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A Study of the Relationships between Quality of Management, Sustainable Supply Chain Management Practices and Performance Outcomes

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Abstract. Extant literature on SSCM practices have paid little attention to quality of management attributes that could influence sustainability implementation in supply chains. The aim of this study is to address this gap by examining the relationship between quality of management, SSCM practices, and business performance. A survey of 192 oil and gas companies was carried out. The data collected was analysed using correlation and multiple regression analysis. The correlation results provide evidence that, quality of management is positively related to the implementation of SSCM practices. The regression results indicate that 18.1% of variance in business performance is explained by quality of management, and 26.4% of the variance is explained by SSCM practices.

Keywords: Quality of management, Sustainable Supply chain management, Firm performance.

1 Introduction

The notion of sustainable supply chain management (SSCM) has received increasing recognition in both theory and practice, due to several factors supporting its acceptance and adoption such as stakeholder pressures, scarcity of raw materials, competitive pressures, and environmental concerns about the negative impacts of industrial operations [15]. Firms in recent years have focused on employing approaches that simultaneously addresses the economic, social, and environmental issues related to their supply chains [14]. SSCM is deemed as a viable approach that can help firms to effectively integrate economic, social, and environmental considerations, which ultimately leads to competitive advantage [17, 2]. The SSCM approach incorporates the principles of supply chain management (SCM), corporate social responsibility and environmental management with the aim of minimizing environmental destruction while improving the performance of the supply chain [18]. Scholars have utilised the complementary definition of SCM and sustainability literature to introduce a more comprehensive definition of SSCM:

“The strategic integration and achievement of an organisation’s social, environmental, and economic goals in the systemic coordination of key organizational business processes for improving the long-term economic performance of the individual company and its supply chain” [1].

In this study, the conceptualisation of SSCM is adopted as it forms the basis for operationalising sustainability concept within the SCM context. In essence, this definition suggests that SSCM is concerned with achieving a balance among the triple bottom line elements. From a holistic perspective, SSCM addresses the economic, social, and environmental goals of the focal firm and its supply chain partners [1]. However, the shift from traditional SCM to a SSCM approach creates substantial pressure on firms to adjust their existing supply chains to meet sustainability needs. While some firms adopt SSCM initiatives due to external pressures, others engage in sustainable practise to improve their reputation and competitiveness [12]. Considering this, it is important for firms to embrace a proactive approach towards achieving a sustainable supply chain,

rather than a reactive approach of regulatory compliance [23]. The following section explains the concept of quality of management.

2 Literature review

2.1 Quality of management

In defining the concept of quality of management (QOM), it is essential to state the meaning of “quality” and that of “management”. **Reeves and Bednar** [21] define quality as level of excellence, while **Smircich and Morgan** [22] describes management as the effective and efficient coordination of organisational processes to achieve defined set of goals. The term QOM has been defined differently from different perspectives.

QOM is viewed as the extent to which an organisation is soundly run [19]. In a more elaborate definition, Koch and Cebula [8] states that QOM encompasses management’s ability to positively transform their organisation to continuously adapt to the ever-changing business environment. According to **Doz and Prahalad** [4], QOM is concerned with influencing the individual behaviour of employees to create an effective organisational context. Given the lack of consensus on the definition of QOM among scholars, this study draws from the definitions of “quality” and “management” and propose a more comprehensive definition of QOM concept: QOM is the degree of excellence in the coordination and organisation of business activities to achieve desired outcomes.

The effectiveness of a firm depends on the willingness and ability of managers to facilitate the success of initiatives in the firm [7]. QOM is a necessary antecedent to performance. This assumes that performance is the ultimate management responsibility [7]. In a similar regard, Mcguire et al. [11] asserts that managerial strength or capacity is an important driver of organisational innovations. Thus, the implementation of SSCM initiatives could be influenced by the QOM in an organisation. However, there is a lack of empirical evidence to prove this. Hence, the need to explore the relationship between QOM and SSCM adoption by firms.

Firms with perceived QOM engage in proactive environmental and social practices [19], to lessen the effects of their business operations on the societies and communities

in which they operate. More so, QOM is associated with quality of stakeholder relationships [19]. In other words, top management are expected to consider environmental, economic, and social objectives simultaneously to meet the concerns of multiple stakeholders. Therefore, the implementation of SSCM initiatives could be influenced by the QOM in an organisation. However, there is a lack of empirical evidence to prove this. Hence, the need to explore the relationship between QOM and SSCM adoption by firms.

2.2. Sustainable supply chain management (SSCM) practices

The notion of SSCM has received increasing recognition in both theory and practice, due to several factors promoting its espousal and implementation including stakeholder demands, scarcity of raw materials, competitive pressures, and environmental concerns about the negative impacts of industrial operations [15]. Sustainable supply chain deemed as a viable approach that can help firms to effectively integrate economic, social, and environmental considerations, which ultimately leads to competitive advantage [14]. SSCM offers a wide range of opportunities for an organisation to distinguish itself from its competitors [1]. In their review of the literature **Seuring and Müller [17]**, argued that SSCM is “the management of material, information, and capital flows, as well as cooperation among companies 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”. It was noted in **Paulraj et al. [14]** that the effective management of an organisation's internal practices (sustainable process and products), as well as external practices (cooperation between suppliers and consumers), help to build a sustainable supply chain.

The philosophy of SSCM encompasses multidimensional activities, comprising of sustainable purchasing [26, 25], which advocates procuring materials with the least environmental impacts; sustainable manufacturing [29], which emphasises internally driven environmental initiatives such as reuse and reproduction; sustainable distribution [23], which facilitates reduction of logistical impacts caused by material flows; and reverse logistics [5, 14], which entails closing the loop through recycling and disposal.

In this study, five categories of SSCM practices are considered: sustainable procurement, design, distribution, investment recovery, and social sustainability.

2.3. Organisational performance

Numerous studies have found that SSCM practices have positive impacts on performance outcomes [5, 14]. SSCM implementation can enhance various processes in supply chains [17]. Major benefits of SSCM include reduction in costs of raw materials and packaging due to the use of recycled materials [25], reduction in environmental risks and improvement in firm's image [12], and improvements in quality of products or processes, flexibility, and delivery speed [15]. Researchers have observed that firms are increasingly adopting SSCM practices to improve relationships, collaboration, competitiveness, and performance of their supply chains [14]. However, many studies on the impact of SSCM practices on organisational performance are either focusing on a particular aspect of performance or structured along a few dimensions only. Thus, this study attempts to shed more light on the impact of SSCM practices on aggregate business performance of supply chains.

3 Methodology

3.1. Data collation

To answer the research questions, a survey by questionnaire was carried out. After a pre-test, seven hundred and forty (740) questionnaires were emailed to potential respondents taken from the Financial Analysis Made Easy (FAME) database of companies and other databases that host business directories of firms. Both mailed postal and web-based methods was used to send the questionnaire to the operations or supply chain managers of each company, who in some cases delegated certain questions to those in charge of environmental management or quality management. The questionnaire was then preceded by a phone call to identify the appropriate addressee, to announce the sending of the question and to ask for collaboration. A cover letter was attached to each questionnaire. After two weeks a mailing and phone call was made to all the respondent companies that had not replied. This procedure yielded a global response rate of 28.7%. The response rate is considered as representative of earlier studies of organizations by questionnaire. In a previous similar empirical study on sustainability, Luthra et al. [10] achieved a response rate of 24.6%. Of the 213

questionnaires returned, 192 were fully completed and thus deemed valid and usable for the study. Twenty-one incomplete questionnaires were not included in the analysis. Even though poorly completed questionnaires still provides some information, researchers recommend excluding such questionnaires from further analysis to avoid incidence of missing data and to improve the reliability of findings [6].

3.2. The Instrument

The questionnaire is divided into four broad categories of questions. The first category deals with the profile of the respondents. While, the second category contains sustainable supply chain management practices, the basic sustainable initiatives that companies implement. In the third section, the respondents were questioned on the organisational factors such as quality of management. The fourth category questioned respondents on measures of business performance employed in their organisation. Overall, the survey instrument consisted of twenty main questions cover the basic features of a sustainability and quality of management. Some of the questions relate to contextual data sought objective answers, such as market share or profitability. Other includes those which sought to determine the relative importance of the competitive objectives and those indicating the importance of various sustainability practices or performance measures. The managers in the sample were asked to score each of the practices and performance separately on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree; 1 = Very low to 5 = Very high). A scale with balanced keying does avoid the problem of acquiescence bias, but central tendency and social desirability biases are somewhat more challenging to offset [24]. The data analysis of the questionnaire data was carried out using SPSS (statistical Packages for social sciences), one of the most widely used software package for statistical analysis in social sciences.

To make sure that questionnaire data is free of random effects, Kimberlin, C. L., & Winterstein [30] suggest the evaluation of the reliability of the scales used to collect data in a study. Reliability tests assesses the internal consistency of instruments used in measuring research constructs [27]. Measurement items must be highly correlated before they can be considered to meet reliability requirements. The most used technique for testing internal consistency is the Cronbach's coefficient alpha [28]. Accordingly, reliability assessment was conducted for the key research variables, demographics, SSCM practices, QOM, firm performance, and the whole questionnaire.

The result indicates that the Cronbach's alpha of the entire questionnaire is 0.736. In addition, reliability test results for each of the sub-items in the survey instrument indicate that all the sub-items have Cronbach's alphas greater than 0.70. Consequently, this mean that there is a strong internal consistency in the scale of the survey instrument. In the literature, the range for Cronbach's alpha value is 0 to 1, and the closer Cronbach's alpha is to 1, the higher the internal reliability. Reliabilities less than 0.60 are rated to be poor, those in the 0.70 range are acceptable and those from 0.80 and above are considered good [27]. Thus, a Cronbach's alpha value of 0.70 or higher is used to establish reliability of a construct.

3.3 Data analysis

To enhance our understanding on the influence of organisational factors (culture, size, and QOM) on the implementation of SSCM practices and firm performance, correlation analysis was carried out to assess the relationships among the factors examined. Furthermore, regression analysis was performed to determine causal effects on the links between the independent and dependent variables. Correlation and regression share some similarities however, they serve distinct purposes. While correlation assesses the strength of associations among variables, regression establishes the type of the association which correlation established through estimation and prediction of the value of a dependent variable based upon the values of some independent variables.

4 Results

4.1. Correlations between the main research constructs

This study followed the guideline provided by [3], which argued that a correlation effect size of less than 0.10 is considered weak, 0.10 to 0.30 is moderate and greater than 0.30 is strong. It is apparent from the correlation coefficients that the relationships between aggregate QOM and SSCM practices ($r = .422, p = .000$) is strong and statistically significant. The relationships of QOM and SSCM practices with organisational performance are ($r = .358, p = .000$; $r = .472, p = .000$) respectively (see table 2). These correlation coefficients indicate that QOM and SSCM practices have significant positive impact on the performance of oil and gas companies.

4.2. Regression analysis

Having identified a positive relationship between quality of management, SSCM practices and the level of business performance, a multiple regression analysis was conducted to evaluate the interactive effects of QOM and SSCM practices on the overall performance of oil and gas companies. The model summary indicates 18.1% of variance in business performance explained by quality of management, and 26.4% of the variance is explained by SSCM practices. From the results, it may be possible to predict the level of performance effect from the level of QOM and SSCM practices in the oil and gas industry. The correlation between QOM and business performance is 0.177. while the correlation between SSCM practices and business performance is 0.344. Approximately 18% ($r^2 = 0.181$) of the variance of the business performance is associated with total quality of management. While 26% ($r^2 = 0.264$) of the variance of the business performance is linked with the overall SSCM practices.

The research has identified a strong relationship between the level of SSCM practices implementation and the level of business performance. While we indicate a weak correlation between the level of QOM and level of business performance. These suggests that QOM may have significant influence on business performance within a short-term, but to maximise the full performance outcomes, organisations need to implement sustainable supply chain practices.

5. Discussion and implications

This paper, extracted from an ongoing research, contributes to the extant literature on SSCM. Specifically, it explored the relationships between QOM and SSCM practices and their impact on the performance of firms in the oil and gas industry.

The correlation results show that QOM is positively related to SSCM practices. This finding is consistent with previous studies, which noted that top management commitment [20] influence the adoption of SSCM practices by firms. In essence, the implementation of SSCM practices requires top management leadership and commitment [9]. Thus, the higher the QOM, the greater the effectiveness of sustainability implementation and realisation of the full benefits of adopting such practices. Similarly, the

results of the regression analysis show that 44.5% of the variance in business performance can be explained by QOM and SSCM practices.

In addition, SSCM practices have been identified to have the highest contributions to business performance in the oil and gas industry. This evidence of a positive link between SSCM practices and performance outcomes is an essential contribution to the ongoing debate on whether it pays to be green/sustainable. While some studies found positive impacts [14], others identified negative impacts [13]. This study confirms that firms could achieve superior performance through the implementation of SSCM practices. Therefore, to attain greater sustainability performance, firms should aim at increasing long-term value through SSCM practices, rather than focusing on short-term economic benefits.

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