

The Role of Green Supply Chain Management in Improving the Level of Sustainable Performance An Applied Study

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Abstract

The current research dealt with identifying the role of GSCM in improving the level of SP at the pharmaceutical companies in Egypt. The field study addressed the role of GSCM in improving SP by preparing a survey list and distributing it to a sample of 371 individuals from the employees at the pharmaceutical companies in Egypt where the received and correct lists reached 342 survey lists by response rate of 92%. The statistical analysis was performed by a number of methods and statistical tests which appropriate to the nature of the data such as the alpha correlation coefficient method, the confirmatory factor analysis method, descriptive analysis and the multiple regression and correlation analysis method through the SPSS package.

The research concluded a number of results that can lead to improve the level of SP at the pharmaceutical companies in Egypt; the most important of which was: there is a positive significant correlation between GSCM and SP, also there is a positive significant effect of GSCM in improving the level of SP at the pharmaceutical companies in Egypt.

In light of the results that have been reached, it was possible to reach a set of recommendations that could contribute to enhancing SP at the pharmaceutical companies in Egypt, the most important of which is that the pharmaceutical companies must seek to strengthen GSCM, represented by the application of green purchasing, by educating suppliers about the importance of environmentally friendly practices and conducting an environmental review of suppliers' green management practices, However, the scope of this research, the methods used and the findings indicate that there are areas for further studies.

ملخص البحث

تناول البحث الحالي التعرف على دور إدارة سلسلة التوريد الخضراء في تحسين مستوى الأداء المستدام بالتطبيق على شركات الأدوية في مصر، وقد تناولت الدراسة الميدانية دور إدارة سلسلة التوريد الخضراء في تحسين الأداء المستدام من خلال إعداد قائمة استقصاء وتوزيعها على عينة قوامها ٣٧١ مفردة من العاملين بشركات الأدوية في مصر حيث بلغت القوائم المستلمة والصحيحة ٣٤٢ قائمة استقصاء بنسبة ٩٢%، وقد تم اجراء التحليل الاحصائي عن طريق عدد من الأساليب والاختبارات الإحصائية المناسبة لطبيعة البيانات كأسلوب معامل الارتباط ألفا، وأسلوب التحليل العاملي التوكيدي، وأسلوب التحليل الوصفي وأسلوب تحليل الانحدار والارتباط المتعدد وذلك من خلال حزمة البرامج الإحصائية الجاهزة SPSS.

وقد خلص البحث إلى عدد من النتائج كان من أهمها وجود علاقة ذات دلالة إحصائية بين إدارة سلسلة التوريد الخضراء والاداء المستدام، كذلك وجود تأثير ذو دلالة إحصائية لإدارة سلسلة التوريد الخضراء في تحسين مستوى الأداء المستدام بشركات الأدوية في مصر.

وفي ضوء النتائج التي تم التوصل إليها أمكن التوصل إلى مجموعة من التوصيات التي يمكن أن تساهم في تعزيز تحسين الأداء المستدام بشركات الأدوية في مصر كان من أهمها انه يجب على شركات الأدوية أن تسعى إلى تعزيز إدارة سلسلة التوريد الخضراء ، المتمثلة في تطبيق الشراء الأخضر، من خلال توعية الموردين بأهمية الممارسات الصديقة للبيئة وإجراء مراجعة بيئية لممارسات الإدارة الخضراء للموردين. إلا أن نطاق هذا البحث والأساليب المستخدمة فيه والنتائج التي توصل إليها تشير إلى وجود مجالات لبحوث أخرى مستقبلية.

1. Introduction

Companies that are seen as the source of environmental problems have had to review their production and supply chain processes as a result of pressure from the community and governments. Hence, activities of supply chains need to be managed, it is essential to develop a new, systematic and emerging environmental approach for whole supply chain (SC) commonly known as Green Supply Chain Management (GSCM) (Cankaya & Sezen, 2019).

In a globalized economy, a growing number of large companies found that in a highly competitive environment, the policy of maximizing short-term profits isn't a guarantee of success and consequently such a policy must be accompanied by the development of a sustainable behavior. Thus becomes increasingly important the business concern towards ensuring the sustainable performance (SP) (Stanciu et al., 2014).

Environmental, social and economic concerns have made GSCM more popular among researchers and practitioners around the globe. Developed countries tend to focus more on this issue, compared to developing countries (Jun et al., 2019). However, companies nowadays have to integrate their supply chain with environmental management due to pressures from customers who have increasing environmental concerns. In addition, organizations can generate more business opportunities than their competitors if they can address environmental issues (e.g. by implementing a proper environmental management system) successfully (Hansmann and Claudia, 2001).

In recent years, people awareness about the effect of the pharmaceutical companies on the environment have increased, so there was always a need to integrate the green practices into supply chain management to avoid long-term damage to the planet. In response, this research aims increase the SP which includes environmental, social and economic performance through GSCM practices at the pharmaceutical companies in Egypt.

2. Research Terminologies

2.1. Green Supply Chain Management (GSCM)

GSCM is the internal and external practices of the organization that are practiced in order to make the supply chain more sustainable in terms of taking into account the three dimensions of sustainable performance, which are: environmental, social and economic (Hong et al., 2018).

2.2. Sustainable Performance (SP)

SP is considered as organizations achievements among different stakeholders, top-level managers' roles can be pivotal, as they are responsible for developing appropriate strategies, acquiring and utilizing necessary resources and guiding employees in the right direction to achieve sustainable goals, objectives and performance (Cheema et al., 2020; Iqbal & Ahmad, 2021).

3. Literature Review

3.1. Green Supply Chain Management (GSCM)

(Yang and Lin, 2020) explores the effects of supply chain collaboration (SCC) on GI performance and considers supply chain collaborative drivers as a crucial part of GI strategy. The study reveals that the relationships between supply chain partners have a very high influence on GI performance. SCC should be deemed as a core component in GI strategies. In addition, environmental regulations, top management commitment and social recognition are among high driving and dependence powers.

(De Giovanni and Cariola, 2020) analyses whether process innovation can be used as a lever to strengthen the relationships among Leanness, GSCM and performance. The results reveal that leanness facilitates the supplier collaboration on environmental programs and positively contributes to environmental and operational performance. In contrast, it exerts a positive second order effect on economic performance, which should then be pursued as a long term target. Nevertheless, firms can gain higher performance either by collaborating with suppliers on environmental programs or by investing in I4.0 technologies but not with both.

(Seman et al., 2019) investigates the relationship between GSCM and GI practices and the influence of these practices on the environmental performance. And the results revealed that there is a significant and positive relationship between GSCM and GI, and the environmental performance. Moreover, GI had a positive effect on the environmental performance. Furthermore, GI had a mediating relationship between GSCM and environmental performance.

(Nejati et al., 2017) investigate the linkage between GHRM and GSCM, in light of the moderating effect of employees' resistance to change. Research results suggest the significant and positive impact of GHRM on GSCM, confirming the general call for integration between HRM and green management.

(Wu, 2013) explore the relationship between green supply chain integration (GSCI) and GI and to analyze the moderating effects of environmental uncertainty. Supplier, customer and internal integration enhance both green product and process innovations. Demand uncertainty positively moderates each GSCI-green innovation link. However, the moderating effect of technological uncertainty is insignificant.

3.2. Sustainable Performance (SP)

(Ch'ng et al., 2021) investigate the influence of ecologically friendly innovation practices on their sustainable business performance, further tested to examine the moderation of market turbulence toward the relationship. The results show that each dimension of the sustainable business performance (economic, social and environmental) can be obtained by distinguishing an eco-innovation strategy, whether eco-process, eco-product or eco-organizational innovation.

(Zhang and Ma, 2021) Explore the relationship between environmental management and firm economic performance with the mediating effect of GI and the moderating effect of environmental leadership. The results show an inverted U-shaped relationship between EMB and economic performance; EMD has a

positive impact on economic performance; GI mediates the relationship between EMB (EMD) and economic performance.

(Hadi & Baskaran, 2021) This paper highlights the study on examining sustainable business performance determinants includes proposed variables of organizational learning culture and digital organizational culture. The results show that supports from organizational learning culture and digital organization culture on sustainable business performance are positive and significant. Digital organizational culture mediates the relationship between organizational learning culture and sustainable business performance.

(Gupta et al., 2021) developed a framework based on concepts of circular economy, sustainable cleaner production and Industry 4.0 standards to assess sustainability performance of manufacturing companies and to guide them in prioritizing investment in potential solutions for enhancing performance on sustainability. Findings suggest that circular economy practices are most important for increasing sustainability performance in manufacturing, followed by practices of cleaner production and Industry 4.0.

(Belhadi et al., 2021) this paper aims to explore the distinct and combined effects of several approaches such as digital business transformation (DBT), organizational ambidexterity (OA) and circular business models (CBMs) on the relationship between I4.0 capabilities and SP. The findings lead to several important implications concerning the potential paths linking I4.0 and SP. Notably, the DBT was found to mediate this relationship by integrating circular principles to devise business models.

Analyzing the Literatures and Concluding the Research Gaps:

Among the most important aspects that have characterized the literatures related to the research variables are the following:

1. Most of the previous studies that dealt with GSCM concerned about studying and analyzing the relationship between GSCM and industry 4.0 technologies, corporate reputation, green human resources management, green innovation, employee's

- resistance to change, customer relational governance and environmental & economic performance.
2. SP came as one of the important elements for the strength and continuity of organizations. Most of the previous studies that dealt with SP concerned about studying and analyzing the relationship between SP and some variables such as: organizational learning culture, green innovation, sustainable cleaner production, Industry 4.0 standards and digital business transformation.
 3. The researcher will study the relationship between two variables, namely GSCM and SP, by applying it to pharmaceutical companies, and this relationship is not studied by researchers despite the importance of this relationship.
 4. There is a scarcity in studies that dealt with the direct relationship between each of the research variables and the other variable in the Arabic region.
 5. According to the researcher's knowledge, there is no Arab studies that dealt with the role of GSCM as an independent variable in improving the level of SP as a dependent variable, by applying to the pharmaceutical companies in Egypt, and thus this research comes as a follow-up to recent trends in the field of production and operations management.

Accordingly, the research gap on which the current research will be based is represented in the failure of any of the previous studies to examine the nature of the relationship between GSCM and SP, as it was found that there are clear deficiencies in the studies. This is what the current research will strive to achieve.

4. Research Problem and Questions:

Due to the progressive internationalization of markets, rapidly changing environment on which industrial companies operate, and increasing the degree of competition, these companies must find a way to deal effectively with these challenges in order to achieve survival and growth. In order to survive and acquire competitive advantages in light of that highly changing business environment,

managers need to accept innovation as a key element for the organization (Maier et al., 2014). And it was revealed from the pilot study that there are some environmental practices that must be given sufficient attention and work to solve any problems they face, these practices are as follows:

- 60% of employees asserted that the pharmaceutical companies in Egypt are not interested in designing products that allow reuse, recycling, and recovering of material and component parts.
- 80% of employees indicated that the pharmaceutical companies in Egypt don't collaborate with suppliers and customers to develop products according to eco-design principles.
- 33% of employees indicated that the pharmaceutical companies in Egypt provide design specification to suppliers, which includes environmental requirements for purchased items.

In addition to investigating to what extent GSCM with its practices can enrich the level of SP in these companies.

So, the research questions could be formulated as follows:

1. What is the level of GSCM at the pharmaceutical companies under research?
2. What is the level of SP at the pharmaceutical companies under research?
3. Is there is a statistically significant relationship between GSCM and SP at the pharmaceutical companies under research?
4. Is there is a statistically significant effect of the level of GSCM at the pharmaceutical companies under research and the level of SP?

5. Research Objectives:

The objectives of this research are represented as follows:

1. Exploring the level of GSCM at the pharmaceutical companies under research.
2. Exploring the level of SP at the pharmaceutical companies under research.

3. Identifying whether is there is a significant relationship between GSCM and SP at the pharmaceutical companies under research.
4. Identifying is there is a significant effect between GSCM and SP at the pharmaceutical companies under research.

6. Research Hypotheses:

GSCM practices lead firms to engage in joint decision making to resolve environmental problems and disperse environmental risk. Firms can achieve common environmental goals collectively among suppliers, partners, and customers in the supply chain (Chan et al., 2012; Yang et al., 2013; Jabbour et al., 2014). They can also generate more business opportunities than their competitors to gain competitive advantage (Peng and Lin, 2008; Chiou et al., 2011). These improvements from green supply chain practices can lead to improve the level of SP (Afum et al., 2020), also there is a relationship between GSCM and SP dimensions (Han and Huo, 2020 ; Acquah et al., 2021 ; Saqib and Zhang, 2021). Accordingly, a positive link is expected between GSCM and SP. Thus, the following hypotheses are proposed:

H1: There is no statistically significant relationship between GSCM and SP at the pharmaceutical companies under research.

H2: There is no statistically significant effect between GSCM and SP at the pharmaceutical companies under research.

7. Research Importance:

The importance of this research lies in directing the attention of decision-makers in pharmaceutical companies in Egypt to the important role of consumer behavior in the relationship between GSCM practices and the SP of pharmaceutical companies in Egypt under research, which contributes to their survival and continuity and achieving their goals efficiently and effectively.

Identify the extent to which Egyptian industrial companies in general and pharmaceutical companies in particular are aware of adopting the concept and practices of GSCM and their

impact on improving the SP of pharmaceutical company in Egypt.

Using GSCM activities that will work to provide pharmaceutical products with the required quality, the right place, time, and the right price, as well as environmentally friendly pharmaceutical products, and achieve public benefits.

Providing recommendations and proposals to decision makers in pharmaceutical companies in Egypt, working to improve the performance and quality of pharmaceutical services, and achieving the highest levels of productivity.

8. Research Variables and Measurement

8.1. Independent Variable: Green Supply Chain Management

It will be measured through five-practices, internal GSCM (IEM and ECO) and external GSCM (EC, GP and RL) (Zaid et al., 2018). This measure consists of 25 statements: six statements for IEM, five statements for ECO, six statements for EC, five statements for GP, and three statements for RL.

8.2. Dependent Variable: Sustainable Performance

It will be measured through three-dimensions 20-item scale adopted based on (Saqib & Zhang, 2021). Environmental performance will be measured by 7 statements, social performance will be measured by 8 statements, and economic performance will be measured by 5 statements.

9. Research Population and Sample

9.1 Research Population

The research population involves the employees at the pharmaceutical companies in Egypt which include (64) companies, this according to the (Medicines Planning and Policy Center, 2018). This research will be limited to just (5) companies at Cairo City (Novartis, Amoun, Sanofi, Glaxo and Pharco) with a total number of employees (10200).

9.2. Research Sample

The researcher used the simple random sample formula in order to calculate the size of the selected sample from the employees at the pharmaceutical companies at Sadat city and 6th of

October City under the research. The following formula is used (Tryfos, 1996).

$$n = \frac{NZ^2 p(1-p)}{Ne^2 + Z^2 p(1-p)}$$
$$n = \frac{10200 \times (1.96)^2 \times 0.25}{10200 \times (.05)^2 + (1.96)^2 \times 0.25} = 371$$

10. Theoretical Framework for the Research Variables

10.1. Green Supply Chain Management Definition

GSCM is the integration of environment thinking through the supply chain, including design, selection of raw materials, manufacturing processes, product delivery and product handling after its life cycle (Mackenzie et al., 1991).

GSCM is handling material and information flows as well as the cooperation of companies along the supply chain, aiming at sustainable, economic and social development (Seuring, 2001).

GSCM is a “green procurement, green manufacturing, green distribution and reverse logistics”. The idea of GSCM is to minimize or eliminate waste (energy, emissions, and chemical/hazardous, solid wastes) along supply chain (Hervani et al., 2005).

GSCM is the minimization or elimination of waste in the form of energy, emissions, hazardous, chemical and solid waste (Olugu et al., 2010).

GSCM is the management of raw materials, activities from suppliers to manufacturers to costumers, and product take back with improvement to environmental impacts through lifecycle phases (Hu & Hsu, 2010).

GSCM is the integration of green practices throughout the supply chain, including functional areas such as purchasing, production and sales, from strategic, tactical and operational (Sarkis et al., 2011).

GSCM is the elimination or mitigation of the negative effects of the supply chain on the environment (Andic et al., 2012).

GSCM is not just a tool for minimizing the environmental footprints of products and operations but is also a unique strategy

for providing economic benefits as well as enhancing social welfare (De Giovanni, 2012).

GSCM is the relationships between a buyer and their supplier, but a broader perspective includes multiple stages of the supply chain and the outbound logistics to customers and end-of-product-life (Sarkis, 2014).

GSCM is considered to be a means of effective strategic management which improves the environmental performance of manufacturing firms, in addition to improving other sustainability performance targets (Hassan et al., 2016)

GSCM is the integration of environmental practices and thinking into different stages of supply chain management (Kumar et al., 2018).

GSCM takes into account environmental issues when managing the supply chain to achieve comprehensive environmental improvements (Al-Ghwayeen & Abdallah, 2018).

Based on what has been mentioned previously, the researcher suggests that GSCM can be defined as: GSCM approach is one of the modern concepts that is an important approach for companies to improve their environmental performance and enhance their competitiveness, whether in product components or design, as well as during green manufacturing and packaging, and during transportation and distribution, in addition to purchasing, storage, and green marketing.

10.2. Green Supply Chain Management Practices

There are many dimensions and practices of GSCM, including: (Internal Environment Management and Eco-design) as an internal practices, and, (Environmental Cooperation, Green Purchasing and Reverse Logistics) as an external practices (Zaid et al., 2018). They are as follows:

- **Internal GSCM**

Internal Environmental Management (IEM) is a systematic process that requires evaluation of the product's environmental impact and the related responsibilities through support for environmental practices by top and mid-level administration and establishing an environmental management system (Darnal et al., 2008).

Eco-Design (Green Design) includes the integration of the design process and all other environmental dimensions by taking the full flow of supply chain into consideration. This is important since many of the environmentally harmful practices originate during the design process through design for reuse that facilitates the use of parts or the whole product by minimal procedure (Eltayeb et al., 2011).

- **External GSCM**

Environmental Cooperation can be defined as actions taken by company and the supplier together in the context of a common plan for environmental management and environmental solutions. In this context, the buyer and the seller plan the activities that can be undertaken to minimize the environmental impact caused by the production process and the products (Vachon & Klassen, 2008). Customers may play critical roles to transform supply chain into green supply chain (Kumar et al., 2014). Short and long term relationships with customers are rather important for successful implementation of GSCM through customer training about environmental management actions and environmental issues and direct support provided to customers by the company in order to develop their environmental performance and help them in environmental matters (Zhu & Sarkis, 2004).

Green Purchasing is the set of purchasing policies held, actions taken, and relationships formed in response to concerns associated with the natural environment". In short, green purchasing can be defined as integrating environmental problems and concerns into the process of purchasing (Handfield et al., 2002; Rao & Holt, 2005). It is important for a company to select the appropriate supplier in order to realize its environmental objectives. However, selection of the suitable supplier is not sufficient by itself to develop environmental performance. Following the selection, it is necessary to manage the supplier by adopting a strategic approach that is based on cooperation. Green purchasing cycle includes the evaluation of whether the supplier adapts to the conditions/criteria of the company in addition to selection and management of the supplier. Supplier evaluation is monitoring the suppliers to assess to

what degree they undertake voluntary or obligatory activities (Paulraj, 2011).

Reverse Logistics involves activities that aim reverse products or materials for reuse, recycle, re-manufacturing, repair, refurbish and safe disposal. In the first stage reverse logistics includes moving goods from the last user to the producer. The next stage includes transforming the returned goods to a product that can be used by the producer again. Reverse logistics involves the transportation and stock management process of traditional logistics. However, it focuses more on return of the goods from the consumers rather than product mobility for consumers through products that can be used again and again after they are cleaned. Containers and bottles can be given as examples of reuse and repairing the parts of the product that are malfunctioning (Eltayeb et al., 2011).

10.3. Sustainable Performance Definition

SP is the adoption of strategies and activities that can address the requirements of economic entities and their current beneficiaries, while at the same time protecting, sustaining, and enhancing human and natural resources for the future (Labuschagne, Brent, & Van Erck, 2005).

SP is the activities that improve organizational performance such as helping the organization measure progress towards its goals, understand its current situation, address the key issues and the options available (Searcy et al., 2008).

SP is the process to identify how successful organizations or individuals have been in attaining their objectives and strategies (Gadenne et al., 2012).

The successful implementation of sustainable development could improve more than one dimension of SP namely environmental sustainability, economic sustainability and social responsibility sustainability (Habidin et al., 2013).

SP is the ability of an organization to meet the needs and expectations of customers and other stakeholders on long-term, balanced by an effective management organization by organization staff awareness by learning and applying appropriate improvements, innovation (Stanciu et al., 2014).

SP is a way of doing something, achieve the goals, customers' satisfaction, work under control and improvements are necessary (Ghosh, 2014).

SP is considered as organizations achievements regarding stakeholders' expectations in three main areas, i.e., economic, social, and environmental performances. It reflects organizations endeavors towards accomplishment of economic, social, and environmental aspects (Vural-Yavas, 2021).

Hence, SP, for the purposes of the present research, is defined as: the actual output from the implementation of both GI and GSCM practices on the organization's environmental, economic, and social performance.

10.4. Sustainable Performance Dimensions

SP includes three components: The natural environment, economic, and social performance this perspective is generally referred to as the triple bottom line (TBL). These dimensions are as follows:

Environmental Performance is the achievements in reducing the resource usage, pollution emitted and waste generated resulting from the undertaken efforts (Brent & Labuschagne, 2004). Environmental performance is the reduction of solid/liquid wastes, reduction of emissions, resource reduction, and decrease of consumption for hazardous/harmful/toxic materials, decrease of frequency of environmental accidents, and improved employee and community health (Zhu and Sarkis, 2004). Environmental performance is the environmental impact that the corporation's activity has on the natural milieu (Chien and Shih, 2007). Environmental performance is the initiatives that include ISO 14000 certification, pollution prevention, recycling of materials and waste reduction (Hibadullah et al., 2013). Environmental performance is the evaluation of organizational reduction for emissions, decrease of consumption for hazardous or harmful materials and efficient energy or resources use (Abidin et al. 2016). Environmental performance is viewed as a firm's capability to cause reductions in pollution and solid waste and its ability to reduce the use of unsafe materials and the occurrence of environmental accidents (Abdul-

Rashid et al., 2017). Environmental performance is the ability of the organization to reduce air emissions and effluent waste, decrease consumption of hazardous and toxic material, as well as lower the frequency of environmental accidents (Zaid et al., 2018). Environmental performance is the ability of a firm to reduce pollution, reduce waste, prevent use of hazardous substances and reduce environmental accidents, and it is necessary for the firm to identify the sources of environmental problems in its scope (such as production, transportation, procurement and the product) (Cankaya & Sezen, 2019). Environmental performance can be determined by the quality of eco-friendly products, green process and product innovation and incorporation of green sustainability matters into a firm's operation (Singh et al., 2020).

Economic Performance is the overall goal of every company. Economic aspects can be flexible integrated later, if a requirement is seen during further research processes (Zimek & Baumgartner, 2017). Economic performance is the financial and marketing performance improvements resulting from implementing green practices that enhance the organization's position compared to the industry average (Zaid et al., 2018). Economic performance is the firm's ability to gain and retain customers, and to improve sales, profitability, and return on investment (ROI) (Phillips et al., 2019). Economic performance is related to the manufacturing plant's ability to reduce costs associated with purchased materials, energy consumption, waste treatment, waste discharge and fines for environmental accidents (Cankaya & Sezen, 2019). Economic performance is the profitability, revenue growth, increase in market share, and increase in productivity. A sustainable approach can lead to internal cost saving, open new markets and find beneficial uses for waste (Han and Huo, 2020). Economic performance is the degree to which a firm can optimize its financial outcomes (Afum et al., 2020). Economic performance is the financial profits that result from greening the supply chain and it includes profitability, revenue progression, increased market share, and productivity development (Malti, 2021).

Social Performance is the social interaction, relations, behaviors and values between people. A respectful interaction

between hosts and guests, involvement of the local people and recognition of the contribution of traditions and culture to the tourist experience are key issues for sustainable businesses (Raderbauer, 2011). Social performance is the companies' contribution to the well-being and quality of life in terms of society and individuals from the current generation to future generations (Kim, 2014). Social performance is the development of policies and strategies that take into account the effects of the organization's behavior on different stakeholder groups including their employees, the communities in which they operate and the environment (Newman et al., 2016). Social performance is a strategy developed by the organization to increase the sustainable performance of the organizations instead of focusing only on environmental sustainability (Zimek & Baumgartner, 2017). Social performance is a socially sustainable society, people are not subject to structural obstacles to health, influence, competence, impartiality and meaning-making (Missimer et al., 2017). Social performance is the real effects of green practices on the social aspects related to the image of firm and their goods from the viewpoint of various stakeholders such as suppliers, employees, customers, and the public (Zaid et al., 2018). Social performance is the ethical understanding of an organization's responsibility for the impact of its business activities on society (Phillips et al., 2019). Social performance is measured by employee safety and health, improvement in the quality of life, vocation training for community members and training of employees among others (Afum et al., 2020).

11. Discuss the Results of the Statistical Analysis

11.1. Evaluation of the Reliability for the Research Variables

The alpha correlation coefficient method was applied to each of the GSCM and SP, in total for the single scale as a whole and for each set of variables from the groups that make up each scale separately. As for the GSCM scale at the pharmaceutical companies in Egypt, it has the results of the reliability analysis showed that the alpha coefficient for the scale as a whole represents about 0.951, which is an indicator of a high degree of reliability, as the

acceptable limits for the alpha coefficient range from 60.0 to 0.80, according to the levels of reliability used in social sciences.

Through the following table, it is clear that the initial result of the reliability assessment reflects that the scale subject to the test can be relied upon in measuring GSCM at the pharmaceutical companies in Egypt.

Table (1)
Outputs of the Reliability Analysis for GSCM
(Independent Variable)

N	GSCM Variables	Number of Statement	Alpha Coefficient
1	IEM	6	0.851
2	ECO	5	0.792
3	EC	6	0.821
4	GP	5	0.795
5	RL	3	0.701
Total		25	0.951

Source: by the researcher according to the results of statistical analysis.

Table (2)
Outputs of the Reliability Analysis for SP (Dependent Variable)

N	SP Variables	Number of Statement	Alpha Coefficient
1	Environmental performance	7	0.842
2	Social performance	8	0.878
3	Economic performance	5	0.844
Total		20	0.947

Source: by the researcher according to the results of statistical analysis.

According to the previous table, it is clear that the results of the reliability analysis showed that the alpha coefficient for the SP scale at the pharmaceutical companies in Egypt as a whole is about 0.947, which is an indicator of a high degree of reliability, and that the initial result of the reliability assessment reflects that the scale subject to the test can be relied upon in measuring SP at the pharmaceutical companies in Egypt.

These results support confidence in the research variables and confirm their validity for the following stages of statistical analysis.

11.2. Confirmatory Factor Analysis for Research Variables

CFA is used to verify the extent to which the practices of the standard model of GSCM match with the data collected from the research sample about those practices, by studying the relationship

between the practices of GSCM and the statements they express, and the ability of the statements to express each practice, and to filter each practice from measurement errors.

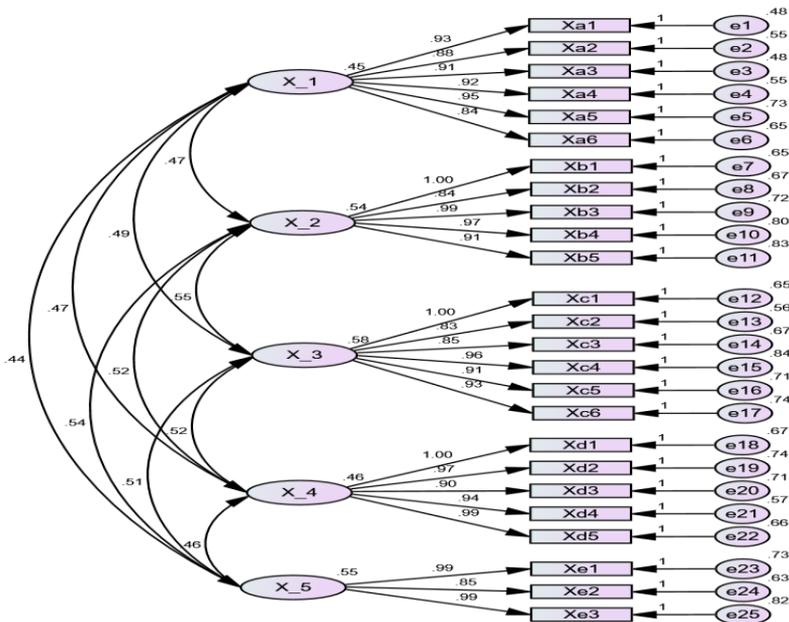
Therefore, the CFA is considered as a tool for interpreting the data, and answering an important question, which is why and how a group of variables and their dimensions were related in the research population? with the aim of reaching a model that simulates reality, and is characterized by efficiency and simplicity at the same time, therefore, through this analysis, the extent of conformity of the sample data for the GSCM measurement model, which was previously determined based on most previous studies, will be revealed as a concept consisting of five practices, and verification of the validity of this structure.

11.2.1 Confirmatory Factor Analysis for GSCM

Where GSCM scale tests the relationship between 25 statements by (6) phrases for the practice IEM, (5) phrases for the practice ECO, (6) phrases for the practice EC, (5) phrases for the practice GP and (3) phrases for the practice RL. Figure (3) shows the standard load coefficients for phrases at the IEM practice ranged between (0.84) and (0.95), while the ECO practice ranged between (0.84) to (1.00), the EC practice ranged between (0.83) and (1.00), while the GP practice ranged between (0.90) to (1.00) finally, the RL practice ranged between (0.85) and (0.99), and all of these coefficients are acceptable as they must be greater than or equal to (0.5) (Hooper et al., 2008).

It also became clear that the correlation coefficients between the five dimensions of the independent variable and each other ranged between (0.44) and (0.55), which are higher than (0.2) this reflects the convergent validity of the phases and the scale as a whole, and its ability to measure what it was prepared for.

Figure (3)
Confirmatory Factor Analysis for GSCM



Source: by the researcher according to the results of statistical analysis.

Table (3)
Conformity Indicators for GSCM

N	Fit indices and their acceptable thresholds	Test Value
1	(Chi-Square) / (Degree of freedom)	5.630
2	P. value	0.000
3	Goodness of fit Index (GFI)	0.885
4	Tuker-Lewis Index (TLI)	0.921
5	Comparative Fit Index (CFI)	0.930
6	Normed Fit Index (NFI)	0.877
7	Incremental Fit Index (IFI)	0.931
8	Relative Fit Index (RFI)	0.860
9	Root Mean Square Residual (RMR)	0.048
10	Root Mean Square Error of Approximation (RMSEA)	0.057

Source: by the researcher according to the results of statistical analysis.

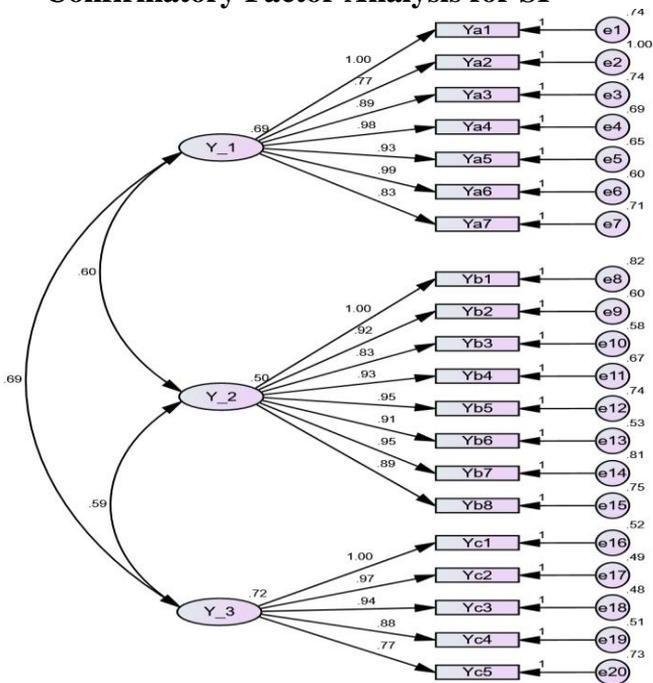
Table (3) shows that the results of the indicators used indicate a good conformity test, as they provide good and acceptable estimates to indicate the constructive validity of the GSCM scale, and that the phrases measure what they were prepared for. In light of the previous results, the GSCM model is completely identical to the sample data, meaning that GSCM maintains its global structure consisting of the following five practices (IEM, ECO, EC, GP and RL) of the research sample. From the above, we conclude that the GSCM model under research has a great deal of validity in representing data, as well as a high level of stability.

11.2.2 Confirmatory Factor Analysis for SP

Where SP scale tests the relationship between 20 statements by (7) phrases for the dimension environmental performance, (8) phrases for the dimension social performance and (5) phrases for the dimension economic performance. Figure (4) shows the standard load coefficients for phrases at the environmental performance dimension ranged between (0.77) and (1.00), the social performance dimension ranged between (0.83) to (1.00), and the economic performance dimension ranged between (0.77) to (0.73), and all of these coefficients are acceptable as they must be greater than or equal to (0.5) (Hooper et al., 2008).

It also became clear that the correlation coefficients between the three dimensions of the independent variable and each other ranged between (0.59) and (0.69), which are higher than (0.2) this reflects the convergent validity of the phases and the scale as a whole, and its ability to measure what it was prepared for.

Figure (4)
Confirmatory Factor Analysis for SP



Source: by the researcher according to the results of statistical analysis.

Table (4)
Conformity Indicators for SP

N	Fit indices and their acceptable thresholds	Test Value
1	(Chi-Square) / (Degree of freedom)	3.140
2	P. value	000.0
3	Goodness of fit Index (GFI)	0.914
4	Tuker-Lewis Index (TLI)	0.951
5	Comparative Fit Index (CFI)	0.957
6	Normed Fit Index (NFI)	0.915
7	Incremental Fit Index (IFI)	0.957
8	Relative Fit Index (RFI)	0.903
9	Root Mean Square Residual (RMR)	0.045
10	Root Mean Square Error of Approximation (RMSEA)	0.052

Source: by the researcher according to the results of statistical analysis.

Table (4) shows that the results of the indicators used indicate a good conformity test, as they provide good and acceptable estimates to indicate the constructive validity of the SP scale, and that the phrases measure what they were prepared for.

In light of the previous results, the SP model is completely identical to the sample data, meaning that SP maintains its global structure consisting of the following three dimensions (environmental performance, social performance and economic performance) of the research sample. From the above, we conclude that the SP model under research has a great deal of validity in representing data, as well as a high level of stability.

11.3. Descriptive Analysis for Research Variables

The descriptive characteristics of the research variables reflect the main statistical parameters, which explain the properties of the variables, and include basic characteristics such as the arithmetic mean and the standard deviation.

11.3.1. Distribution of the Sample Items According to Demographic Variables

The researcher has analyzed the data contained in the questionnaires which related to the demographic characteristics through calculating frequencies and percentages. This in order to describing the population items under investigation in terms of their personal and demographic characteristics (gender, age, academic qualification, administrative level and experience). Table (5) illustrates distribution of the sample items according to demographic variables.

Table (5) Distribution of the Sample Items According to Demographic Variables

Variables	Category	Frequencies	Percent %
Gender	Male	221	64.5 %
	Female	121	35.5 %
Total		342	100 %
Age	Less than 25	63	18.4 %
	From 25 to 35	98	28.7 %
	From 35 to 45	123	36 %
	More than 45	58	17 %
Total		342	100 %
Academic qualification	Medium	26	7.6 %
	High	219	64 %
	Master	69	20.2 %
	Doctorate	28	8.2 %
Total		342	100 %
Administrative Level	Top	88	25.7 %
	Middle	133	38.9 %
	Lower	121	35.4 %
Total		342	100 %
Experience	Less than 5	86	25.1 %
	From 5 up to 15	176	51.5 %
	More than 15	80	23.4 %
Total		342	100 %

Source: by the researcher according to the results of statistical analysis.

11.3.2. The Descriptive Analysis of GSCM

This part discusses the results of the statistical analysis for answering the first question of this research, related to GSCM practices (IEM, ECO, EC, GP and RL) at the pharmaceutical companies in Egypt. To achieve this, the researcher evaluated the level of GSCM by answering the practices of GSCM, which include (25) statements that cover the five practices of GSCM shown as follows:

**Table (6)
The Mean and Standard Deviation for GSCM**

N	Statements	Mean	Standard Deviation
1	IEM	3.94	0.507
2	ECO	3.67	0.855
3	EC	3.65	0.807
4	GP	3.68	0.805
5	RL	3.67	0.955
Total		3.73	0.789

Source: by the researcher according to the results of statistical analysis.

The previous table (6) shows the following:

It is clear from the results of descriptive analysis for GSCM as shown in table (6) that IEM, as one of the GSCM practices, ranked first with an arithmetic average of (3.94), followed by GP with an arithmetic average of (3.68), and ECO and RL came in third rank with an arithmetic average of (3.67), and finally the EC came in the fourth stage with an arithmetic average of (3.65) this is according to employee's opinions at the pharmaceutical companies in Egypt.

And from the review of the descriptive analysis of the GSCM practices, the first question of the research can be answered, which states: "What is the level of GSCM at the pharmaceutical companies under research?", and the researcher found that the level of GSCM is somewhat average, as the value of the arithmetic mean for the general scale of GSCM is (3.73) with a standard deviation of (0.789).

11.3.3. The Descriptive Analysis of SP

This part discusses the results of the statistical analysis for answering the third question of this research, related to SP dimensions (environmental, social, and economic performance) at the pharmaceutical companies in Egypt. To achieve this, the researcher evaluated the level of SP by answering the dimensions of SP, which include (20) statements that cover the two dimensions of SP shown as follows:

**Table (7)
The Mean and Standard Deviation for SP**

N	Statements	Mean	Standard Deviation
1	Environmental Performance	3.65	0.841
2	Social Performance	3.68	0.803
3	Economic Performance	3.69	0.826
Total		3.69	0.794

Source: by the researcher according to the results of statistical analysis.

It is clear from the results of descriptive analysis for GSCM as shown in table (7) that economic performance, as one of the SP dimensions, ranked first with an arithmetic average of (3.69), followed by social performance with an arithmetic average of (3.68), and finally the environmental performance came in the third stage with an arithmetic average of (3.65), this is according to employee's opinions at the pharmaceutical companies in Egypt.

And from the review of the descriptive analysis of the SP dimensions, the second question of the research can be answered, which states: "What is the level of SP at the pharmaceutical companies under research?", the researcher found that the level of SP is somewhat average, as the value of the arithmetic mean for the general scale of SP is (3.69) with a standard deviation of (0.794).

11.4. The Relationship between GSCM and SP

The simple correlation coefficient (Spearman) was calculated between the research variables, except for the demographic variables, in order to identify the strength, direction and significance of the relationship between the research variables, the positive sign indicates that the relationship is positive, and the negative sign indicates that the relationship is inverse. This is through testing the first hypothesis of this research which is: "There is no statistically significant relationship between GSCM and SP at the pharmaceutical companies under research". We explain this in the following table:

11.4.1. MCA for GSCM and SP

Table (8)
MCA for GSCM and SP

	IEM	ECO	EC	GP	RL
IEM	1.000				
ECO	0.688**	1.000			
EC	0.652**	0.665**	1.000		
GP	0.629**	0.688**	0.695**	1.000	
RL	0.548**	0.586**	0.544**	0.520**	1.000
SP	0.735**	0.674**	0.672**	0.712**	0.634**

Source: by the researcher according to the results of statistical analysis.

** Correlation is significant at 0.01 level

n= 342

It is clear from the matrix of correlation coefficients between GSCM practices and SP that:

1. There is a significant direct correlation between the practices of GSCM and each other. The correlation coefficients ranged between (0.695) and (0.520), all of which are statistically significant at a significant level of 0.01.
2. IEM as a practice of GSCM is directly and statistically significant with SP, and the value of the correlation coefficient between IEM and SP (0.735).
3. Eco as a practice of GSCM is directly and statistically significant with SP, and the value of the correlation coefficient between Eco and SP (0.674).
4. EC as a practice of GSCM is directly and statistically significant with SP, and the value of the correlation coefficient between EC and SP (0.672).
5. GP as a practice of GSCM is directly and statistically significant with SP, and the value of the correlation coefficient between GP and SP (0.712).
6. RL as a practice of GSCM is directly and statistically significant with SP, and the value of the correlation coefficient between RL and SP (0.634).

Based on the above, It was decided to reject the null hypothesis which states that "There is no statistically significant relationship between GSCM and SP at the pharmaceutical companies under research" and accept the alternative hypothesis which states that "There is a statistically significant relationship between GSCM and SP at the pharmaceutical companies under research" and this is according to results of MCA that had shown that there was a relationship at a statistical significance level of 0.01 and 0.05 (according to F-Test) between GSCM and SP. Also it can be said that the correlation analysis gives an initial indication of the extent of the impact of GSCM practices on SP, but the judgment of the extent of the impact of each practice of GSCM on the SP is left to the results of the multiple regression analysis.

11.4.2. MRA for GSCM and SP

This section attempts to explain the effect of GSCM on SP. This is through testing the second hypothesis of this research which is: "There is no statistically significant effect between GSCM and SP at the pharmaceutical companies under research."

To achieve this, the researcher applied a MRA method to verify the type and degree of this relationship between the GSCM as an independent variable and SP as a dependent variable. The results of applying the (MRA) method can be illustrated as follows:

Table (9)
MRA Results for GSCM and SP

	Variables of GSCM	Beta	R	R ²	Sig.
1	IEM	0.354**	0.837	0.700	0.000
2	ECO	0.077	0.770	0.592	0.105
3	EC	0.109*	0.757	0.573	0.015
4	GP	0.228**	0.810	0.656	0.000
5	RL	0.224**	0.731	0.534	0.000
R		0.887			
R ²		0.786			
Calculated F value		247.543			
Tabulated F value		2.24085427			
Degree of Freedom		5-336			
Significant level		0.000			

Source: by the researcher according to the results of statistical analysis.

** Statistical significance at the level 1%.

* Statistical significance at the level 5%.

The previous table (10) shows the following:

1. There is a positive linear relationship with statistical significance between the variables of GSCM and SP at the pharmaceutical companies in Egypt under research (taken totally), and this relationship represented 88.7% (according to the multiple correlation coefficient in the model "R"), and this relationship is positive, where the greater interest with the GSCM practices, the greater SP for employees at pharmaceutical companies in Egypt under research.
2. It became clear that the interest of GSCM practices at pharmaceutical companies under research can explain about 78.6%

(according to the coefficient of determination in the model "R²") of the total variance in the level of SP among employees at pharmaceutical companies in Egypt.

3. It is clear from the analysis that there are four variables related to GSCM that enjoy a positive linear relationship with statistical significant between them and between the variable of SP at pharmaceutical companies in Egypt under the current research, and these practices are (IEM - EC - GP – RL).
4. It is also clear that there is only one practice of GSCM is not statistically significant in its relationship to SP, and this practice is (ECO), and it has a low contribution in explaining the variance of SP at pharmaceutical companies in Egypt under research.

It was decided to reject the null hypothesis which states that "There is no statistically significant relationship between GSCM and SP at the pharmaceutical companies under research" and accept the alternative hypothesis which states that "There is a statistically significant relationship between GSCM and SP at the pharmaceutical companies under research" and this is according to results of multiple regression analysis that had shown that there was a relationship at a statistical significance level of 0.01 and 0.05 (according to F-Test) between GSCM and SP.

12. Research Findings

1. the general average of GSCM among employees at the pharmaceutical companies in Egypt is considered somewhat average, as the arithmetic mean value reached (3.73), IEM, as one of the GSCM practices, ranked first with an arithmetic average of (3.94), followed by GP with an arithmetic average of (3.68), and ECO and RL came in third rank with an arithmetic average of (3.67), and finally the EC came in the fourth stage with an arithmetic average of (3.65).
2. the general average of SP among employees at the pharmaceutical companies in Egypt is considered somewhat average, as the arithmetic mean value reached (3.69), economic performance, as one of the SP dimensions, ranked first with an

arithmetic average of (3.69), followed by social performance with an arithmetic average of (3.68), and finally the environmental performance came in the third stage with an arithmetic average of (3.65).

3. There is a positive significant correlation between GSCM as a whole and SP, this means that the higher interest with the level of GSCM practices, the higher SP at the pharmaceutical companies in Egypt under research. MRA shows that R value between GSCM and SP (88.7%) and R^2 (78.6%).

13. Research Recommendations

1. The need for pharmaceutical companies to use energy-efficient transportation and distribution methods that reduce carbon emissions.
2. Pharmaceutical companies must use the latest technological means to ensure the provision of orders for raw materials for manufacturing medicines in the shortest possible time.
3. Pharmaceutical companies must seek to strengthen green supply chain management, represented by the application of green purchasing, by educating suppliers about the importance of environmentally friendly practices and conducting an environmental review of suppliers' green management practices.
4. The need to expand scientific research to address environmental problems, ensure the application of green supply chain management practices, and use appropriate means to train and qualify workers within the environmental orientation of the organization.
5. The necessity of adopting and disseminating the green culture in pharmaceutical companies through creating green products, as well as storing and distributing in a modern way, and relying on renewable energies in light of the spread of the green economy.

14. Suggested for Future Researches

The research results showed a number of areas that deserve attention, study and analysis from the researcher's point of view, and the most important of these issues are the following:

1. A study explaining the relationship of green supply chain management to beneficiary satisfaction under e-government - by application to any of the (traffic departments - civil registry - real estate registration) in the ARE.
2. The impact of the Corona pandemic on the management of global green supply chains in light of the green economy.
3. Study the role of GSCM in increasing productivity.

References

- Abdul-Rashid, S., Sakundarini, N., Ghazilla, R., & Thurasamy, R. (2017). The impact of sustainable manufacturing practices on sustainability performance: Empirical evidence from Malaysia. *International Journal of Operations & Production Management*, 37(2), 182-204.
- Abidin, R., Abdullah, R., Hassan, M., & Sobry, S. (2016). Environmental sustainability performance: the influence of supplier and customer integration. *The Social Sciences*, 11(11), 2673-2678.
- Acquah, I. S. K., Agyabeng-Mensah, Y., & Afum, E. (2021). Examining the link among green human resource management practices, green supply chain management practices and performance. Benchmarking: An International Journal, 28(1), 276-290.
- Afum, E., Agyabeng-Mensah, Y., Sun, Z., Frimpong, B., Kusi, L. Y., & Acquah, I. S. K. (2020). Exploring the link between green manufacturing, operational competitiveness, firm reputation and sustainable performance dimensions: a mediated approach. *Journal of Manufacturing Technology Management*, 31(7), 1417-1438.
- Al-Ghwayeen, W., & Abdallah, A. (2018). Green supply chain management and export performance: The mediating role of environmental performance. *Journal of Manufacturing Technology Management*, 29(7), 1233-1252.
- Belhadi, A., Kamble, S., Gunasekaran, A., & Mani, V. (2021). Analyzing the mediating role of organizational ambidexterity and digital business transformation on industry 4.0 capabilities and sustainable supply

- chain performance. *Supply Chain Management: An International Journal*.
- Brent, A., & Labuschagne, C. (2004, October). Sustainable Life Cycle Management: Indicators to assess the sustainability of engineering projects and technologies. In *2004 IEEE International Engineering Management Conference (IEEE Cat. No. 04CH37574)* (Vol. 1, pp. 99-103). IEEE.
- Cankaya, S., & Sezen, B. (2019). Effects of green supply chain management practices on sustainability performance. *Journal of Manufacturing Technology Management*, 30(1), 98-121.
- Ch'ng, P., Cheah, J., & Amran, A. (2021). Eco-innovation practices and sustainable business performance: The moderating effect of market turbulence in the Malaysian technology industry. *Journal of Cleaner Production*, 283, 124556.
- Chan, R.Y.K., He, H., Chan, H.K., Wang, W.Y.C., 2012. Environmental orientation and corporate performance: the mediation mechanism of green supply chain management and moderating effect of competitive intensity. *Ind. Mark. Manag.* 41, 621–630.
- Cheema, S., Afsar, B., & Javed, F. (2020). Employees' corporate social responsibility perceptions and organizational citizenship behaviors for the environment: The mediating roles of organizational identification and environmental orientation fit. *Corporate Social Responsibility and Environmental Management*, 27(1), 9-21.
- Chien, M., & Shih, L. (2007). An empirical study of the implementation of green supply chain management practices in the electrical and electronic industry and their relation to organizational performances. *International Journal of Environmental Science and Technology*, 4(3), 383-394.
- Chiou, T. Y., Chan, H. K., Lettice, F., & Chung, S. H. (2011). The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan. *Transportation Research Part E: Logistics and Transportation Review*, 47(6), 822-836.
- De Giovanni, P., & Cariola, A. (2020). Process innovation through industry 4.0 technologies, lean practices and green supply chains. *Research in Transportation Economics*, 100869.

- De Giovanni, P., (2012). Do internal and external environmental management contribute to the triple bottom line? *Int. J. Oper. Prod. Manag.* 32(3), 265-290.
- Eltayeb, T., 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.
- Gadenne, D., Mia, L., Sands, J., Winata, L., & Hooi, G. (2012). The influence of sustainability performance management practices on organisational sustainability performance. *Journal of Accounting & Organizational Change*. 8(2): 210-235.
- Ghosh, S. (2014). Measuring sustainability performance of local food production in home gardens. *Local Environment*, 19(1), 33-55.
- Habidin, N., Zubir, A., Conding, J., Jaya, N., & Hashim, S. (2013). Sustainable manufacturing practices, sustaining lean improvements and sustainable performance in Malaysian automotive industry. *World Review of Entrepreneurship, Management and Sustainable Development*, 9(4), 444-459.
- Hadi, S., & Baskaran, S. (2021). Examining sustainable business performance determinants in Malaysia upstream petroleum industry. *Journal of Cleaner Production*, 294, 126231.
- Han, Z., & Huo, B. (2020). The impact of green supply chain integration on sustainable performance. *Industrial Management & Data Systems*, 120(4), 657-674.
- Handfield, R., Walton, S., Sroufe, R., & Melnyk, S. (2002). Applying environmental criteria to supplier assessment: A study in the application of the analytical hierarchy process. *European Journal of Operational Research*, 141(1), 70–87.
- Hansmann, K., & Claudia, K. (2001). Environmental management policies. *Green manufacturing and operations: From design to delivery and back*, 192-204.
- Hassan, M., Abidin, R., Nordin, N., Yusoff, R. (2016). GSCM practices and sustainable performance: a preliminary insight. *J. Adv. Manag. Sci.* 4(5), 430-434.
- Hervani A., Helms M., and Sarkis J. (2005) “Performance measurement for green supply chain management,” *Benchmarking: An International Journal*, vol. 12, no. 4, pp. 330-353.

- Hibadullah, S., Habidin, N., Izzaida, F., Zamri, M., Fuzi, N., Fatin, A., & Desa, N. (2013). The integrated between lean manufacturing practices and ISO 14001 efforts in Malaysian automotive industry. *Journal of Applied Science and Research*, 1(1): 17-27.
- Hong, J., Zhang, Y., & Ding, M. (2018). Sustainable supply chain management practices, supply chain dynamic capabilities, and enterprise performance. *Journal of cleaner production*, 172, 3508-3519.
- Hooper, D., Coughlan, J., & Mullen, M. (2008, September). Evaluating model fit: a synthesis of the structural equation modelling literature. In 7th European Conference on research methodology for business and management studies (pp. 195-200).
- Hu, A., & Hsu, C. (2010). Critical factors for implementing green supply chain management practice: an empirical study of electrical and electronics industries in Taiwan. *Management research review*, 33(6), 586-608.
- Iqbal, Q., & Ahmad, N. (2021). Sustainable development: The colors of sustainable leadership in learning organization. *Sustainable Development*, 29(1), 108-119.
- Jabbour, A.B.L.S., Jabbour, C.J.C., Latan, H., Teixeira, A.A., Oliveira, J.H.C., 2014. Quality management, environmental management maturity, green supply chain practices and green performance of Brazilian companies with ISO 14001 certification: direct and indirect effects. *Transp. Res. Part E* 67, 39–51.
- Jun, W., Ali, W., Bhutto, M., Hussain, H., & Khan, N. (2019). Examining the determinants of green innovation adoption in SMEs: a PLS-SEM approach. *European Journal of Innovation Management*.
- Kim, J. (2014). Drivers of Sustainable Performances Across the Flight Catering Supply Chain: From The Corporate and the Supply Chain Level. *University of Surrey (United Kingdom)*.
- Kumar, R., Ojha, A., Malmasi, S., & Zampieri, M. (2018, August). Benchmarking aggression identification in social media. In *Proceedings of the First Workshop on Trolling, Aggression and Cyberbullying (TRAC-2018)* (1-11).
- Kumar, S., Luthra, S., & Haleem, A. (2014). Critical success factors of customer involvement in greening the supply chain: An empirical study. *International Journal of Logistics Systems and Management*, 19(3), 283–310.

- Labuschagne, C., Brent, A., & Van Erck, R. (2005). Assessing the sustainability performances of industries. *Journal of cleaner production*, 13(4), 373-385.
- Le, T. (2022). How do corporate social responsibility and green innovation transform corporate green strategy into sustainable firm performance?. *Journal of Cleaner Production*, 132228.
- Mackenzie, D., Moss, L., Engelhardt, J., & Martyn, R. (1991). *Green design: design for the environment* (p. 154). London: Laurence king.
- Maier, A., Brad, S., Nicoara, D., & Maier, D. (2014). Innovation by developing human resources, ensuring the competitiveness and success of the organization. *Procedia-Social and Behavioral Sciences*, 109, 645-648.
- Malti, J. (2021). *Green Supply Chain Management for Competitive Advantage* (Doctoral dissertation, Walden University).
- Missimer, M., Robèrt, K., & Broman, G. (2017). A strategic approach to social sustainability–Part 1: exploring the social system. *Journal of cleaner production*, 140, 32-41.
- Nejati, M., Rabiei, S., & Jabbar, C. J. C. (2017). Envisioning the invisible: Understanding the synergy between green human resource management and green supply chain management in manufacturing firms in Iran in light of the moderating effect of employees' resistance to change. *Journal of Cleaner Production*, 168, 163-172.
- Newman, A., Miao, Q., Hofman, P. S., & Zhu, C. J. (2016). The impact of socially responsible human resource management on employees' organizational citizenship behaviour: the mediating role of organizational identification. *The international journal of human resource management*, 27(4), 440-455.
- Olugu, E., Wong, K., & Shahrour, A. (2010). A Comprehensive Approach in Assessing the Performance of an Automobile closed loop Supply Chain. *Sustainability*, 2, 871-879.
- Paulraj, A. (2011). Understanding the relationships between internal resources and capabilities, sustainable supply management and organizational sustainability. *Journal of Supply Chain Management*, 47(1), 20–37.
- Peng, Y.S., Lin, S.S., 2008. Local responsiveness pressure, subsidiary resources, green management adoption and subsidiary's performance:

- evidence from Taiwanese manufactures. *J. Bus. Ethics* 79 (1), 199–212.
- Phillips, S., Thai, V., & Halim, Z. (2019). Airline value chain capabilities and CSR performance: the connection between CSR leadership and CSR culture with CSR performance, customer satisfaction and financial performance. *The Asian Journal of Shipping and Logistics*, 35(1), 30-40.
- Raderbauer, M. (2011). The importance of sustainable business practices in the viennese accommodation industry. *Unpublished master dissertation, University of Exeter*.
- Rao, P., & Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance? *International Journal of Operations & Production Management*, 25(9), 898–916.
- Saqib, Z. A., & Zhang, Q. (2021). Impact of sustainable practices on sustainable performance: the moderating role of supply chain visibility. *Journal of Manufacturing Technology Management*.
- Sarkis, J., (2014). "Green supply chain management". New York: Momentum Press.
- Sarkis, J., Zhu, Q., & Lai, K. (2011). An organizational theoretic review of green supply chain management literature. *International journal of production economics*, 130(1), 1-15.
- Searcy, C., Karapetrovic, S., & McCartney, D. (2008). Application of a systems approach to sustainable development performance measurement. *International Journal of Productivity and Performance Management*. 57(2): 182-197.
- 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.
- Seuring, S. (2001). Green supply chain costing: joint cost management in the polyester linings supply chain. *Greener Management International*, (33), 71-80.
- Singh, S., Del Giudice, M., Chierici, R., & Graziano, D. (2020). Green innovation and environmental performance: The role of green transformational leadership and green human resource management. *Technological Forecasting and Social Change*, 150, 119762.

- Stanciu, A., Constandache, M., & Condrea, E. (2014). Concerns about the sustainable performance of firm in the context of quality management systems implementation. *Procedia-Social and Behavioral Sciences*, 131, 340-344.
- Tryfos, P. (1996). *Sampling methods for applied research: text and cases* (No. QA276. 6 T87).
- Vachon, S., & Klassen, R. (2008). Environmental management and manufacturing performance: The role of collaboration in the supply chain. *International Journal of Production Economics*, 111(2), 299–315.
- Wu, G. (2013). The influence of green supply chain integration and environmental uncertainty on green innovation in Taiwan's IT industry. *Supply Chain Management: An International Journal*, 18(5), 539-552.
- Yang, Z., & Lin, Y. (2020). The effects of supply chain collaboration on green innovation performance: An interpretive structural modeling analysis. *Sustainable Production and Consumption*, 23, 1-10.
- Yang, Z., Sun, J., Zhang, Y., & Wang, Y. (2017). Green, green, it's green: A triad model of technology, culture, and innovation for corporate sustainability. *Sustainability*, 9(8), 1369.
- Zaid, A., Jaaron, A., & Bon, A. (2018). The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study. *Journal of Cleaner Production*, 204, 965-979.
- Zhang, Q., & Ma, Y. (2021). The impact of environmental management on firm economic performance: The mediating effect of green innovation and the moderating effect of environmental leadership. *Journal of Cleaner Production*, 292, 126057.
- Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of operations management*, 22(3), 265-289.
- Zimek, M., & Baumgartner, R. (2017). Corporate sustainability activities and sustainability performance of first and second order. In *18th European Roundtable on Sustainable Consumption and Production Conference (ERSCP 2017)*. Skiathos Island, Greece 1-5.