahman, M. N., & Deros, B. M. (2011). The relationship between manufacturing system performance and green practices in supply chain management. *Practice*, 5, 6.
- Matten, D., & Moon, J. (2008). "Implicit" and "explicit" CSR: A conceptual framework for a comparative understanding of corporate social responsibility. *Academy of management Review*, 33(2), 404-424. <https://doi.org/10.5465/amr.2008.31193458>
- Moktadir, M. A., Rahman, T., Rahman, M. H., Ali, S. M., & Paul, S. K. (2018). Drivers to sustainable manufacturing practices and circular economy: A perspective of leather industries in Bangladesh. *Journal of Cleaner Production*, 174, 1366-1380. <https://doi.org/10.1016/j.jclepro.2017.11.063>
- Montabon, F., Sroufe, R., & Narasimhan, R. (2007). An examination of corporate reporting, environmental management practices and firm performance. *Journal of Operations Management*, 25(5), 998-1014. <https://doi.org/10.1016/j.jom.2006.10.003>
- Muthuri, J. N., & Gilbert, V. (2011). An institutional analysis of corporate social responsibility in Kenya. *Journal of Business Ethics*, 98(3), 467-483. <https://doi.org/10.1007/s10551-010-0588-9>
- Ngowi, A. (2001). Creating competitive advantage by using environment-friendly building processes. *Building and Environment*, 36(3), 291-298. [https://doi.org/10.1016/S0360-1323\(00\)00006-8](https://doi.org/10.1016/S0360-1323(00)00006-8)
- Noori, H., & Chen, C. (2003). Applying scenario-driven strategy to integrate environmental management and product design. *Production and Operations Management*, 12(3), 353-368. <https://doi.org/10.1111/j.1937-5956.2003.tb00208.x>
- Paulraj, A. (2009). Environmental motivations: a classification scheme and its impact on environmental strategies and practices. *Business strategy and the Environment*, 18(7), 453-468. <https://doi.org/10.1002/bse.612>
- Phelps, C. C. (2010). A longitudinal study of the influence of alliance network structure and composition on firm exploratory innovation. *Academy of Management Journal*, 53(4), 890-913. <https://doi.org/10.5465/amj.2010.52814627>
- Porter, M., & Van der Linde, C. (1995). *Green and competitive: ending the stalemate. The Dynamics of the eco-efficient economy: environmental regulation and competitive advantage*(p. 33).
- Pujari, D. (2006). Eco-innovation and new product development: understanding the influences on market performance. *Technovation*, 26(1), 76-85. <https://doi.org/10.1016/j.technovation.2004.07.006>
- Rashid, M. H. U., & Uddin, M. M. (2018). Green financing for sustainability: analysing the trends with challenges and prospects in the context of Bangladesh. *International Journal of Green Economics*, 12(3-4), 192-208. <https://doi.org/10.1504/IJGE.2018.097876>
- Rodrigue, M., Magnan, M., & Cho, C. H. (2013). Is environmental governance substantive or symbolic? An empirical investigation. *Journal of Business Ethics*, 114(1), 107-129. <https://doi.org/10.1007/s10551-012-1331-5>
- Rusinko, C. (2007). Green manufacturing: an evaluation of environmentally sustainable manufacturing practices and their impact on competitive outcomes. *IEEE Transactions on Engineering Management*, 54(3), 445-454. <https://doi.org/10.1109/TEM.2007.900806>
- Sanni, M. (2018). Drivers of eco-innovation in the manufacturing sector of Nigeria. *Technological Forecasting and Social Change*, 131, 303-314. <https://doi.org/10.1016/j.techfore.2017.11.007>
- Shang, K.-C., Lu, C.-S., & Li, S. (2010). A taxonomy of green supply chain management capability among electronics-related manufacturing firms in Taiwan. *Journal of Environmental Management*, 91(5), 1218-1226. <https://doi.org/10.1016/j.jenvman.2010.01.016>
- Sobhani, F. A., Amran, A., & Zainuddin, Y. (2012). Sustainability disclosure in annual reports and websites: a study of the banking industry in Bangladesh. *Journal of Cleaner Production*, 23(1), 75-85. <https://doi.org/10.1016/j.jclepro.2011.09.023>
- Soo Wee, Y., & Quazi, H. A. (2005). Development and validation of critical factors of environmental management. *Industrial Management & Data Systems*, 105(1), 96-114. <https://doi.org/10.1108/02635570510575216>

- Steiger, J. H. (2007). Understanding the limitations of global fit assessment in structural equation modeling. *Personality and Individual Differences*, 42(5), 893-898. <https://doi.org/10.1016/j.paid.2006.09.017>
- Tabachnick, B., & Fidell, L. (2007). Multivariate analysis of variance and covariance. *Using Multivariate Statistics*, 3, 402-407.
- Tauringana, V., & Chithambo, L. (2015). The effect of DEFRA guidance on greenhouse gas disclosure. *The British Accounting Review*, 47(4), 425-444. <https://doi.org/10.1016/j.bar.2014.07.002>
- Theyel, G. (2000). Management practices for environmental innovation and performance. *International Journal of Operations & Production Management*, 20(2), 249-266. <https://doi.org/10.1108/01443570010304288>
- Udomleartprasert, P. (2004). Roadmap to green supply chain electronics: design for manufacturing implementation and management. *Paper presented at the 2004 International IEEE Conference on the Asian Green Electronics (AGEC)*. <https://doi.org/10.1109/AGEC.2004.1290895>
- 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. <https://doi.org/10.1016/j.ijpe.2006.11.030>
- Van den Broek, F., & Van den Broek-Serlé N. (2010). *Green supply chain management, marketing tool or revolution*. NHTV, Breda.
- Verrier, B., Rose, B., Caillaud, E., & Remita, H. (2014). Combining organizational performance with sustainable development issues: the Lean and Green project benchmarking repository. *Journal of Cleaner Production*, 85, 83-93. <https://doi.org/10.1016/j.jclepro.2013.12.023>
- Wagner, M. (2008). Empirical influence of environmental management on innovation: evidence from Europe. *Ecological Economics*, 66(2-3), 392-402. <https://doi.org/10.1016/j.ecolecon.2007.10.001>
- Wasko, M. M., & Faraj, S. (2005). Why should I share? Examining social capital and knowledge contribution in electronic networks of practice. *MIS Quarterly*, 29(1), 35-57. <https://doi.org/10.2307/25148667>
- Woo, C., Kim, M. G., Chung, Y., & Rho, J. J. (2016). Suppliers' communication capability and external green integration for green and financial performance in Korean construction industry. *Journal of Cleaner Production*, 112, 483-493. <https://doi.org/10.1016/j.jclepro.2015.05.119>
- Xie, X., Zeng, S., & Tam, C. M. (2010). Overcoming barriers to innovation in SMEs in China: A perspective based cooperation network. *Innovation*, 12(3), 298-310. <https://doi.org/10.5172/impp.12.3.298>
- Zhu, Q., Geng, Y., Fujita, T., & Hashimoto, S. (2010). Green supply chain management in leading manufacturers: Case studies in Japanese large companies. *Management Research Review*, 33(4), 380-392. <https://doi.org/10.1108/01409171011030471>
- Zhu, Q., Sarkis, J., & Lai, K.-H. (2008). Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics*, 111(2), 261-273. <https://doi.org/10.1016/j.ijpe.2006.11.029>