

Impact of Relationship Marketing on Green Supply Chain Management (GSCM): An Empirical Study in the Oil and Gas Industry in Port Harcourt

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Abstract: *The amount of carbon foot print emitted in the supply chain of the downstream sector of the oil and gas industry is overwhelming but has received little attention. This study empirically investigates the impact of relationship marketing on green supply chain management in the downstream sector of the Nigerian oil and gas industry. The result is intended to acquaint government and players in the oil and gas industry to ascertain the level of awareness of green supply chain management in the downstream sector of the oil and gas industry. The SPSS 21 was used. The statistical tools employed in the analysis were descriptive statistics, Pearson's Correlation and multiple regression. A survey of 132 businesses in the sector revealed that 69.7% understood what greening the supply chain imports while 30.3% were not acquainted. The result also revealed that there is a significant correlation between the relationship marketing variables (perceived transaction quality, perceived trust, perceived satisfaction and perceived commitment) and green supply chain management. The result also found that perceived trust in the supply chain is more effective in influencing the adoption of green supply chain management. Based on these findings, the authors suggest implications for the players.*

Keywords: *relationship marketing, green supply chain management*

I. Introduction

A careful perusal of available literature indicates that the petroleum sector has contributed immensely to any nation [1;2]. The petroleum sector has almost become inextricably tied to modern life as all modern technological advancements have direct or indirect need of petroleum. To this end, operations in the petroleum industry affect every fabric of the society. [1] opine that the petroleum sector is made up of upstream and downstream operators. According to them, the upstream operators comprises exploration and production; consultancy; marine and allied transport; engineering services and offshore construction; computer and communication equipment; supply and rental equipment; automotive and automobile accessories; electrical and electronics products; food drink and chemical products and industrial, hospital and agricultural products. The downstream operators include distribution, marketing and retail.

While government's efforts are exerted on the upstream sector to reduce gas flaring and other environmentally unsustainable practices, little is known in the downstream which comprises distribution, marketing and retail, activities. The use of smoking trucks and rickety vehicles to convey petroleum products, high energy consumption machineries contribute to Green House Gas (GHG) emissions. The environmental effects, according to [3] is that the ecosystem is affected by disrupting food and water supplies, submerging coasting wetlands and causing severe weather patterns and species extinction. In some cases, due to the old nature of the petroleum delivery trucks, incidents of falling tankers have razed down buildings and caused the untimely deaths of many. While there is a plethora of research on sustainable and green supply chain management in the advanced economies [3; 4; 5], there is a dearth of such studies in the developing economies especially in the petroleum sector. This study is therefore aimed at investigating the level of awareness of Green Supply Chain Management (GSCM) in the Nigerian petroleum sector and to empirically test how Relationship Marketing (RM) can drive GSCM in the downstream sector of the Nigerian petroleum industry.

II. Literature Review

The intertwining of activities from the production process to the final consumer has made the study of supply chain imperative as many actors play different roles in the value chain before the products get to the final consumer. According to [6], supply chain is defined as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole. Different authors have looked at the different aspects of supply chain. For instance, [7] consider the quality management dimension as comprising processes, inputs, machines,

people, procedures, plant, and equipment as a means of creating excellence in products and services. However, a new stream of researchers have focused on the aspect of environmental sustainability in the supply chain [8; 3;9; 10; 11], with other studies specifically looking at the environmental (green) dimension of supply chain in the oil and gas industry [1; 2].

2.1 Green Supply Chain Management (GSCM) in the oil and gas industry

[12] defines Green supply chain management as “integrating environmental thinking into supply-chain management including product design, material sourcing and selection, manufacturing process, delivery of final product to the consumers as well as end-of-life management of the product after its useful life.” [4] posit that GSCM comprises practices such as total quality management, lean supply chain management, reverse logistics, life cycle assessment and product stewardship while [9] argue that a firm’s commitment to greening its supply chain is demonstrated by how the firm manages lean production, reverse logistics, product development and design, and packaging. Due to increasing environmental awareness, firms embrace GSCM through regulation, support of top management and employees’ demand [8], and drive towards cost reduction, customer perception, public expectation and competition [1].

[1] found that UK oil and gas firms implement GSCM through the use of energy saving devices like sensors, low energy consumption equipment, reduction of air pollution, high health and safety standards, community development, health insurance, use of recycled materials, reducing amount of travel by members and encouraging meetings through teleconferencing.

2.3 Green Supply Chain Management and Relationship Marketing (RM)

The growth of SCM from the traditional, transactional and arms-length view to a relationship-based system in which partners see themselves as a collective entity with a common purpose has necessitated the adoption of relationship marketing. [13] defines RM as to “establish, maintain, and enhance relationships with customers and other partners, at a profit, so that the objectives of the parties involved are met. This is achieved by a mutual exchange and fulfillment of promises”, while [14] opine that RM is aimed at “establishing, developing and maintaining successful relational exchanges”. A successful relational exchange is underpinned by certain factors. These factors include transaction quality [15], trust [4], satisfaction [16;17], commitment [14;18]

2.3.1 Perceived Transaction Quality

[15] define transaction quality as a conjoint of complementary capabilities required to sustain confident and reliable transaction with partners and stakeholders, including planning, pricing, timing and problem solving.” [19] opine that quality is the comparison of expectation with outcome. When therefore the outcome is more than the expectation, the partner is said to experience a quality service. It has been argued that delivering quality service is considered essential strategy for success in a competitive market [20]. From the foregoing, a link can therefore be drawn between transaction quality and implementing GSCM. The pursuit of green policy will be actualized when the partners perceive quality transaction in their relationships. It is therefore hypothesized that:

H1: Perception of transaction quality is positively related to the implementation of GSCM in the downstream sector of Nigeria oil and gas industry

2.3.2 Perceived Trust

Trust is the cornerstone of exchange relationship [14;21]. According to [14] trust is seen “as existing when one party has confidence in an exchange partner’s reliability and integrity.” Trust is developed in an exchange relationship when the partners have confidence, reliability and integrity towards each other [20]. [4] argue that trust is an important element in a strategic supply relationships. [4] also opine that trust in the partners makes the supply chain more agile and responsive, improve commitment and the collaborative nature of the relationship which in turn improves performance. [22] posit that trust among partners in the supply chain results to greater adaptability and reduces governance costs. The link between trust and implementation of GSCM is further strengthened as trust, being an informal mechanism often leads to coordinated joint-efforts that lead to outcomes that exceed what the firm can achieve if it were merely acting on its interest alone (ibid). It is therefore hypothesized that:

H2: Perception of trust is positively related to the adoption GSCM in the downstream sector of Nigeria oil and gas industry.

2.3.3 Perceived Satisfaction

[15] argue that satisfaction is related to upholding or maintaining a relationship. [23] define satisfaction as the result of a cognitive and affective evaluation, where some comparison standard is compared

to the actually perceived performance. [24] posit that when customers are satisfied, it heightens customer loyalty and prevents customer churn, lowers customers' price sensitivity, reduces the costs of failed marketing and of new customer creation, reduces operating costs due to customer number increases, improves effectiveness of advertising and enhances business reputation. Satisfaction has been seen as an antecedent of relationship maintenance especially in the supply chain. Satisfied partners in the supply chain are therefore likely to embrace policies that seek to maintain the relationship. It is therefore proposed that:

H3: Perception of satisfaction is positively related to the adoption of GSCM in the downstream sector of Nigeria oil and gas industry

2.3.4 Perceived Commitment

[25] defines commitment as a consumer's conviction to maintain (rather than terminate) a relationship that might produce functional and emotional benefits. According to [26], commitment can be a source of competitive advantage to a firm as it enhances cost reduction, profits, positive word of mouth and the prospects of sales at a premium price. Different types of commitment have been proposed. For instance, [27] grouped commitment into instrumental and normative commitments. [28] classified commitment into continuous, normative and emotional. Additionally, [26] see commitment as classified into affective, calculative and normative. They argue that affective commitment results in a strong trusting relationship among partners in the exchange process. They further argue that it entails personal involvement and a reciprocal behaviour. They further maintain that calculative commitment obtains when partners calculate the gains and losses of remaining or terminating the relationship. The firm will terminate the relationship if the losses exceed the gain and vice versa. Finally normative commitment results into a sense of obligation. To this end, the social ties developed in the relationship are bound to keep the partners and mutual respect permeate the relationship. It is therefore argued that when the partners perceive commitment in the relationship, it will result to the adoption of green supply chain management. It is hereby proposed:

H4: Perception of commitment is positively related to the adoption of GSCM in the downstream sector of Nigeria oil and gas industry

2.4 Research Conceptual Framework

The model in Fig. 1 examines the relationship between GSCM and perceived transaction quality, perceived trust, perceived satisfaction and perceived commitment. It proposes that when partners in the supply chain perceive transaction quality, trust, satisfaction and commitment, they will adopt green supply chain management.

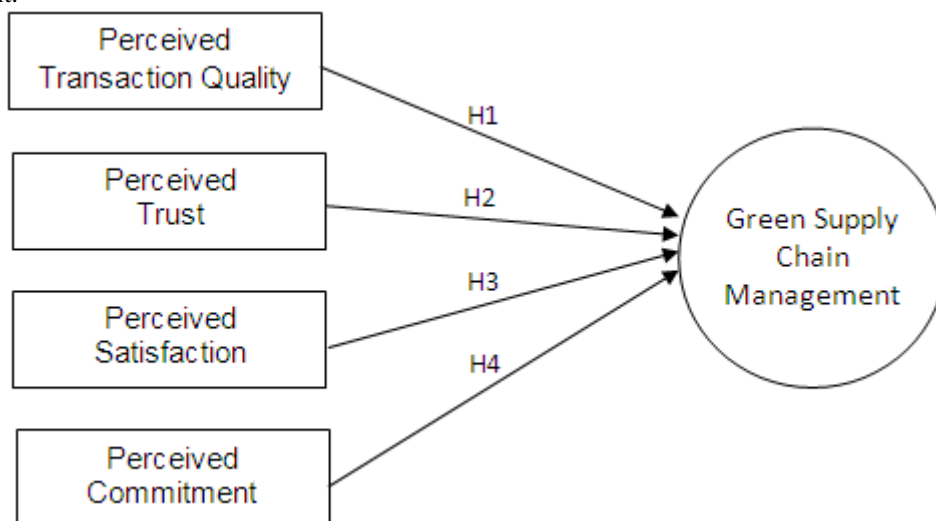


Figure 1 Research Conceptual Model

III. Materials and Methods

3.1 Population, Sample and Sampling procedure

Population for the study comprised businesses in the oil and gas within Port Harcourt. The study employed survey method of data collection. Convenience sampling was utilized since access to businesses proved difficult using a probability sampling method. 250 questionnaires were administered and out of that, 25 were badly filled, and could not be used while 93 were not returned, leaving a total of 132 which signify usable response rate of 52.8%. Respondents were visited in the refinery, petroleum depots and filling stations. Tanker

drivers, kerosene sellers and those engaged in ancillary services in the oil sector such as suppliers and caterers were also used.

3.2 Measurement and operationalization of variables

Instrument for measurement was divided into dependent and independent variables. Dependent variable included Green Supply Chain Management while independent variables comprised Perceived Transaction Quality, Perceived Trust, Perceived Satisfaction and Perceived Commitment. Existing scales from relevant literature were adopted and adapted for this study. Similarly, scales from [29;30] were used to measure Perceived Transaction Quality. Perceived Trust was measured with scales from [4]. Perceived Satisfaction was measured using scales from [16;17] while Perceived Commitment was measured with scales from [21]. Green Supply Chain management was measured with scales from [10]. A five-point Likert scale ranging from Strongly Agree = 5 to Strongly Disagree = 1 was used to measure each of the variables. Data analysis was done using SPSS 21. Tools used include descriptive statistics and multiple regression. Descriptive statistics was used to find out the demographic configurations of the respondents while multiple regression was used to test hypotheses.

IV. Results

Validity and reliability tests were conducted on the scales used for measurement. [31] bench mark model recommends at least a score of 0.70. However, [32] posit that Cronbach Alpha scores above 0.60 are also acceptable. See Table 1 for variables, number of items per construct and Cronbach’s Alpha.

Table 1: Reliability test for Cronbach’s Alpha

Variable	Number of Items	Cronbach’s Alpha
Perceived Transaction Quality (PTQ)	4	0.776
Perceived Trust (PT)	5	0.686
Perceived Satisfaction (PS)	4	0.698
Perceived Commitment (PC)	3	0.735
Green Supply Chain Management (GSCM)	6	0.764

Table 2: Descriptive Statistics for demographics

Demographics		Frequency	Valid Frequency Percent (%)
No. of employees	1-10	37	28
	11-20	50	37.9
	21-30	34	25.8
	31-40	10	7.6
	40 & Above	1	0.8
Company’s Annual Turnover	N5m-N10m	37	28
	N11m-N20m	50	37.9
	N21m-N30m	15	11.4
	N31m-N40m	18	13.6
	N41m-N50m	12	9.1
Business Sector	Marketing	70	53
	Distribution	51	38.6
	Retail	11	8.3
Do you know/understand what GSCM is all about?	Yes	92	69.7
	No	40	30.3

Table 3 Correlation of variables

	1	2	3	4	5
PTQ					
PT	.41*				
PS	.41*	.65*			
PC	.26*	.46*	.52*		
GSCM	.21	.49*	.36*	.39*	

* = statistically significant at p<.05.

Pearson’s correlation indicate that perceived transaction quality, perceived trust, perceived satisfaction, perceived commitment were significantly correlation with Green Supply Chain Management, $r = .21$, $r = .49$, $r = .36$, $r = .39$, respectively (all $ps < .001$).

A multiple regression analysis was conducted to determine the predictive power of the RM variables on GSCM. The assumptions of independence of errors, normality of residuals and Durbin-Watson were all met. Perceived Transaction Quality ($t(127) = -.15$, $p = .88$). Perceived Trust ($t(127) = 3.87$, $p < .001$), Perceived Satisfaction ($t(127) = -.03$, $p = .98$) and Perceived Commitment ($t(127) = 2.38$, $p = .02$). From the above,

hypothesis 2 was supported while hypotheses 1, 3 and 4 were not supported. The Standardised beta coefficients for the above result is shown in Table 4.

Table 4 Multiple Regression Analysis

Variable	B	SE _B	β
Constant	0.78	0.48	
PTQ	-0.02	0.12	-.01*
PT	0.50	0.13	.40*
PS	-.00	0.13	-.00*
PC	0.23	0.10	0.21*

Note: (DV = GSCM); B = unstandardized regression coefficient; SE_B = Standard error of the coefficient; β = standardized coefficient; R² = .28, (p<.001).

V. Discussion and Implications

5.1 Theoretical Implications

Many authors have pinpointed the role of trust among partners in the supply chain towards the implementation of green supply chain management [4;3;7]. Perceived transaction quality, perceived satisfaction and perceived commitment were all seen to have a directional relationship with the adoption of green supply chain management but their relationships with GSCM were not statistically significant. Trust like the aforementioned studies had a statistically significant relationship with the implementation of green supply chain management. Trust was followed by commitment on their influence on the adoption of green supply chain management. This also aligns with [15]. Since research on ‘greening’ the supply chain using relationship marketing in Nigeria is still at its infantile stage, this study serves as a reference point.

5.2 Managerial Implications

Reducing environmental degradation through the supply chains will go a long way in impacting the environment. Since Nigeria’s economy depends heavily on petroleum, the number of environmental wastes from the sector is much especially from the supply chain. This study cautions that partners in the downstream sector of the petroleum supply chain will adopt green practices when they perceive trust and commitment from the major partners. These major partners could be the Nigerian National Petroleum Corporation (NNPC) and its affiliates such as Refining companies, Pipelines and Products Marketing Company (PPMC) and Independent Petroleum Marketers. It is instructive to learn that if all these organisations have individual targets on the rate of carbon emission, the rest partners in the supply chain such as the filling stations, small size petroleum retail outlets will adopt their environmental policies if they perceive trust and commitment in their activities.

5.3 Limitations of the study and direction for future research

The nature of the job of those who responded to the questionnaire is always in a hurried nature. For that reason, the questionnaire was administered and retrieved on the spot. It is reasoned that if more time were given to the respondents, they could have given a more thoughtful response which might likely be different from the one which was done on the spot. Also, access to some principal actors in the supply chain was difficult and so the survey was administered to some whose businesses were peripheral to the petroleum industry. Finally, the scales used were developed by researchers in the developed economies. Scales developed from an emerging economy like Nigeria might yield a different result. It is therefore recommended that a research focusing on measurement development and validation on those constructs should be undertaken in an emerging economy.

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