The Moderating Effect of Environmental Management Accounting Practices on the Relationship Between Green Supply Chain Management Practices and Corporate Performance of Egyptian Manufacturing Firms

Dr. Nancy Mohamed Mahmoud Ahmed

Lecturer of Accounting
Faculty of Commerce, Cairo University

nancy_m_mahmoud@foc.cu.edu.eg

Scientific Journal for Financial and Commercial Studies and Researches (SJFCSR)

Faculty of Commerce – Damietta University
Vol.3, No.2, Part 1., July 2022

APA Citation:

Ahmed, N. M. M. (2022). The Moderating Effect of Environmental Management Accounting Practices on the Relationship Between Green Supply Chain Management Practices and Corporate Performance of Egyptian Manufacturing Firms, ***Scientific Journal for Financial and Commercial Studies and Research***, Faculty of Commerce, Damietta University, 3(2)1, 475- 507.

Website: https://cfdj.journals.ekb.eg/

The Moderating Effect of Environmental Management Accounting Practices on the Relationship Between Green Supply Chain Management Practices and Corporate Performance of Egyptian Manufacturing Firms

Dr. Nancy Mohamed Mahmoud Ahmed

Abstract:

As an important management strategy for effective environmental improvement activities and performance, Green Supply Chain Management (GSCM) techniques and Environmental Management Accounting Practices (EMAP) are gaining prominence. Despite this, many organizations are unaware of their importance in achieving ecologically sustainable growth. The goal of this study is to create a structural framework to empirically test the relationship between GSCM practices and EMAPs, which may have an impact on economic, environmental, and operational performance, and to better understand the key sustainability drivers when making decisions related to the protection of the environmental and saving costs. Data collected using a questionnaire survey of 33 Egyptian manufacturing companies listed on the Egyptian Stock Exchange were analyzed using multivariate regression analysis. Respondents provide information on how well their companies collaborate with suppliers and consumers to enhance the supply chain's environmental sustainability, the extent to which several EMAPs are applied, and how the application of GSCM techniques and EMAPs would affect their economic, environmental, and operational performance. A complete performance model for GSCM activities and EMAPs is presented and rigorously tested. The empirical results showed that industrial firms that use GSCM techniques and EMAPs individually enhance their environmental, operational, and economic performance. However, the study failed to prove that EMAPs moderate the impact of GSCM practices on economic, environmental, and operational performance.

Keywords*:* Green Supply Chain Management (GSCM) Practices, Operational Performance, Environmental Performance, Economic Performance, Environmental Management Accounting Practices (EMAP).
JEL Classification: L6*,* M19, M49, Q560

1. Introduction

Despite increasing global warming and shifting biodiversity, the world's sustainability has been affected negatively in recent years. As a result, one of the most important areas for researchers, scholars, and practitioners is to discover effective strategies to ensure environmental sustainability. Manufacturing enterprises have a critical role in reaching long-term goals by reducing pollution through paying more attention to the surrounding environment, in other words, they have to adopt the philosophy of "Going Green" (Bansal and Roth, 2000). "Going Green" refers to the companies' efforts that address the environmental consequences of their activities.

SCM (supply chain management) is a holistic approach to business that includes materials management, purchasing, and distribution. It is a crucial division of production and operations management that has a significant impact on the environment, such as emissions, pollution, and societal health risks, among other things. As a result, any corporation typically incorporates its environmental concerns into its supply chain activities to reduce possible environmental impacts of its activities. The application of SCM practices to environmental challenges is known as "Green Supply Chain Management GSCM" (Sarkis, 2012).

Handfield et al. (1997) defined the new concept as "Application of environmental management principles to the entire set of activities across the whole customer order cycle, including design, procurement, manufacturing and assembly, packaging, logistics, and distribution". Both environmental issues and SCM are combined under GSCM, which includes product design, material sourcing and selection, manufacturing processes, final product delivery, and product end-of-life management after its useful life (Srivastava, 2007). Furthermore, GSCM is recognized as a critical strategic management

tool for reducing environmental impacts and risks, hence improving sustainability, which aids organizations in increasing stakeholder satisfaction, profitability, and market share (Micheli et al., 2020).

Despite the rise in GSCM literature over the last decade, more empirical research is needed to gain a better knowledge of the primary GSCM techniques and their effects on business performance, particularly in developing countries like Egypt. Furthermore, there has been little research conducted to test the effect of moderator variables that may influence the association between GSCM practices and business performance.

As a result, this study is conducted in response to a shortage of empirical studies on GSCM practices in the Egyptian environment, as well as a need to learn more about the impact of these practices on corporate performance, particularly in developing nations like Egypt. Due to the lack of empirical studies on GSCM practices in the Egyptian context, this study investigates those practices and how GSCM practices may affect corporate performance, particularly in developing countries like Egypt.

Therefore, the researcher's goals are threefold: first, to examine the direct impact of GSCM techniques on business performance, including operational, environmental, and economic performance. Second, to examine the direct impact of GSCM on the Environmental Management Accounting Practices (EMAP). The third goal is to investigate the moderator role of EMAP on the relationship between GSCM procedures and business performance, with a focus on the Egyptian publicly traded manufacturing enterprises.

This research contributes to the literature in several ways. First, this research is one of few studies that attempt to investigate the different GSCM procedures in the Egyptian context. Second, to the best of the researcher's knowledge, this is the first study that considers the role of EMAP, as a moderator variable, on the association between GSCM practices and business performance in the Egyptian context. Third, this study uses a comprehensive business performance metric that includes operational, environmental, and economic factors.

Moreover, this study is considered a step forword reminding managers of the need of cultivating a pro-environmental company culture and improving their awareness to significant external stakeholders' environmental demands in order to achieve greener supply chain management practices. Egyptian companies top management should recognize the critical role that the EMAP could play in successfully implement GSCM practices.

In this paper, the theoretical background and hypotheses development are presented in section 2, followed by the details of the research methodology in section 3. Section 4 discusses the empirical results of the study, and finally, section 5 presents the study's conclusion, limitations, and directions for future research.

2. Theoretical Background and Hypotheses Development

GSCM is an important business environmental strategy, emerged in manufacturing companies because of the environmental pressures exerted by stakeholders to encourage their companies to protect their environment (Zhu et al., 2012). GSCM consists of practices used to improve sustainability by reducing the environmental impacts of the production process in manufacturing companies. The fundamental purpose of GSCM practices is to reduce the harmful environmental effects, such as incorrect product disposal, pollution, and the use of non-renewable resources (Zhu et al., 2017; Sharma et al., 2017 and Seman et al., 2019).

Greening the supply chain, product-based green supply, and advanced green supply are the three forms of GSCM that Bowen et al. (2001) and Hsu et al. (2008) identified. The first type, greening the supply chain, entails changes to a company's SCM activities that take into account the company's environmental concerns, such as obtaining environmental data about suppliers to aid in evaluating and ranking suppliers' environmental performance. The second form of GSCM, product-based green supply, focuses on making modifications to the product and managing the by-products of given inputs such as packaging. The third category, advanced supply chain, entails more complex environmental processes such as using environmental risk-sharing criteria and combining cooperative clean technology projects with suppliers.

Green procurement, customer cooperation, and investment recovery were the three key operations of GSCM when it first started. Green purchasing encompasses everything acquired from suppliers, subcontractors, and services rendered, with environmental standards applied throughout the process, such as providing vendors with design specifications as well as environmental requirements for all purchased items. Customer cooperation is concerned with involving customers to decrease the negative environmental effects of a company's actions, such as incorporating consumers in the design, production, and packaging of final products to achieve echo-friendly design, production, and packaging. Reverse logistics, or investment recovery, is concerned with maximizing the value of a company's materials and products by systematic recycling, resale, and redeployment. The primary goal of investment recovery is to ensure that all materials and products are returned to the manufacturer for recycling, reusing, or redeploying. This will lead to selling idle assets, lowering storage space, and reusing idle assets in more productive activities through converting surplus assets into revenue (Zhu et al., 2011 and Chan et al., 2012).

In addition to the three core activities mentioned by Zhu et al. (2011), Sharma et al., (2017) added three additional practices connected to GSCM, including green design, green manufacturing, and green transportation. The goal of green design is to create products that have low negative environmental consequences. Green manufacturing operations aim to reduce the negative effects of the manufacturing process on the environment by minimizing hazardous emissions and wastes, as well as improving energy consumption and supply. Green transportation activities aim to reduce the environmental impact of various means of transportation used to convey resources, supplies, or finished goods. The use of low polluting means of transportation, such as shipping and rail, are examples of green transportation activities.

Furthermore, Zhu et al. (2013) divided GSCM practices into internal and external categories. Internal GSCM processes, such as green design, are carried out and maintained by individual manufacturers. External GSCM practices, on the other hand, refer to activities such as green purchasing and

green transportation that need collaboration with external partners such as suppliers and customers. Companies must first execute internal GSCM practices, according to Zhu et al. (2010), to encourage the adoption of external practices. In addition, both internal and external GSCM practices should collaborate to lower the negative environmental impact of the manufacturing process.

This research investigates the impact of GSCM practices on operational, environmental, and economic performance directly as shown in Figure 1. The model also examines EMAP's role as a moderator between GSCM practices and corporate performance.

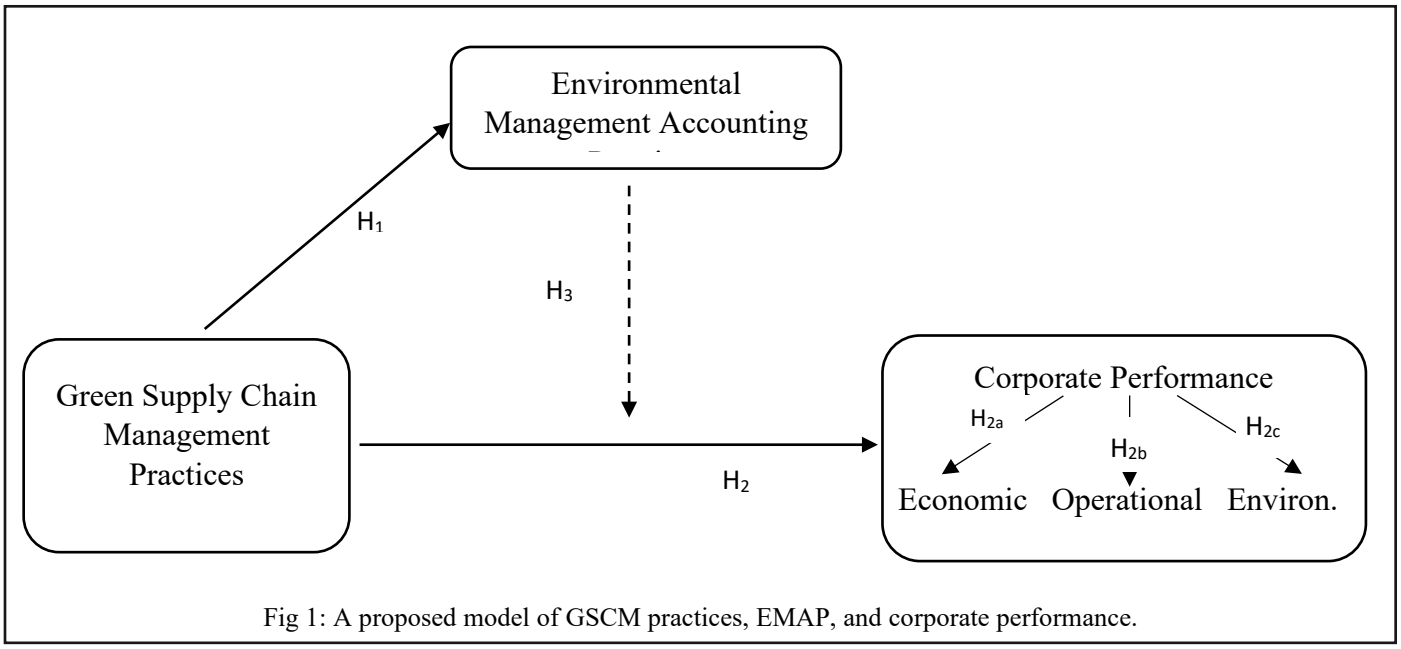

Fig 1: A proposed model of GSCM practices, EMAP, and corporate performance.

2.1.GSCM Practices and EMAP

As management methods for positive environmental improvement activities and performance, GSCM techniques and EMAP are growing rapidly. Despite this, many organizations are unaware of their importance in achieving an eco-friendly environment. GSCM is a strategic resource for a business that connects suppliers and customers and uses life-cycle assessment to measure the environmental impacts of the business activities to reduce emissions, effluents, and wastes through continuous improvement initiatives. The different stages of involvement and activities can lead to the creation of reliable EMAPs that improve environmental decision-making (Jamal et al., 2020).

According to Chan et al. (2014), a key advantage in EMAPs implementation is life-cycle-oriented green design, which includes monetary and physical environmental management accounting information. Zailani et al. (2017) argued that environmental-related activities facilitate the establishment of EMAPs. The Natural-Resource Based View (NRBV), which describes the relationship between an organization's environmental resources, competencies, and competitive advantage, considers GSCM as an organization's strategic resource with pollution prevention and production stewardship attributes, which is applied to support EMAPs data collection such as handling and disposal costs, as well as physical information about the use and flows of energy, water, and materials (Zailani et al., 2017).

Jamal et al. (2020) suggested that companies who prioritized greening their supply chains can benefit from the pool of more advanced EMAPs data to better detect costs and value-adding processes across traditional organizational boundaries. The results emphasized the importance of implementing a group of environmental-related practices to accomplish cost-reduction and sustainable development. The adoption of GSCM practices in business operations can be completed successfully by explicitly acknowledging material and energy movements inside the business processes. In addition, they revealed that GSCM practices and EMAPs are significant tools that help the environment by reducing wastes. This could be achieved through better communication and sharing environmental data.

Based on the above discussion, this study hypothesized that:

H_1: There is a positive significant association Between Green Supply Chain Management practices and Environmental Management Accounting Practices.

2.2.GSCM Practices and Corporate Performance

Researchers, academics, and practitioners have been studying the impact of applying GSCM strategies on business performance. In this regard, the researcher classified the literature into three groups: first, studies that found that applying GSCM methods is considered an encumbrance on the organization, and they require large investments with uncertain returns in the short-term (Bowen et al., 2001).

Second, other researchers go further and argued that implementing GSCM practices may have a negative economic impact; for instance, Sarkis (2003) claimed that implementing GSCM practices results in higher operational costs, higher procurement costs for environmentally friendly items and materials, and higher training costs. Other studies in this group, such as Walley and Whitehead (1994), argued that GSCM is simply a trade-off between economic and environmental performance.

The third group claimed that there is a link between GSCM practices and business performance and that organizations can benefit from them in a variety of ways, including reducing costs of operations (Orlitzky et al., 2003), improving corporate public image (Porter, 1991), increasing customers and employees satisfaction (Kleindorfer et al., 2005), and expanding market opportunities (Diabat et al., 2013). In addition, successful adoption of GSCM procedures aids in enhancing environmental performance through minimizing air pollutants, wastewater, solid waste, hazardous or toxic materials, and the frequency of environmental mishaps, (Eltayeb et al., 2011; Zhu et al., 2012).

Based on the above discussion, this study hypothesized that:

H_{2a}: There is a positive significant association between Green Supply Chain Management practices and economic performance.

H_{2b}: There is a positive significant association between Green Supply Chain Management practices and environmental performance.

H_{2c}: There is a positive significant association between Green Supply Chain Management practices and operational performance.

2.3.Moderating Effect of EMAP

Several variables have been identified as potentially influencing the association between GSCM practices and business performance. (Rahman et al., 2014 and Miroshnyenko et al., 2017). Authors have shown that the adoption of GSCM practices might vary depending on their alignment with the local institutional environment (Micheli et al., 2020). According to Hajikhani et al. (2012), such variables could be investigated as moderators.

In empirical research, moderating variables are frequently inspired from control variables (Geng et al., 2017). Chan et al. (2012) showed how the intensity of competition might be investigated as a moderator. González-Benito and González-Benito (2006) described several factors that appear to affect the decision whether or not to implement environmental policies. They classified those factors into internal factors (company size, degree of internationalization, position in the value chain, managerial attitude and motivations, and company strategic attitude.) and external factors (industrial sector and geographical locations of production facilities). De Sousa Jabbour et al. (2013), on the other hand, provided empirical evidence on some factors influencing the adoption of GSCM practices in Brazil, including firm size.

In addition, Micheli et al. (2020) looked at the role of several moderators in the relationship between GSCM practices and business performance in Italian manufacturing firms. The moderator variables of Micheli et al. (2020) consist of: firm size, ISO 14001 certification, past performance, institutional requirements, the position of the firm within the supply chain, production strategy, organizational strategy, industrial sector, and trust, collaboration, and information sharing.

To the best of the researcher's knowledge, there is no study was conducted to explore the potential effect of EMAPs on the relationship between GSCM practices, and corporate performance. The goal of this paper is to help fill this gap.

EMA was created as a decision-making tool to provide valuable environmental information to decision-making, planning, monitoring, and assessing to assure the attainment of strategic environmental goals (Mokhtar et al., 2016; Ong et al., 2016). Jamil et al. (2015) found that EMAPs provide relevant and trustworthy information to identify important sustainability drivers to assist in the utilization of possible environmental benefits and the reduction of environmental dangers.

Moreover, in the presence of increasing global environmental concerns, organizations became more responsive to society's calls for green production and products. Therefore, they switch to the implementation of EMAPs, and GSCM practices. As a result, if a company can use GSCM techniques to find ways to reduce the negative environmental impacts of its operations and/or products, the positive performance implications drawn from GSCM practices should be even more important in a situation where EMAPs implementation is high rather than low.

Based on this discussion, the following hypotheses are developed regarding EMAPs' positive moderating impact on the association between GSCM practices and firm performance:

H_{3a}: EMAPs enhances the positive association between Green Supply Chain Management practices and economic performance.

H_{3b}: EMAPs enhances the positive association between Green Supply Chain Management practices and environmental performance.

H_{3c}: EMAPs enhances the positive association between Green Supply Chain Management practices and operational performance.

3. Research Methodology

The research methodology used in this work is presented in this section. The tool used to collect data, the variables measurement, and the research models are all included in the research methodology section.

3.1. Data collection and sample selection

Due to the nature of this study, which is an exploratory study, the data was obtained using a survey approach. The questionnaire was chosen, because of its popularity in the fields of GSCM, EMAPs, and corporate performance. The

survey was sent to Egyptian publicly traded industrial companies. Manufacturing companies on the stock exchange were picked because they are more conscious of environmental issues and are more devoted to their environmental duties. This could be due to shareholders' pressures exerted on firms to pay more attention to environmental issues in order to safeguard the environment from pollution, and to make efficient use of environmental resources. General managers, production managers, cost managers, financial managers, and others are among the respondents.

In 2020, there were 88 manufacturing companies listed on the Egyptian Stock Exchange Market. A total of 33 questionnaires were completed, generating a response rate of 37.5 percent, after being delivered to the 88 manufacturing listed companies. The number of completed surveys in each industrial sector is summarized in Table (1).

Table 1 shows that 5.88 percent of the respondents are working in basic resources industries, 38.46 percent in pharmaceutical industries, 36.36 percent in chemicals, construction and material industries, 16.67 percent in industrial goods and automobiles industries, 64.29 percent in food and beverage industries, 20 percent in paper and packaging industries, and 37.5 percent in textile and durables industries.

Table (1): Summary of Sample firms and Sectors

Sectors	Sample Size	Responses	Response Rate
1. Basic resources industries	17	1	5.88%
2. Chemicals, construction, and building materials	11	4	36.36%
3. Pharmaceutical industries	13	5	38.46%
4. Industrial goods and automobiles industries	6	1	16.67%
5. Paper and packaging industries	5	1	20%
6. Food and beverage industries	28	18	64.29%
7. Textile and durables	8	3	37.5%
Total	**88**	**33**	**37.5**%

3.2. Questionnaire development and variables measures

The empirical data used in this study consists of questionnaire responses obtained from managers of Egyptian Manufacturing listed companies. The survey questionnaire was written in English at first, and then it was translated into Arabic. The back-translation approach was used to verify linguistic equivalence between the two versions. Table (2) summarizes the final variables measures, which are further explained below.

The questionnaire consists of five sections: (a) general information about the respondents' companies (total assets and industry type); (b) current GSCM practice adoption; (c) current EMAP; (d) performance; and (e) personnel questions about the respondents (years of experience and position). Twenty-one items in part two (current GSCM practice adoption) were developed based on Zhu et al. (2008) and each respondent was asked to indicate whether each item is applied in his/her company or not applied.The Twelve items in part three (EMAPs) were developed from Qian et al., (2018). In this part, respondents were asked to determine whether they applied specific tools, that reflect the adoption of EMAPs or not (1=applied, and 0=not applied). The Seventeen questions in the fourth section of the questionnaire were developed from Zhu et al. (2007) and Zhu et al. (2008) with a focus on environmental performance, economic performance, and operational performance. Questions related to the impact of GSCM practices on the three dimensions of corporate performance were asked using a five-point scale (1= not at all, 2= to a little extent, 3= to some extent, 4= to a high extent, and 5= to a great extent).

Table (2): Study variables and the number of items used to measure each variable

Variables	Construct	Number of items
Green Supply Chain Management practices	Internal Environmental Management	7 items
	Green Purchasing	5 items
	Cooperation with customers	3 items
	Eco-Design	3 items
	Investment Recovery	3 items
Environmental Management Accounting Practices	Environmental Management Accounting Practices	12 items
Corporate Performance	Economic Performance	5 items
	Environmental Performance	6 items
	Operational Performance	6 items
Control Variables	Firm Size	1 item
	Industry Sector	1 item
Total		**52 items**

Control variables, firm size, and industrial sector were measured using the two questions of the first section of the questionnaire (total assets and industry type). Firm size is measured using the Natural Logarithm of total assets.

3.3. Research Models

After all of the study variables were considered, the impact of GSCM practices on EMAPs was examined by calculating the coefficients in the following multiple regression model (Model 1):

Model 1: Multiple Regression Model of Environmental Management Accounting Practices

$$EMAP = \beta_o + \beta_1 GSCM + \beta_2 SIZE + \beta_3 INDUSTRY + \varepsilon \dots\dots\dots\dots\dots\dots\dots (Model\ 1)$$

Where:

$EMAP$ = Environmental Management Accounting Practices.

β_o = The intercept of the regression line and is a constant value.
β_1 - β_3 = Coefficients of the independent variables.
$GSCM$ = Green Supply Chain Management Practices.
$SIZE$ = Firm Size
$INDUSTRY$ = Industry Sector.
ε = Errors of estimate.

In addition, the following multiple regression models (Models 2, 3, and 4) are used to investigate the relationship between GSCM procedures and organizational performance (economic, environmental, and operational performance):

Model 2: Multiple Regression Model of Economic Performance

$$ECOPER = \beta_o + \beta_1 GSCM + \beta_2 SIZE + \beta_3 INDUSTRY + \varepsilon \dots\dots\dots\dots\dots\dots\dots (Model\ 2)$$

Where:
$ECOPER$ = Economic Performance.
β_o = The intercept of the regression line and is a constant value.
β_1 - β_3 = Coefficients of the independent variables.
$GSCM$ = Green Supply Chain Management Practices.
$SIZE$ = Firm Size
$INDUSTRY$ = Industry Sector.
ε = Errors of estimate.

Model 3: Multiple Regression Model of Environmental Performance

$$ENVPER = \beta_o + \beta_1 GSCM + \beta_2 SIZE + \beta_3 INDUSTRY + \varepsilon \dots\dots\dots\dots\dots\dots\dots (Model\ 3)$$

Where:
$ENVPER$ = Environmental Performance.
β_o = The intercept of the regression line and is a constant value.
β_1 - β_3 = Coefficients of the independent variables.

$GSCM$ = Green Supply Chain Management Practices.
$SIZE$ = Firm Size
$INDUSTRY$ = Industry Sector.
ε = Errors of estimate.

Model 4: Multiple Regression Model of Operational Performance

$$OPERPER = \beta_o + \beta_1 GSCM + \beta_2 SIZE + \beta_3 INDUSTRY + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots.. (Model\ 4)$$

Where:
$OPERPER$ = Operational Performance.
β_o = The intercept of the regression line and is a constant value.
β_1 - β_3 = Coefficients of the independent variables.
$GSCM$ = Green Supply Chain Management Practices.
$SIZE$ = Firm Size
$INDUSTRY$ = Industry Sector.
ε = Errors of estimate.

Furthermore, the following multiple regression models (Models 5, 6, and 7) are used to investigate the relationship between GSCM practices, the interaction between GSCM Practices and EMAPs, EMAPs, and the three performance metrics:

Model 5: Multiple Regression Model of Economic Performance

$$ECOPER = \beta_o + \beta_1 GSCM + \beta_2 GSCM * EMAP + \beta_3 EMAP + \beta_4 SIZE + \beta_5 INDUSTRY + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.. (Model\ 5)$$

Where:
$ECOPER$ = Economic Performance.
β_o = The intercept of the regression line and is a constant value.
β_1 - β_5 = Coefficients of the independent variables.
$GSCM$ = Green Supply Chain Management Practices.

$EMAP$ = Environmental Management Accounting Practices.
$SIZE$ = Firm Size
$INDUSTRY$ = Industry Sector.
ε = Errors of estimate.

Model ٦: Multiple Regression Model of Environmental Performance

$$ENVPER = \beta_o + \beta_1 GSCM + \beta_2 GSCM * EMAP + +\beta_3 EMAP + \beta_4 SIZE + \beta_5 INDUSTRY + \varepsilon \dots\dots (Model\ 6)$$

Where:

$ENVPER$ = Environmental Performance.
β_o = The intercept of the regression line and is a constant value.
β_1 - β_5 = Coefficients of the independent variables.
$GSCM$ = Green Supply Chain Management Practices.
$EMAP$ = Environmental Management Accounting Practices.
$SIZE$ = Firm Size
$INDUSTRY$ = Industry Sector.
ε = Errors of estimate.

Model 7: Multiple Regression Model of Operational Performance

$$OPERPER = \beta_o + \beta_1 GSCM + \beta_2 GSCM * EMAP + \beta_3 EMAP + \beta_4 SIZE + \beta_5 INDUSTRY + \varepsilon \dots\dots (Model\ 7)$$

Where:

$OPERPER$ = Operational Performance.
β_o = The intercept of the regression line and is a constant value.
β_1 - β_5 = Coefficients of the independent variables.
$GSCM$ = Green Supply Chain Management Practices.
$EMAP$ = Environmental Management Accounting Practices.
$SIZE$ = Firm Size

$INDUSTRY$ = Industry Sector.
ε = Errors of estimate.

4. Data Analysis and Results

The following steps were taken to analyze the data using the Statistical Package for the Social Sciences (SPSS): first, a reliability test was carried out to ensure that the questions used to measure each variable in the questionnaire were consistent. Second, descriptive statistics were utilized to figure out what the mean, median, range, standard deviation, maximum, and minimum values were. Third, Pearson's Correlation Matrix was conducted to test the degree of correlation between the study variables in the 7 research models. Finally, regression analysis was used to investigate the hypotheses.

4.1. Reliability test

The reliability test findings show that the Cronbach's Alpha for the entire questionnaire is around 0.9429, indicating that the questionnaire items have strong covariances and the questions are very reliable (Hair et al., 1998). Cronbach's alpha is larger than 0.6 for GSCM practices, EMAPs, economic performance, environmental performance, and operational performance, suggesting that the questions are highly reliable. However, Because the two proxy measures of control variables (firm size and industrial sector) are derived using objective data, the Cronbach's alpha coefficient is not calculated for them (Drury and Tayles, 2005 and Al- Omiri and Drury, 2007).

Table (3): Study Variables and Cronbach's Alpha

Variables	Cronbach's Alpha
Firm Size	N/A
Industrial Sector	N/A
GSCM	0.9097
EMAPs	0.9358
Economic Performance	0.8753
Environmental Performance	0.9626
Operational Performance	0.8528
Overall Cronbach's Alpha	0.9429

4.2. Descriptive statistics

The selected sample is located in Egypt, which is one of the most important manufacturing economies in the Middle East and North Africa (MENA). Below, the researcher provides several key statistics, in Table (4) that describe the sample.

Table (4): Descriptive statistics

	Mean	Median	Standard Deviation	Range	Minimum	Maximum
GSCM	13.0606	14	5.868	17	4	21
EMAPs	7.3636	10	4.4428	12	0	12
Economic Perf.	17.303	18	5.7363	20	5	25
Environmental Perf.	22.1515	24	6.2306	24	6	30
Operational Perf.	20.6667	22	6.1981	24	6	30
Firm Size	0.7437	5.956	5.8840	2.4351	4.6856	7.1208

According to Table (4), GSCM ranges from 21 (complete application of all GSCM practices) to 4 (limited application of GSCM practices), with more than half of the sample not fully adopting GSCM practices, indicating that GSCM techniques are poorly implemented in Egyptian manufacturing enterprises. EMAPs, on the other hand, range from 12 (complete adoption) to 0 (no adoption), with more than half of the respondents implementing most of the EMAPs listed in this paper, indicating that Egyptian manufacturing firms are aware of the importance of incorporating environmental issues into their management accounting processes.

4.3. Correlation matrix

To examine the association between the variables, the researcher employed Pearson correlation coefficients (correlation matrix), and the results are shown in Table (5) below. Pearson's correlation matrix was conducted to test the degree of correlation between GSCM practices, EMAPs, and the three-

performance metrics. In addition, Pearson's matrix help in evaluating the nature of the relationship between the study variables, whether it is positive or negative relation, and in determining the degree of strength of the relationship between contingent variables and independent variables. Table (5) shows the findings of the matrix for correlation.

Table (5) revealed that there is a positive correlation between GSCM practices and EMAPs, significant at the 0.01 level. GSCM practices correlate positively with the 3 performance metrics (economic, environmental, and operational performance), at the 0.01 level of significance. However, both firm size and industry type do not correlate with the GSCM practices.

Table (5): Pearson's Correlation Matrix

		GSCM	EMAP	GSCM X EMAP	ECOPER	ENVPER	OPERPER	SIZE	INDUS
GSCM	Pearson Correlation	1							
	Sig. (2-tailed)								
EMAP	Pearson Correlation	0.530**	1						
	Sig. (2-tailed)	0.002							
GSCM x EMAP	Pearson Correlation	0.791**	0.884**	1					
	Sig. (2-tailed)	0.000	0.000						
ECOPER	Pearson Correlation	0.481**	0.385*	0.471**	1				
	Sig. (2-tailed)	0.005	0.027	0.006					
ENVPER	Pearson Correlation	0.448**	0.445**	0.469**	0.779**	1			
	Sig. (2-tailed)	0.009	0.009	0.006	0.000				
OPERPER	Pearson Correlation	0.544**	0.434*	0.504**	0.632**	0.672**	1		
	Sig. (2-tailed)	0.001	0.012	0.003	0.000	0.000			
SIZE	Pearson Correlation	0.082	0.041	0.026	0.072	0.241	0.203	1	
	Sig. (2-tailed)	0.652	0.819	0.886	0.691	0.176	0.258		
INDUS	Pearson Correlation	-0.261	-0.397*	-0.335	-0.345*	-0.252	0.513**	0.029	1
	Sig. (2-tailed)	0.142	0.022	0.056	0.049	0.157	0.002	0.872	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Moreover, Pearson's correlation matrix shows that the interaction between GSCM practices and EMAPs is positively associated with economic, environmental, and operational performance at a significant level of 0.01.

4.4. Hypotheses tests and discussion of results

For the seven models examined in this study, a multivariate regression analysis was performed. The first model analyses the link between GSCM practices and EMAPs. The second, third and fourth models explore the relationship between GSCM practices and the economic, environmental, and operational performance respectively. The fifth, sixth and seventh models examine the influence of GSCM practices, EMAPs, and the interplay between GSCM practices and EMAPs on the economic, environmental, and operational performance respectively. Table (6) summarizes the results of the multivariate regression analysis of all seven models.

Based on the results of the multiple regression analysis for the first model, which are summarized in Table (6) below, it can be observed that the full regression model explains 35.3 % of the change in the degree of implementation of EMAPs in the Egyptian manufacturing firms. The multivariate regression analysis reveals a positive significant relationship between the implementation of GSCM techniques and the degree of adoption of EMAPs, with a *p*-value< 0.01. Therefore, hypothesis (H_1), which stated that "*There is a positive significant association Between Green Supply Chain Management practices and Environmental Management Accounting Practices*" is accepted. The results showed that the higher the emphasis on GSCM practices, the greater the focus on EMAPs. The implementation of GSCM techniques has a significant impact on the development of EMAPs by disclosing hidden environmental costs such as water, energy, and material flow. The significant environmental activities involving clients and suppliers further supported the contribution to the hidden costs of the environment. GSCM activities provide vital information that links physical and financial information with decision-making processes through environmental management activities that vary from simple to complex approaches. This is in line with the findings of Chan et al. (2014), Zailani et al. (2017), and Jamal et al. (2020), who showed that companies that use GSCM procedures account

for environmental data in their management accounting system and conduct cost-benefit analyses when making environmental choices.

Table (6): Multivariate Regression Analysis Results

Models	Independent	Dependent	R^2	Adjusted R^2	β	Std Error	T	Sig.
1	GSCM	EMAP	0.353	0.286	0.346	0.118	2.937	**0.006***
	Firm Size				0.083	1.006	0.082	0.935
	Industry Type				-0.505	0.281	-1.795	0.083
2	GSCM	Economic Performance	0.285	0.211	0.406	0.160	2.543	**0.017****
	Firm Size				0.390	1.365	0.285	0.777
	Industry Type				-0.557	0.382	-1.459	0.155
3	GSCM	Environmental Performance	0.266	0.190	0.414	0.176	2.357	**0.025****
	Firm Size				2.011	1.502	1.338	0.191
	Industry Type				-0.398	0.420	-0.947	0.352
4	GSCM	Operational Performance	0.476	0.422	0.447	0.148	3.026	**0.005***
	Firm Size				1.685	1.262	1.335	1.92
	Industry Type				-1.033	0.353	-2.927	**0.007***
5	GSCM	Economic Performance	0.296	0.165	0.263	0.329	0.800	0.431
	EMAP				-0.047	0.561	-0.08	0.936
	GSCM x EMAP				0.014	0.039	0.355	0.726
	Firm Size				0.453	1.420	0.319	0.752
	Industry Type				-0.512	0.419	-1.220	0.233
6	GSCM	Environmental Performance	0.310	0.182	0.344	0.353	0.975	0.338
	EMAP				0.469	0.624	0.751	0.459
	GSCM x EMAP				-0.008	0.042	-0.191	0.850
	Firm Size				1.938	1.527	1.269	0.215
	Industry Type				-0.201	0.451	-0.445	0.660
7	GSCM	Operational Performance	0.479	0.382	0.409	0.387	1.339	0.192
	EMAP				0.070	0.050	0.129	0.898
	GSCM x EMAP				0.001	0.017	0.033	0.974
	Firm Size				1.685	0.180	1.276	0.213
	Industry Type				-0.992	-0.392	-2.544	**0.017****
*** Significant at 99% level of confidence of**								
****Significant at 95 % level of confidence**								

The findings revealed that implementing GSCM practices resulted in lower costs for waste discharge and treatment, material and energy consumption, and environmental penalties. By detecting the cost return in energy use, material procurement, manufacturing environmentally friendly products, and collecting discarded items or materials for recycling and reuse, GSCM approaches can lead to economic advantages. This is consistent with Bowen et al. (2001), Orlitzky et al. (2003) who claimed that successful GSCM deployment may lead to improved economic performance.

According to Table 6 above, the results of regression analysis of the model (3), which explains 26.6% of the variation in Egyptian manufacturing businesses' environmental performance, suggest that GSCM practices significantly positively affect the environmental performance directly at a *p*-value < 0.05. According to the findings, GSCM activities aid in the reduction of air pollutants, effluent waste, solid waste, hazardous material consumption, and environmental accidents. The achieved results support Eltayeb et al. (2018) who found that business companies may assist the environment by creating environmentally friendly goods and returning items and packaging, resulting in less waste and more effective use of resources. This is also in line with the findings of Zhu et al. (2012), who discovered that GSCM practices, both internal and external activities, have a direct and positive significant effect on environmental performance. Therefore, hypothesis (H_{2b}), which stated that "*There is a positive significant association Between Green Supply Chain Management practices and Environmental Performance*" is accepted.

Furthermore, the multivariate regression analysis of the fourth model, which investigates the direct impact of GSCM practices on operational performance, explains 47.6% of the variation in the operational performance of the sample companies. This regression model found a positive direct significant impact of GSCM practices on operational performance at a *p*-value < 0.01. This leads to the acceptance of, hypothesis (H_{2c}), which stated that "*There is a positive significant association Between Green Supply Chain Management practices and Operational Performance*". This is consistent with Zailani et al. (2012) and Yu et al. (2014) who argued that GSCM activities improve operational performance by lowering production operating costs,

responding promptly to market changes, and delivering flawless orders. In addition, GSCM practices facilitate information exchange across functional areas to enhance green operations and process designs at the same time, which is critical for lowering production costs and increasing product quality. Firms that adopt GSCM techniques can also achieve greater coordination of operations capacity, resulting in improved flexibility and delivery performance.

However, the fifth, sixth, and seventh models, which are concerned with examining the moderator role of EMAPs on the relationship between GSCM practices and economic, environmental, and operational performance respectively, failed to confirm the moderator role of EMAPs in the impact of GSCM techniques on the three measures of corporate performance. This finding suggests that EMA's various practices will have no impact on enhancing the relationship between GSCM activities and business performance (economic, environmental, and operational performance). Therefore, hypotheses (H_{3a}), (H_{3b}), and (H_{3c}), which state that "*EMAPs enhances the positive association between Green Supply Chain Management practices and economic performance", "EMAPs enhances the positive association between Green Supply Chain Management practices and environmental performance", and "EMAPs enhances the positive association between Green Supply Chain Management practices and operational performance",* respectively are rejected.

5. Conclusion

The purpose of this research is to develop a structural framework for empirically testing the relationship between GSCM practices and EMAP, which can affect economic, environmental, and operational performance, as well as to better understand the key sustainability drivers when making decisions about environmental protection and cost-cutting. A questionnaire survey was utilized to obtain data from Egyptian industrial firms. The findings confirmed the hypotheses that the application of GSCM techniques should be followed by the implementation of EMAPs. The findings suggest that companies who place a premium on greening their supply chains would

benefit from the pool of more advanced EMAs data to better detect expenses and value-adding activities beyond conventional organizational boundaries, improving economic, environmental, and operational performance.

Additionally, organizational performance, GSCM methods, and EMAPs all showed a strong connection, according to the collected data. Improvements in environmental performance are reflected in improved economic and operational results. Through a focus on environmental and operational performance, the collaborative use of green supply chain methodologies and EMAPs may be leveraged for economic gain in the form of cost reductions. According to production managers, cost accountants, and financial accountants, GSCM techniques and EMAP help in the development of superior provisions for environmental risk assessments, environmental costing determinations, and environmental investment decisions. The findings emphasize the need for implementing collective environmental-related practices to accomplish cost-cutting and long-term growth. The adoption of GSCM practices in business operations may be accomplished by explicitly identifying material and energy fluxes inside the business processes. This research shows that both GSCM techniques and EMAPs are useful resources that help manufacturing companies protect the environment by decreasing wastes and exchanging environmental information.

This research has also led to a better understanding of EMAPs moderating effects in the relationship between GSCM practices and corporate performance (economic, environmental, and operational) performance. However, the study failed to confirm the moderating role of EMAPs in this relationship.

Egyptian Companies' management may benefit from the study since it highlights the importance of green supplier evaluation and green collaboration with suppliers, which have a beneficial influence on economic, environmental, and operational performance, according to the study's findings. The results also reveal that GSCM procedures are influenced by the buying department's strategic level and the firm's level of environmental commitment. Companies must be committed to the environment to successfully apply GSCM principles. This implies that they should make

environmental protection a core company priority and have a clear policy statement encouraging environmental awareness in all aspects within the organization.

In addition, implementing GSCM techniques and using EMAPs relevant and accurate data to identify the major sustainability drivers, allow effective appropriation of possible cost-cutting and environmental-protection advantages. Operation managers, cost accountants, and others can all benefit from understanding how GSCM practices and EMAPs provide transparency in the development of better provisions for environmental risk assessments, environmental costing determinations, and compliance with environmental accounting regulations.

However, despite that this study makes a significant contribution to research and has some important managerial implications, it does have some limitations. First, GSCM practices, EMAPs, economic, environmental, and operational performance have all been measured in broad terms rather than for specific buyer-supplier relationships. Second, performance has only been evaluated from the standpoint of the purchasing business; suppliers' performance has not been taken into account. Third, this study employed a small sample size of Egyptian manufacturing companies. As a result, the findings of this study should be interpreted in light of Egypt's unique characteristics. Finally, this study's data was gathered in Egypt, as opposed to prior studies that employed data from other nations. Different cultures and national institutions should be ruled out as sources of prejudice. The aforementioned shortcomings should be addressed in future studies.

Therefore, future studies should examine the relevance and validity of empirical findings of this study in a variety of cultural contexts. Studies comparing GSCM practices in developed and emerging countries will be particularly interesting. Second, future studies should consider other improvement initiatives such as JIT, TQM, lean manufacturing, and agile manufacturing should as potential antecedents of GSCM techniques. Third, future studies may investigate several factors, such as market instability and volatility, relationship commitment, and trust, and stakeholders' pressures that might affect the degree of GSCM application.

References

AL-Omiri, M. and Drury, C. (2007). Organizational and Behavioral Factors Influencing the Adoption and Success of ABC in the UK, *Cost Management, 21(*6), 38- 48. https://www.researchgate.net/publication/290846828_Organizational_and_behavioural_factors_influencing_the_adoption_and_success_of_ABC_in_the_UK

Bansal, P., & Roth, K. (2000). Why Companies Go Green: A Model of Ecological Responsiveness. *Academy of Management Journal*, *43*(4), 717-736. https://doi.org/10.5465/1556363

Bowen, F. E., Cousins, P. D., Lamming, R. C., & Farukt, A. C. (2001). The Role of Supply Management Capabilities in Green Supply. *Production and Operations Management*, *10*(2), 174-189. https://doi.org/10.1111/j.1937-5956.2001.tb00077

Chan, H. K., Wang, X., & Raffoni, A. (2014). An Integrated Approach for Green Design: Life-Cycle, Fuzzy AHP and Environmental Management Accounting. *The British Accounting Review*, *46*(4), 344-360. https://doi.org/10.1016/j.bar.2014.10.004

Chan, R. Y., He, H., Chan, H. K., & Wang, W. Y. (2012). Environmental Orientation and Corporate Performance: The Mediation Mechanism of Green Supply Chain Management and Moderating Effect of Competitive Intensity. *Industrial Marketing Management*, *41*(4), 621-630. https://doi.org/10.1016/j.indmarman.2012.04.009

De Sousa Jabbour, A. B. L., Jabbour, C. J. C., Govindan, K., Kannan, D., Salgado, M. H., & Zanon, C. J. (2013). Factors Affecting the Adoption of Green Supply Chain Management Practices in Brazil: Empirical Evidence. *International Journal of Environmental Studies*, *70*(2), 302-315. https://doi.org/10.1080/00207233.2013.774774

Diabat, A., Khodaverdi, R., & Olfat, L. (2013). An Exploration of Green Supply Chain Practices and Performances in an Automotive Industry. *The*

International Journal of Advanced Manufacturing Technology, *68*(1), 949-961. https://doi.org/10.1007/s00170-013-4955-4

Drury, C. and Tayles, M. (2005). Explicating the design of overhead absorption procedures in UK organizations. *The British Accounting Review,* Vol. 37, pp. 47-84. https://doi.org/10.1016/j.bar.2004.08.003

Eltayeb, T. K., Zailani, S., & Ramayah, T. (2011). Green Supply Chain Initiatives Among Certified Companies in Malaysia and Environmental Sustainability: Investigating the Outcomes. *Resources, Conservation and Recycling*, *55*(5), 495-506. https://doi.org/10.1016/j.resconrec.2010.09.003

González-Benito, J., & González-Benito, Ó. (2006). A Review of Determinant Factors of Environmental Proactivity. *Business Strategy and the Environment*, *15*(2), 87-102. https://doi.org/10.1002/bse.450

Geng, R., Mansouri, S. A., & Aktas, E. (2017). The Relationship Between Green Supply Chain Management and Performance: A Meta-Analysis of Empirical Evidences in Asian Emerging Economies. *International Journal of Production Economics*, *183*, 245-258. https://doi.org/10.1016/j.ijpe.2016.10.008

Hair, J. F., Anderson, R. E., Tatham, R. L., & William, C. (1998). Black (1998), Multivariate Data Analysis.

Hajikhani, M., Wahat, N. W. B. A., & Idris, K. B. (2012). Considering on Green Supply Chain Management Drivers, as a Strategic Organizational Development Approach, Malaysian Perspective. *Australian Journal of Basic and Applied Sciences*, *6*(8), 146-165. http://www.ajbasweb.com/old/ajbas/2012/August/246-265.pdf

Handfield, R. B., Walton, S. V., Seegers, L. K., & Melnyk, S. A. (1997). 'Green'value Chain Practices in the Furniture Industry. *Journal of Operations Management*, *15*(4), 293-315. https://doi.org/10.1016/S0272-6963(97)00004-1

Hsu, C. W., & Hu, A. H. (2008). Green Supply Chain Management in the Electronic Industry. *International Journal of Environmental Science & Technology*, *5*(2), 205-216. https://doi.org/10.1007/BF03326014

Jamal, N. M., Wong, W. K., Saat, M. M., & Othman, A. (2020). A Relationship Analysis between Green Supply Chain Practices, Environmental Management Accounting and Performance. *Journal of Sustainability Science and Management*, *15*(3), 113-133. https://jssm.umt.edu.my/wp-content/uploads/sites/51/2020/05/10-V15N3.pdf

Jamil, C. Z. M., Mohamed, R., Muhammad, F., & Ali, A. (2015). Environmental Management Accounting Practices in Small Medium Manufacturing Firms. *Procedia-Social and Behavioral Sciences*, *172*, 619-626. https://doi.org/10.1016/j.sbspro.2015.01.411

Kleindorfer, P. R., Singhal, K., & Van Wassenhove, L. N. (2005). Sustainable Operations Management. *Production and Operations Management*, *14*(4), 482-492. https://doi.org/10.1111/j.1937-5956.2005.tb00235.x

Micheli, G. J., Cagno, E., Mustillo, G., & Trianni, A. (2020). Green Supply Chain Management Drivers, Practices and Performance: A Comprehensive Study on the Moderators. *Journal of Cleaner Production*, 121024. https://doi.org/10.1016/j.jclepro.2020.121024

Miroshnychenko, I., Barontini, R., & Testa, F. (2017). Green Practices and Financial Performance: A Global Outlook. *Journal of Cleaner Production*, *147*, 340-351. https://doi.org/10.1016/j.jclepro.2017.01.058

Mokhtar, N., Jusoh, R., & Zulkifli, N. (2016). Corporate Characteristics and Environmental Management Accounting (EMA) Implementation: Evidence from Malaysian Public Listed Companies (PLCs). *Journal of Cleaner Production*, *136*, 111-122. https://doi.org/10.1016/j.jclepro.2016.01.085

Ong, T. S., Teh, B. H., Ng, S. H., & Soh, W. N. (2016). Environmental Management System and Financial Performance. *Institutions and Economies*, *8*(2), 26-52. http://eprints.intimal.edu.my/id/eprint/754

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate Social and Financial Performance: A Meta-Analysis. *Organization studies*, *24*(3), 403-441. https://doi.org/10.1177/0170840603024003910

Porter, M. E. (1991). Towards a Dynamic Theory of Strategy. *Strategic Management Journal*, *12*(S2), 95-117. https://doi.org/10.1002/smj.4250121008

Qian, W., Hörisch, J., & Schaltegger, S. (2018). Environmental Management Accounting and its Efects on Carbon Management and Disclosure Quality. *Journal of Cleaner Production*, *174*, 1608-1619. https://doi.org/10.1016/j.jclepro.2017.11.092

Rahman, A. A., Ho, J. A., & Rusli, K. A. (2014). Pressures, Green Supply Chain Management Practices and Performance of ISO 14001 Certified Manufacturers in Malaysia. *International Journal of Economics and Management*, *8*(1-24). https://www.scopus.com/inward/record.uri?eid=2-s2.0-84921446611&partnerID=40&md5=08846fc39b2c596cdae92540fc97ed35

Sarkis, J. (2003). A Strategic Decision Framework for Green Supply Chain Management. *Journal of cleaner production*, *11*(4), 397-409. https://doi.org/10.1016/S0959-6526(02)00062-8

Sarkis, J. (2012). A Boundaries and Flows Perspective of Green Supply Chain Management. *Supply Chain Management: An International Journal*, *17*(2), 202-216. https://doi.org/10.1108/13598541211212924

Seman, N. A. A., Govindan, K., Mardani, A., Zakuan, N., Saman, M. Z. M., Hooker, R. E., & Ozkul, S. (2019). The Mediating Effect of Green Innovation on the Relationship Between Green Supply Chain

Management and Environmental Performance. *Journal of cleaner production*, *229*, 115-127. https://doi.org/10.1016/j.jclepro.2019.03.211

Sharma, V. K., Chandna, P., & Bhardwaj, A. (2017). Green Supply Chain Management Related Performance Indicators in Agro Industry: A Review. *Journal of Cleaner Production*, *141*, 1194-1208. https://doi.org/10.1016/j.jclepro.2016.09.103

Srivastava, S. K. (2007). Green Supply-Chain Management: A State-of-the-Art Literature Review. *International Journal of Management Reviews*, *9*(1), 53-80. https://doi.org/10.1111/j.1468-2370.2007.00202.x

Walley, N., & Whitehead, B. (1994). It's not Easy Being Green. *Harvard Business Review*, *72*(3), 46-51. https://www.elibrary.ru/item.asp?id=2080860

Yu, W., Chavez, R., Feng, M., & Wiengarten, F. (2014). Integrated Green Supply Chain Management and Operational Performance. *Supply Chain Management: An International Journal*, *19* (5/6), 683-696. https://doi.org/10.1108/SCM-07-2013-0225

Zailani, S., Govindan, K., Shaharudin, M. R., & Kuan, E. E. L. (2017). Barriers to Product Return Management in Automotive Manufacturing Firms in Malaysia. *Journal of Cleaner Production*, *141*, 22-40. https://doi.org/10.1016/j.jclepro.2016.08.160

Zailani, S., Jeyaraman, K., Vengadasan, G., & Premkumar, R. (2012). Sustainable Supply Chain Management (SSCM) in Malaysia: A Survey. *International Journal of Production Economics*, *140*(1), 330-340. https://doi.org/10.1016/j.ijpe.2012.02.008

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., Geng, Y., Sarkis, J., & Lai, K. H. (2011). Evaluating Green Supply Chain Management Among Chinese Manufacturers from the Ecological

Modernization Perspective. *Transportation Research Part E: Logistics and Transportation Review*, *47*(6), 808-821. https://doi.org/10.1016/j.tre.2010.09.013

Zhu, Q., Qu, Y., Geng, Y., & Fujita, T. (2017). A Comparison of Regulatory Awareness and Green Supply Chain Management Practices Among Chinese and Japanese Manufacturers. *Business Strategy and the Environment*, *26*(1), 18-30. https://doi.org/10.1002/bse.1888

Zhu, Q., Sarkis, J., & Lai, K. H. (2007). Green Supply Chain Management: Pressures, Practices, and Performance Within the Chinese Automobile Industry. *Journal of Cleaner Production*, *15*(11-12), 1041-1052. https://doi.org/10.1016/j.jclepro.2006.05.021

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

Zhu, Q., Sarkis, J., & Lai, K. H. (2012). Examining the Effects Of Green Supply Chain Management Practices and their Mediations on Performance Improvements. *International Journal of Production Research*, *50*(5), 1377-1394. https://doi.org/10.1080/00207543.2011.571937

Zhu, Q., Sarkis, J., & Lai, K. H. (2013). Institutional-Based Antecedents and Performance Outcomes of Internal and External Green Supply Chain Management Practices. *Journal of Purchasing and Supply Management*, *19*(2), 106-117. https://doi.org/10.1016/j.pursup.2012.12.001

التأثير المعدل لممارسات المحاسبة الإدارية البيئية وتأثيرها على العلاقة بين ممارسات إدارة سلسلة التوريد الخضراء وأداء الشركات الصناعية المصرية

د. نانسي محمد محمود أحمد

مدرس المحاسبة، كلية التجارة، جامعة القاهرة

الملخص

اكتسبت تقنيات إدارة سلسلة التوريد الخضراء وممارسات المحاسبة الإدارية البيئية مكانة بارزة كإستراتيجيات إدارية مهمة تهدف الى التحسين الفعال للأداء والأداء البيئي .وعلى الرغم من ذلك ، فإن العديد من المنظمات غير مدركة لأهميتها في تحقيقتنمية بيئية مستدامة. لذلك تهدف هذه الدراسة الى إنشاء إطار نظري لاختبار العلاقة بين ممارسات إدارة سلسلة التوريد الخضراء و ممارسات المحاسبة الإدارية البيئية اختباراً عملياً، وهذه العلاقة قد تؤثر على الأداء الاقتصادي والبيئي والتشغيلي ، وتحسين فهم العوامل الرئيسية المحركة للاستدامة عند اتخاذ القرارات المتعلقة بحماية البيئة وتقليل التكاليف. تم جمع البيانات باستخدام استبيان أجري على ٣٣ شركة تصنيع مصرية مدرجة في البورصة المصرية و تم تحليلها باستخدام تحليل الانحدار المتعدد. وقدم المديرين معلومات عن مدى حسن تعاون شركاتهم مع الموردين والمستهلكين لتعزيز الاستدامة البيئية لسلسلة التوريد ، و عن مدى تطبيق عدة ممارسات للمحاسبة الإدارية البيئية ، و عن مدى تأثير تطبيق ممارسات إدارة سلسلة التوريد الخضراء على أدائهم الاقتصادي والبيئي والتشغيلي. تم عرض نموذج أداء كامل لأنشطة إدارة سلسلة التوريد الخضراء و ممارسات المحاسبة الادارية البيئية ، كما تم اختباره بدقة .وأظهرت النتائج الاحصائية أن الشركات الصناعية التي تستخدم تقنيات إدارة سلسلة التوريد الخضراء وممارسات المحاسبة الإدارية البيئية نجحت فى تحسين أدائها البيئي والتشغيلي والاقتصادي .غير أن الدراسة فشلت في إثبات التأثير الوسيط لممارسات المحاسبة الادارية البيئية على العلاقة بين تقنيات ادارة سلسلة التوريد الخضراء و الأداء الاقتصادي والبيئي والتشغيلي.

الكلمات المفتاحية: ادارة سلسلة التوريد الخضراء، الأداء الاقتصادي، الاداء البيئي، الاداء التشغيلية، ممارسات المحاسبة الإدارية البيئية (EMAPs) .