Sustainable Supply Chain Management and Environmental Performance: A Study of Retail Fuel Stations in Rivers State, Nigeria.

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Abstract
This research investigates the relationship between sustainable supply chain management practices and environmental performance. The data collection instrument used was a questionnaire which was administered to a total sample of 200 managers in retail fuel stations in Rivers State. The response rate was 62%. Sample selection was based on convenient sampling technique. The analysis involved statistical methods such as reliability and validity tests and correlational test. The research findings supported the hypotheses that economic sustainability is positively related to environmental performance, environmental sustainability is positively related to environmental performance and social sustainability is positively related to environmental performance. The study recommends that, managers of retail fuel stations should adopt sustainable supply chain practices that will enhance environmental performance

Keywords: *Environmental performance, Nigeria Retail fuel stations, Sustainable supply chain*

Introduction

Research areas linked to supply chain management has sprang up, such as sustainable operations (Gimenez et al, 2012; Kleindorfar et al; 2005), sustainable logistics (Lee et al, 2010; Frota et al., 2008), reverse logistics and closed loop supply chains (Dekker et al; 2013; Roger & Tibben-lembke, 2001) and sustainable supply chains (Seuring & Muller, 2008; Linton et al., 2001). Seuring and Muller (2008:p,1700) defined sustainable supply chain as "the management of mutual information and capital flows as well as cooperation along the supply chain while taking goals from all three dimensions of sustainable development, (i.e., economic, environmental and social) into account which are derived from customer and stakeholder requirements

The issue of sustainable supply chain management in promoting environmental performance has always attracted the attention of scholars and practitioners in the field of management science (Yu & Ramanathan, 2017; Kim & Chai, 2017; Esfahbodi, 2016; Golicic & Smith, 2013; Zhu, Sarkis & Lai, 2012; Shi, et al., 2012; Hollos, Blome & Foerstl, 2012). Some

scholarly inquiries (e.g., Walker & Jones, 2003; Rao, 2005) and recent ones (e.g., Kim & Chai, 2017; Esfahbodi, 2016; Golicic & Smith, 2013) report on how the influence of sustainable supply chain management have advanced environmental performance in organizations. These studies conceptualized three constructs of sustainable supply chain management (economic, environmental and social), but none took their bearings from the downstream retail fuel station. Besides, there is an absolute dearth of scholarly inquiries that simultaneously measured sustainable supply chain management alternatives (economic, environmental and social) against environmental performance. Therefore, this study bridged such knowledge gaps by proposing a framework of three dimensions of sustainable supply chain management and examines the relationship of each on environmental performance of retail fuel stations in Nigeria.

Statement of the Problem

A retail fuel station is defined as a factory where fuel and lubricants for automobiles are sold. (Afolabi et al., 2011). Retail fuel stations sell petrol, liquefied natural gas (LNG), diesel, kerosene and motor oil. Modern societies function on the wheel of efficient oil supply (Briggs et al., 2012). Therefore, in many countries there is the existence of retail fuel stations as a result of urban growth (WHO, 2010; UN, 2010). The consequence of this is that the health of people in this area is adversely affected due to incessant vapor emissions. Products sold by the retail fuel stations especially petrol, consists of volatile organic elements like benzene which are flammable and capable of releasing vapor even at low temperature. Some empirical studies revealed that the inhalation of benzene exposed to the environment causes cancer of the lungs, brain and stomach leukemia, mucous membrane irritation, dermatitis, bone marrow depletion and heart attack (HSE, 2002; IARC, 1982; Hunter, 1966).

The retail fuel stations belong to the oil and gas supply chain. The oil and gas supply chain consists of three sectors: upstream, midstream and downstream (Briggs & Tolliver, 2012; Briggs et al., 2012; Schweitzer et al., 2011; Weijermans, 2010). The downstream sector is responsible for selling of products that cause emission in the course of their use or deposit. Larzen and Murray (2010) noted that the downstream sector is introduced and powered by sale which is accompanied with associated emissions that would have been made visible differently. The retail fuel station is thus not immune to instances of environmental degradation that characterize product deliveries and dispensing. Hence, sustainable supply chain management will also be an integral facet of the industry. However, much is not known about the sustainable supply chain management practices of firms in the industry, and how such practices enhance environmental performance. It may not be out of place to suspect that the retail fuel stations do not have enshrined sustainable supply chain management practices that deliver favourable environmental performance.

The present study, therefore, leaves this important question unanswered: To what extent does sustainable supply chain management influence the environmental performance of retail fuel stations in Nigeria? In other words, how does sustainable supply chain management influence the environmental performance of retail fuel stations in Nigeria? This constitutes the problem of the study. The concern for this problem is comprehensible because of the existing and continuance effect it will have on the retail fuel stations and the society at large if it is not neutralized.

Thus, with a view to complementing the body of knowledge on sustainable supply chain management practices and environmental performance, the current study seeks to investigate the link between the variables; using economic sustainability, environmental sustainability

and social sustainability on environmental performance. It is the considered view of this paper that a study of this nature is needed especially in view of the current environmental conditions in Nigeria; which has underscored the need for retail fuel stations to enhance their environmental performance.

Literature Review and Hypotheses

Sustainable Supply Chain Management

Since its beginning to date, sustainability has emerged in very many distinct ways in distinct contexts and disciplines (Shrivastava, 2010; Hoffman & Bazerman, 2005; Filho, 2000). The first internationally recognized definition of sustainability according to Pisani (2006) emanates from the World Council of Environment and Development (WCED) who defined sustainability as "the development that meets the needs of the present generation without compromising the ability of the future generations to meet their own needs" (WCDE, 1987: P.14). The definition envelops two prime concepts that of 'needs" specifically, the essential needs of the global poor, which must be addressed accordingly and the restrictions brought about by the state of technology and social organization on the environments ability to meet immediate and distant needs. The application of sustainability in contemporary times is a way of finding solution to contemporary environmental crisis and that may guarantee that production does not decompose resources beyond point of renewal (WCED, 1987). This implies that what we do today have corresponding impact on future generation (Bell & Morse 1999). Sustainability is dimensioned along economic sustainability, environmental sustainability and social sustainability.

Carter and Rogers (2008) define sustainable supply chain management as "the strategic transparent integration and achievement of an organization's social environmental and economic goals in the systemic coordination of key inter-organizational business processes for improving the long-term economic performance of the individual company and its supply chains." This study adopts the definition of Carter and Rogers (2008).

Dimensions of Sustainability Supply Chain Management

Economic Sustainability

Economic sustainability alludes to the use of resources in an impressive manner in order to furnish long term significant impact through reducing negative effects of resource exploitation. Tsai et al. (2009) noted that economic stability is not only favaurable returns on investment but also guaranteeing that the actions of organizations do not lead to any form of environmental or social degradation. Dyllick and Heckerts (2002; p:133) State "Economically sustainable companies guarantee at any time cash flow sufficient to ensure liquidity while producing a persistent above returns to their shareholders" Hence, attaining sustainability requires that economic records keeping systems must mirror ecosystems resources (Constanza, 1991).

Environmental Sustainability

Environment is a major dimension of sustainability. It is a collection of the constraints of the four key activities on which the scale of the human economic subsystem is conducted: the utilization of renewable and non-renewable resources on the source side, and pollution of waste assimilation on the sink side (Goodland, 1995). Walker and Jones (2012) posit that the environment is under increased ruin since creation. The needs for sustainability emanate from the way natural resources is wasted (Shrivastava, 2010; Brown & Bassant, 2003). In the existing business world, corporate survival hinges on the levels at which organization considers integrating the aspects of environment in their supply chains (Buyukozkan & Cifei,

2010).

Social Sustainability

Social sustainability handles the relationship between human rights and human development, corporate power and environmental justice, global poverty and citizen action, responsible global citizenship in an envelope component of what may at first sighting appear to be easy matters of personal consumer or moral choice (Blewitt, 2008). Socially responsible companies are the ones that integrate their operational activities, social ethnics and environmental interests more advanced than those required by law (Dyllick & Hockerts 2002) and whose outcome may lead to an enhanced quality of life for most corporate stakeholders (Kaynak & Monttal, 2009; Labuschagne et al., 2004).

Environmental Performance

Environmental performance entails the reduction of the environmental harm caused by business activities and the protection of the natural environment. Thus, companies are expected to abate and regulate the use of natural resources and energy to minimize or exclude the production of waste and pollutants during and after the production process; companies can also expound modern environmentally compatible products that reduce their ecological trace (Albertini, 2013).

Related Empirical Studies on Sustainable Supply Chain Management and Environmental Performance

Empirical literature offers rich perception into the implicit designs of sustainable-based supply chain relations for improving environmental performance (Yu & Ramanathan, 2015; Zhu et al., 2013; Zhu & Sarkis, 2007). The existing literature posits that the adoption of environmental management programme in line with the supply chain and the implementation of sustainable supply chain management (SSCM) practices specifically, can enrich companies environmental performance (Zhu & Sarkis, 2007; Rao, 2005). For example. Vachon and Klassen (2008) found a significant positive association between the implementation of SSCM actions and enhancement in environmental performance. Zhu and Sarkid also found that the adoption of eco-design actions inside supply chain management contexture can lead to enhancement in environmental performance. Other studies seem to agree on a positive association between adoption of SSCM practices and environmental performance (Zhu et al. 2012; Hollos et al., 2012). Essentially, the environmental performance in this study refers to the environmental influence minimization, subject to the implementation of SSCM practices.

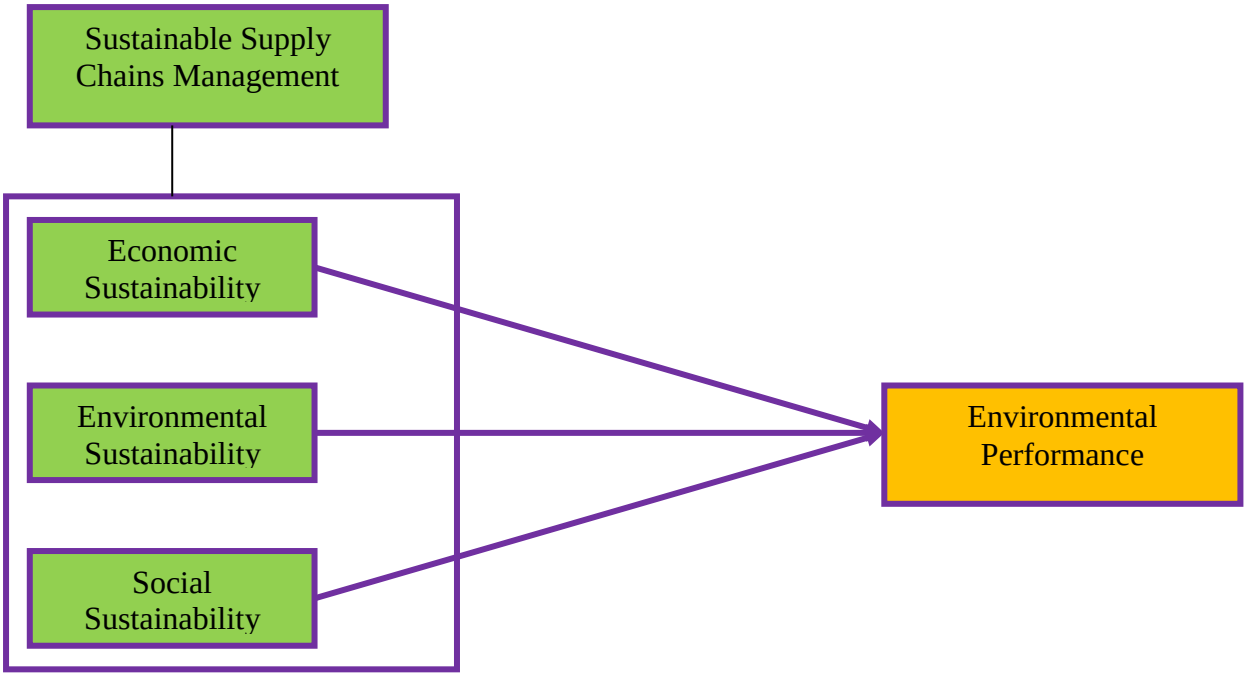

Figure 1: Proposed research framework
Source: Adapted from Carter and Rogers (2008).

This study investigates the relationship between sustainable supply chain management and environmental performance. Based on the research framework in figure 1, sustainable supply chain management encompasses economic sustainability, environmental sustainability and social sustainability are significantly related to environmental performance.

Hence, the following hypotheses will be tested:

H1*: Economic sustainability is positively related to environmental performance.*

H2*: Environmental sustainability is positively related to environmental performance.*

H3: *Social sustainability is positively related to environmental performance.*

Research Methodology
Sampling and data collection
The study is based on the perspective of retail fuel stations in Nigeria with implementation of sustainable supply chain management. Data were collected using questionnaire survey which was administered to a total of 200 managers of retail fuel stations in Rivers State, classified by job title and job functions as purchasing, distribution/logistics, SCM, transportation, material, and operations. The respondents were asked to indicate on a 5-point Likert scale anchored on 1(strongly disagree) to 5(strongly agree) on the extent to which sustainable supply chain management practices relates with environmental performance. The Cronbach's alpha was conducted to access the reliability of each scale. Alpha values over 0.7 indicate that all scales are considered reliable (Nunnally, 1978).

Correlation Analysis
The correlation is between independent and dependent variables: The independent variable is sustainable supply chain management that encompasses economic sustainability,

environmental sustainability and social sustainability, while the dependent variable is environmental performance. The test of hypotheses is given below.

Table 1: Correlation Analysis showing the direction and strength of the relationship between economic sustainability and environmental performance.

Correlations **n=200**

Variables	**Statistics**	**Economic Sustainability**	**Environmental Performance**
Environmental Performance	Pearson's correlation Sig. (2-tailed) N	1.000 200	.483^{xx} .000 200
Economic Sustainability	Pearson's correlation Sig (2-tailed) N	.483^{xx} . 000 200	1.000 200

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

Table 1 shows that the Pearson's r = 0.483. Thus shows that a moderate relationship exists between economic sustainability and environmental performance. The significant/probability value (pv) = 0.000 < 0.05. Therefore the researcher concludes that a significant positive relationship exists between economic sustainability and environmental performance.

Table 2: Correlation Analysis showing the direction and strength of the relationship between environmental sustainability and environmental performance

Correlations **n=200**

Variables	**Statistics**	**Environmental Sustainability**	**Environmental Performance**
Environmental Performance	Pearson's correlation Sig. (2-tailed) N	1.000 200	.415^{xx} .000 200
Environmental Sustainability	Pearson's correlation Sig (2-tailed) N	.415^{xx} . 000 200	1.000 . 200

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

Table 2 shows that the Pearson's (r) = 0.415**. This shows that a moderate relationship exist between environmental sustainability and environmental performance. The significant/probability value (pv) = 0.001 < 0.05. Therefore, the researcher concludes that a significant, moderate and positive relationship exist between environmental sustainability and environmental performance.

Table 3: Relationship between social sustainability and environmental performance

Correlation

Variables	Statistics	Social Sustainability	Environmental Performance
Environmental Performance	Pearson's correlation sig. (2-tailed) N	1.000 . 200	.560** .000 200
Social Sustainability	Pearson's Sig(2-tailed) N	.560** .000 200	1.000 .000 200

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

The information in table 3 reveals that a moderate relationship exist between social sustainability and environmental performance (r= 0.560**). The relationship is also significant (significant/probability value (pv) = 0.000 <0.05) hence, the researcher concludes that a significant and positive relationship between social sustainability and environmental performance.

Results

In this study, the following outcomes were obtained: The correlation analysis showed that sustainable supply chain management in terms of economic sustainability; environmental sustainability and social sustainability are related to environmental performance. For hypothesis 1, this study found a significant relationship between economic sustainability and environmental performance, while hypothesis 2 assessed the relationship between environmental sustainability and environmental performance, findings show there is a significant relationship. Hypothesis 3, considered the relationship between social sustainability and environmental performance and testing found that there is a significant relationship.

Discussion

The aim of the research presented in this study was to contribute to the knowledge on sustainable supply chain management and environmental performance. Research finding showed that 39% of the respondents indicated that their companies have not embarked upon a programme aimed specifically at implementing sustainable supply chain management practices. Of the remaining 61% of the respondents indicated that their companies embarked on a sustainable supply chain management program they are aware of the presence of regulatory bodies.

The result on the test of hypotheses demonstrates that the three hypotheses proposed in the study have moderate, positive and significant relationships between the predictor and criterion variables, hence are accepted. The first hypothesis has a moderate, significant and positive relationship with environmental performance. This result reflects the ability and efficiency of the managers in retail fuel stations to be environmentally conscious in performing the activities which are related to the economic dimension of SSCM to achieve environmental performance. This finding is consistent with Constanza (1991) assertion that attaining sustainability requires that economic records keeping systems must mirror ecosystems resources.

A moderate, positive and significant relationship was observed between environmental sustainability and environmental performance. The results revealed that this dimension of SSCM reasonably predicts the behaviour of environmental performance and explains the least effect on environmental performance. This result is in line and support that of Vachon and Klassen (2008) who found a significant positive association between the implementation of SSCM actions and enhancement in environmental performance.

Finally, the third hypothesis depicts clearly that social sustainable dimension of SSCM explained the highest effect on environmental performance, and has a strong positive relationship with environmental performance. This finding is in agreement with Dyllick and Hockerts (2002) who affirm that socially responsible companies are the ones that integrate their operational activities, social ethnics and environmental interests more advanced than those required by law.

Conclusion and Recommendation

The purpose of this study was to empirical examine the relationship between sustainable supply chain management and environmental performance in retail fuel stations in Rivers State. The findings of this study affirm that the components of sustainable supply chain management have moderate, positive and significant relationship with environmental performance. The findings of this study assure supply chain practitioners and managers that sustainable supply chain management practices do have a strong impact on environmental performance. The H1, H2 and H3 were all statistically tested and accepted indicating that supply chain sustainability in all dimensions, namely, economic, environmental and social relates positively and significantly with environmental performance. The study therefore, recommends that, managers of retail fuel firms should adopt sustainable supply chain practices that will enhance environmental performance.

Limitations and Contributions

The conduct of this study witnessed a major limitation, the unwillingness of the respondents to respond to the research questionnaire posed a limitation in terms of sample size intended by the researchers.

However, this study has contributed in the growing number of literature in sustainable supply chain management. Overall, this study contributes to knowledge of the role of sustainable supply chain management in enhancing environmental performance in the supply chain of retail fuel stations, as it proposed a theoretical framework that identified sustainable supply chain management and environmental performance.

Further, the findings demonstrate to supply chain practitioners and managers the essence of sustainable supply chain management and proves that the measurements developed in this study can capture the different aspects of sustainable supply chain management, thus not only enabling managers of retail fuel stations to identify the immediate outcomes of it, but also to understand its impact on environmental performance.

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