

The Effect of Sustainable Supply Chain Management on Environmental Performance: Applied on Fuel Stations in KSA

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Chapter One

Introduction

Introduction:

The World Environment and Development Organization define sustainable development as "development necessary to meet contemporary people's needs, they cannot destroy the ability of future generations to meet their own needs." This definition is the most widely recognized. A growing number of organizations are including sustainability on their strategic objectives. Businesses frequently follow the triple bottom line approach put forward by Elkington (1998), who suggested balancing social, environmental, and economic challenges from a micro perspective. Businesses have been paying more attention to social responsibility and environmental practices in recent years, as well as timely release of environmental and corporate social responsibility (CSR) reports, as they have become more concerned with the social parties for sustainable development (Wan Nurul Karimah et al., 2016).

Businesses used social practices (like initiatives to enhance working conditions for employees or assist community activities) and environmental programs (like product design and recycling) to achieve sustainable supply chain management (SSCM) (Wang & Dai, 2018). SSCM has become ingrained in both individuals and companies with the idea of sustainable development and increased awareness of environmental protection and social responsibility. Managers must take the public's attitudes on social responsibility and the environment into account. SSCM is a crucial component of dynamic business development's corporate innovation processes, which are essential to the continued existence and growth of corporate (Gosling et al., 2017).

Generally, supply chain companies assume liability for any adverse impacts caused by any link in the network. Core businesses must take greater accountability for the social and environmental performance of their whole supplier chain. As a result, businesses use the SSCM process to control every supply chain participant in addition to themselves, for sustainable management. To prevent and reduce the negative effects of supply chain members' lack of environmental and social responsibility, supply chain core firms should enhance their environmental and social performance through both internal and external SSCM management (Wang & Dai, 2018). So, this

study examines the effect of Sustainable Supply Chain Management for fuel stations in KSA, analyzes their effect on environmental performance.

Research Problem:

The oil industry is huge and important in today's world. In addition to being a significant source of energy, petroleum products and their byproducts are used as feedstock for a variety of consumer goods in the petrochemical, textile, pharmaceutical, and fertilizer industries. If not managed properly, the greater oil business might lead to major environmental dangers and have a detrimental effect on the land, water, and air in addition to all living things. The retail fuel service station industry and business rely on the environment for functionality, resources, and ultimately trash disposal. As a result, they play a crucial part in assisting global efforts to achieve sustainable development (Kany, 2014).

A factory that sells fuel and lubricants for cars is known as a retail fuel station. Gasoline, liquefied natural gas (LNG), diesel, kerosene, and motor oil are all sold at retail gasoline stations. Effective oil supply is essential to the operation of modern society. Consequently, as a result of urbanization, retail gas stations are present in many nations. As a result, the constant vapor emissions have a negative impact on the health of the local population. Products, particularly gasoline, that are sold at retail fuel stations contain volatile organic compounds like benzene, which can catch fire and release vapour even at low temperatures. According to certain empirical research, breathing in benzene when exposed to the environment can result in lung cancer, leukemia in the brain and stomach, irritation of mucous membranes, dermatitis, bone marrow depletion, and heart attacks (Mac-Kingsley & Pokubo, 2018).

The supply chain for gas and oil includes the retail gasoline stations. There are three sectors in the oil and gas supply chain: upstream, midstream, and downstream (Briggs et al., 2012). Selling goods that release emissions during usage or storage is under the purview of the downstream industry. According to Lenzen and Murray (2010), the downstream industry is brought to life and sustained by sales, which come with emissions that would have been revealed in a different way. Thus, incidents of environmental deterioration that are typical of product delivery and dispensing do not exclude the retail fuel station. Sustainable supply chain management will therefore be essential to the sector. On the other hand, little is known about the industry's sustainable supply

chain management strategies and how they improve environmental performance. Suspicion that the retail gas stations lack well-established sustainable supply chain management techniques that produce favorable environmental performance could not be entirely out of place.

Thus, how does sustainable supply chain management affect the environmental performance of retail petrol stations in Saudi Arabia is the current study's main issue. This is what the study's issue is. The issue at hand is understandable given the impact it currently has and will continue to have on retail fuel stations, society at large, and other relevant parties if it is not resolved.

Research Importance:

- Assisting supply chain managers in responding to the growing trends towards sustainability issues and attention to environmental and societal issues, especially in Arab countries.
- Helping business organizations develop competitive advantages resulting from improved financial performance as a result of adopting and applying sustainable supply chain practices.
- Helping business organizations carry out their social and environmental responsibilities and improving their image in society in general.
- Following up on recent studies in the field of supply chain management, which tended to study the transformation from traditional supply chain practices to adopting modern practices that take into account the current environmental and societal dimensions.
- The research is an extension of the growing trend of research in the field of supply chain management by linking supply chain practices and activities, sustainability practices, environmental conservation issues, and scarce resources from a holistic perspective.

Research Questions:

- What is the impact of economic sustainability on the environmental performance of Fuel stations in the Kingdom of Saudi Arabia?
- What is the impact of Environmental sustainability on the environmental performance of Fuel stations in the Kingdom of Saudi Arabia?
- What is the impact of Social sustainability on the environmental performance of Fuel stations in the Kingdom of Saudi Arabia?

Research Objectives:

- Determine the impact of economic sustainability on the environmental performance of Fuel stations in the Kingdom of Saudi Arabia.
- Determine the impact of Environmental sustainability on the environmental performance of Fuel stations in the Kingdom of Saudi Arabia.
- Determine the impact of Social sustainability on the environmental performance of Fuel stations in the Kingdom of Saudi Arabia.

Research Hypothesis:

H1: There is a significant positive effect of Economic sustainability on the environmental performance of Fuel stations in the Kingdom of Saudi Arabia.

H2: There is a significant positive effect of Environmental sustainability on the environmental performance of Fuel stations in the Kingdom of Saudi Arabia.

H3: There is a significant positive effect of Social sustainability on the environmental performance of Fuel stations in the Kingdom of Saudi Arabia.

Research Model:

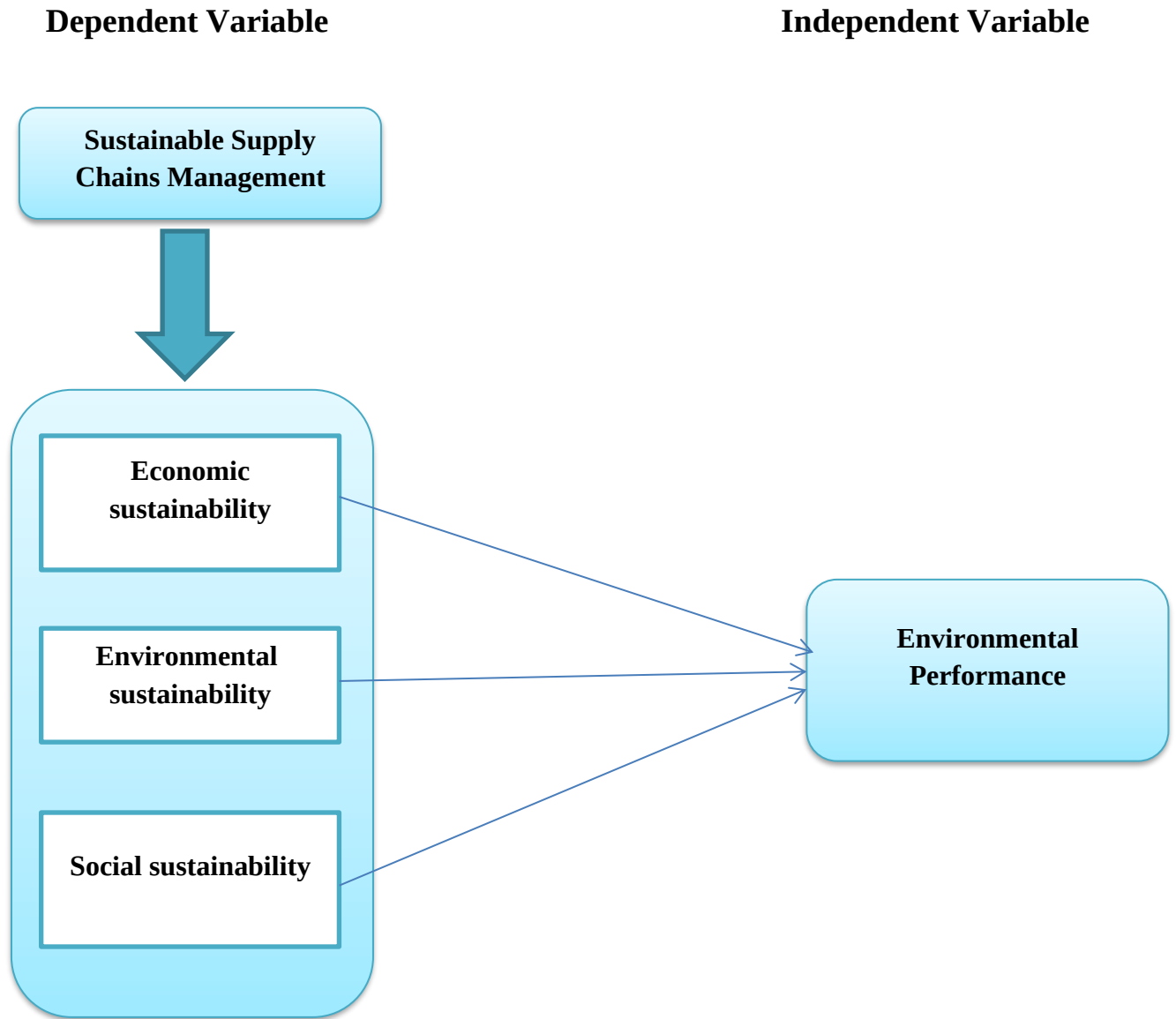


Figure 1: Research Model.

Timeline Table:

Assignment	Weeks											
	1	2	3	4	5	6	7	8	9	10	11	12
#1												
#2												
#3												
#4												

Chapter Two

Literature Review

In this part, the researcher will discuss previous studies that dealt with the study variables of sustainable supply chain and environmental performance, and they will be presented from oldest to newest, where the relationship between both the independent variable and the dependent variable will be clarified as follows:

1. (Esfahbodi et al., 2016): "Sustainable supply chain management in emerging economies: Trade-offs between environmental and cost performance".

This study links SSCM practices and organizational performance by developing and empirically evaluating an integrated SSCM performance framework supported by the Resource Dependence Theory (RDT). This study applies the RDT tenets to comprehend how businesses leverage the resources of their partners to adopt SSCM practices and handle the performance consequences. through an empirical investigation of 128 manufacturing companies—72 in China and 56 in Iran—this study analyzed and evaluated how the implementation of SSCM affected cost and environmental performance in these two developing economies. The results of a multiple regression analysis indicate that these two growing economies have more things in common than things in different ways. The findings show that while adopting SSCM procedures raises environmental performance standards for Chinese and Iranian businesses, it does not always translate into better cost performance. Our findings imply that in order to minimize trade-offs between cost performance and environmental sustainability, businesses operating in emerging countries should approach SSCM programs with a more comprehensive focus on their financial bottom line.

2. (Costantini et al., 2017): "Eco-innovation, sustainable supply chains and environmental performance in European industries".

Green technology adoption and introduction are seen to be the most economical ways to lessen environmental impact without sacrificing economic competitiveness. Although the scientific literature has highlighted the critical role that green technology diffusion channels play throughout the supplier value chain, there are few actual quantitative studies regarding the efficacy of green technologies in enhancing environmental performance. This paper's goal is to draw attention to

how inter-sectoral relationships shape how eco-innovations affect sectoral environmental performance. Empirical research demonstrates that Eco innovations have both direct and indirect benefits on reducing environmental stress, and that the degree of these effects changes along the value chain based on the technology used and the kind of pollutant being studied. First, corporate and policy governance strategies should explicitly address the objective of maximizing environmental gains that can be achieved through the development and adoption of clean technologies along the supply chain. Secondly, both strategies should be coordinated in order to minimize the costs for reducing environmental pressures. These are the main conclusions that can be drawn from this.

3. (Wang & Dai, 2018): "Sustainable supply chain management practices and performance".

This research aims to provide a substantial empirical contribution to the field's understanding of how Chinese enterprises' performance is affected by sustainable supply chain management (SSCM) methods. A thorough SSCM practices and performance model are also intended to be theorized and empirically evaluated in this study. The model analyzes the effects on corporate sustainability performance from all angles, taking into account the two SSCM practice components of internal and external management. This study creates a conceptual model to look into how SCM practices affect the performance of the company. This article uses PLS structural equation methods to assess the effects of SSCM practices on firm economic performance, environmental performance, and social performance for each dimension based on data from 172 Chinese enterprises. The findings demonstrate that a company's internal SSCM procedures improve both its social and environmental performance. Furthermore, there exists a positive correlation between economic performance and environmental and social performance.

4. (Wang et al., 2018): "Moderating the Role of Firm Size in Sustainable Performance Improvement through Sustainable Supply Chain Management".

The study of sustainable supply chain management (SSCM) for businesses has significant practical value in light of the Chinese government's policy for sustainable development. Using hierarchical regression analysis using SPSS 22.0, the model examined the moderating effect of firm size on the SSCM practices and the sustainable performance of the firms (economic, environmental, and social), drawing data from 172 Chinese enterprises. The findings imply that the environmental and

social performance of the company is positively correlated with the use of SSCM techniques and business size. The impact of SSCM techniques on economic performance is mitigated by firm size. Furthermore, major businesses' financial performance is significantly improved by SSCM internal processes; small and medium-sized businesses' (SMEs) financial performance is not as greatly affected. Firm size is identified as a moderating factor in the entire SSCM practice performance model that is proposed in this paper. SSCM is implemented and recommended for varying firm sizes based on studies on the moderating influence of firm size.

5. (Acquayea et al., 2018): "A quantitative model for environmentally sustainable supply chain performance measurement".

The current work proposes a comprehensive environmental sustainable performance measurement model supported by industrial lifecycle thinking, by utilizing the power of a Multi-Regional Input–Output framework to handle the intricate and global nature of supply chains. In an effort to address some of the methodological and applied measurement issues, some theoretical insights are thus offered and an empirical application of the model to the Metal Products industry of the BRICS (Brazil, Russia, India, China, and South Africa) nations is undertaken. This, in particular, made it possible to simulate the patterns in carbon emissions over a 20-year period (1992–2011) both within and between the BRICS countries and with the rest of the world, and it also gave rise to speculation on how well these countries will perform in terms of carbon emissions in the future. Analyses conducted specifically on the Metal Product industry revealed that the primary cause of the rising carbon footprint is demand. Nonetheless, technologically-driven efficiency gains and reductions in emissions intensity were the main causes of the overall drop in reported carbon footprint. The report also evaluates how imports and economic expansion affect carbon footprint and talks about how the findings may affect the BRICS countries' sustainable transition procedures.

6. (Somjai et al., 2019): "The Trade-off between Cost and Environmental Performance in the Presence of Sustainable Supply Chain".

Examining the trade-off between cost performance and environmental performance in the context of a sustainable supply chain is the primary goal of the current study. The study has specifically looked at the effects on costs and environmental performance of implementing sustainable supply chain practices, such as sustainable manufacturing, distribution, procurement, and reserve

logistics. The question of whether or not SSCM operations may improve a firm's profitability and financial performance has been raised in the study. In the context of developing economies, research is scarce. On the other hand, a wealth of research on industrialized economies exists. Understanding how SSCM programs affect the sustainability of manufacturing in developing nations is important. It is imperative to comprehend the correlation between SSCM projects and performance in growing regions, such as Indonesia. The theoretical underpinning and hypothesis of the current investigation have been supported by the study's findings. Policymakers and practitioners will find the current study useful in understanding the problems associated with supply chain performance and the implementation of sustainable supply chains. As far as the author is aware, this is one of the very few groundbreaking works on the subject.

7. (Andalib Ardakani & Soltanmohammadi, 2019): "Investigating and analyzing the factors affecting the development of sustainable supply chain model in the industrial sectors".

Supply chains are under more pressure to be sustainable as a result of the rising demands for goods, which have a detrimental impact on the environment and society by exacerbating environmental and social disasters. Owing to the importance of sustainability, this study proposed a conceptual model based on six hypotheses in an effort to explore the factors that motivate sustainable supply chain management. 91 industry experts answered an 18-item questionnaire, and partial least squares path modeling was used to analyze the data. Path modeling results showed that green supply chain management and environmental performance management can effectively address social issues through green product creation. Furthermore, it was discovered that the green supply chain management has a direct impact on environmental performance management. As a result, several conclusions about the value of sustainable supply chain management and manager practices were made.

8. (Baliga et al., 2019): "Sustainable supply chain management practices and performance".

The goal of this research is to create an integrated study that makes use of the antecedent-activities-performance principles to identify the factors that motivate supply chain management (SSCM) practices and the effects these practices have on the performance of sustainable supply chains. The study is important because the Indian government is working hard to grow the manufacturing sector, and one of the key requirements for Indian manufacturing to remain competitive

internationally is sustainability. A comprehensive literature analysis informed the development of the survey instrument, which was used to poll 211 functional heads and managers of operations and supply chains in the Indian manufacturing sector. Confirmatory factor analysis was used to validate the scales, and then Amos 20.0 structural equation modeling was used to establish the structural relationships between the components. With the exception of the relationship between LM and social practices in the SCM, the results of the SEM indicate that the antecedents, or motivators, LM and SM, have a significant impact on environmental and social practices in the SCM. These practices also have a positive relationship with SSCM performance, with acceptable goodness-of-fit measures. Therefore, it may be claimed that seven of the eight hypotheses are statistically significant.

9. (Ni & Sun, 2019): "The effect of sustainable supply chain management on business performance: Implications for integrating the entire supply chain in the Chinese manufacturing sector".

An integrative method for examining supply chain management's (SSCM) impact on company performance is presented in this study. The concept of SSCM was put forth in three dimensions: outbound, internal, and inbound sustainability. Partial least squares structural equation modeling was used to test the conceptual model within the framework of China's manufacturing industry. The findings demonstrated that whilst internal and inbound sustainability had an indirect impact on business performance, outbound sustainability had a direct relationship with it. Additionally, the model showed that the relationship between internal and outbound sustainability was strengthened by customer integration. The findings indicated that while examining the relationship between SCCM and business success, the supply-side and demand-side sustainability had distinct roles and that the complete supply chain should be integrated. The realization of demand-side value creation was the only way to attain company performance, since a supply-side collaboration advantage was important but insufficient. The results highlight the unique functions of each SSCM dimension and the significance of supply chain integration.

10. (Tran et al., 2020): "The impact of supply chain quality integration on green supply chain management and environmental performance in Vietnam's tourism industries".

This research aims to evaluate the effects of supply chain quality integration on financial performance, environmental performance, and green supply chain management. An analysis was conducted on 568 tourism-related enterprises in Vietnam. Software such as SPSS 22 and Smart

PLS 3.6 were used to analyze the results. The findings demonstrate that financial performance and green supply chain management were positively impacted by supply chain quality integration. Financial and environmental performance both benefited from green supply chain management. In the relationship between supply chain quality integration and financial performance, green supply chain management also fully mediated. However, there was no moderating effect of scale or institutional pressure on the relationship between financial and environmental performance and green supply chain management.

11. (Taghipour & Beneteau-Piet, 2020): "Sustainable Supply Chain Management Performance".

More than ever, sustainable supply chain management is a crucial topic to discuss. Businesses must incorporate environmental concerns, such as global warming, into their management for a number of crucial reasons, including maintaining a positive brand image, cutting operating expenses, and complying with legal requirements. In this review, we'll examine how the literature has emphasized the idea of sustainable supply chain management (SSCM) and what approaches have been suggested to support businesses in addressing issues related to sustainable development. It will become apparent that three crucial elements must be taken into account. The literature refers to them as "the triple bottom line approach" and they include social, environmental, and economic factors. This process will be examined in order to gauge how well a business employing SSCM as a management approach performs.

12. (Narimissa et al., 2020): "Evaluation of sustainable supply chain management performance: Dimensions and aspects".

Over the last ten years, businesses have realized that in order to make their supply chains more competitive, they need to use effective methods. As a result, a sustainable supply chain perspective has evolved from the old supply chain viewpoint. Improved performance is an advantage for organizations that prioritize sustainability. Sustainability deployment is required to identify the aspects and second layer of sustainability in addition to the primary sustainability dimensions, such as the social, environmental, and economic dimensions, in order to categorize the supply chain indicators. Research has demonstrated that the distinction between the dimensions and elements of sustainability is not given due consideration in the crucial paradigm of sustainability. Consequently, taking into account the function and impact of sustainability's dimensions and features is crucial for facilitating the implementation and evaluation of sustainability. Two primary

and useful goals guide the conduct of this paper. First, the literature's lack of conflicts has been highlighted by examining and identifying the dimensions and elements of sustainability. Second, based on the opinions of experts, the most crucial sustainability dimensions and elements are determined in one of Iran's oil businesses' supply chains. The findings of this study will help the researchers take sustainability into account and enhance the relevant industry policies.

13. (Isnaini et al., 2020): "Moderating Effect of Supply Chain Dynamic Capabilities on the Relationship of Sustainable Supply Chain Management Practices and Organizational Sustainable Performance: A Study on the Restaurant Industry in Indonesia".

In the current study, the relationship between SSCM practices and organizational sustainable performance (OSP) indicators—that is, "economic performance, environmental performance, social performance"—in the Indonesian restaurant industry is examined, with an emphasis on the empirical moderating effect of supply chain dynamic capabilities (SCDC). A 78% response rate was obtained by employing the basic random sample technique to gather data from the 210 supply chain managers for this purpose. The results of this study also demonstrated that SCDC considerably modifies the relationship between OSP and SSCM practices in Indonesia's restaurant business. This demonstrates that SCDC is regarded as the study's major contribution. Furthermore, adding to the body of knowledge are the theoretical and practical consequences of the current research. At the end of the study, the limitations and future directions are also highlighted.

14. (Kuwornu et al., 2023): "The adoption of sustainable supply chain management practices on performance and quality assurance of food companies".

This study looked at how food companies in Bangkok, Thailand, were able to ensure food quality and perform sustainably when they adopted sustainable supply chain management (SSCM) strategies. 126 food enterprises in Bangkok were given questionnaires to complete in order to gather primary data. To investigate the impact of both external and internal sustainable supply chain management techniques on sustainable performances, the Seemingly Unrelated Regression (SUR) method was employed. To investigate the impact of sustainable performances on the food company's quality assurance, Ordinary Least Squares (OLS) was utilized. The empirical outcome of the study showed that the financial, environmental, and social performances of the organizations are positively impacted by both internal and external SSCM strategies. Quality assurance is positively impacted by the sustainable performance metrics, which include environmental,

financial, and social aspects. This report offers suggestions for Thai food companies looking to implement SSCM processes.

15. (Bentalha, 2024): "Sustainable Supply Chain Management in Tourism: An Understanding of the Prospective Possibilities of Environmental Performance".

Ensuring long-term social, economic, and environmental stability is the goal of sustainable logistics management, which promotes long-term sustainable growth. The use of sustainable logistics techniques in the management of logistics associated to tourism is being driven by the worldwide push towards sustainable development, with an emphasis on achieving environmental performance targets. As a result, the subject of tourism logistics operations is receiving more and more theoretical and practical attention. This chapter looks at how service organizations' environmental performance is affected by sustainable tourism supply chain management. The authors examine the connection between environmentally friendly logistical methods in tourism and their impact on environmental performance using a prospective approach. The results show that the responsible supply chain in the tourism sector may function more efficiently when logistics resources are integrated, cooperative, and shared.

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Appendices

Questionnaire for Research Variable

Section one: Demographic Information				
Gender	Male	Female		
Job title at work	Owners	Manager		
Length of Work in the Company	2 to < 5 years	5 to < 8 Years	8 to < 10 Years	Ten years over
Number of Workers Fuel Station	20 to < 60 Employees	Over 100 Employees		

Section two: Independent variable: Sustainable Supply Chain Management

No	Question	5 Likert Scale				
		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Economic Sustainability						
1	Fuel Station's material procurement costs have decreased					
2	Fuel Station's energy consumption costs have decreased					
3	Fuel Station's waste management charges have decreased					
4	Fuel Station has reduced the charges paid for the disposal of wastes					
Environmental Sustainability						
1	Fuel Station reduced the amount of wastewater					
2	Fuel Station reduced the amount of solid waste					
3	Fuel Station reduced the number of environmental accidents					
4	Fuel Station improved its environmental management system and practices					
Social Sustainability						
1	Fuel Station implements occupational health and safety, work standards compliance, and audit systems for our supply chain partners					
2	Fuel Station develops systems of professional ethics with our supply chain partners					
3	Fuel Station and supply chain partners have reduced the health risk that consumers may encounter					

4	Fuel Station has benefited employees throughout the supply chain					
5	Fuel Station and supply chain partners have reduced occupational safety and health risks in new products/processes developed over the last two years					
6	Fuel Station carries out supply chain strategy changes that minimize adverse impacts					

Section three: Dependent Variable: Environmental Performance

No	Question	5 Likert Scale				
		Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
Environmental Performance						
1	Fuel Station has reduced consumption of hazardous/toxic material					
2	Fuel Station has reduced air emissions					
3	Fuel Station has reduced effluent wastes					
4	Fuel Station has sought to improve its environmental image/position					
5	Fuel Station has reduced energy consumption					

Table of Research Instruments

Research Tool	Questionnaire
Parts of Questionnaire	1. Part one (Demographic variables). 2. Part two (Dependent variable): Sustainable supply chain management. 3. Part three (Independent variable): Environmental Performance.