

FACTORS INFLUENCING ADOPTION OF SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICES AMONG MANUFACTURING FIRMS

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Abstract:

There is a significant gap in emerging nations such as Ghana on factors influencing the adoption of Sustainable Supply Chain Management (SSCM), as most of these studies are conducted in advanced nations. As a result, this study investigates the factors influencing manufacturing companies in Ghana's adoption of SSCM practices. Three hundred and three 303 manufacturing firms with an annual turnover of not less than one million dollars (\$1,000,000) were purposively selected for the study. Throughout the study, close-ended questionnaires were adopted for the data collection. The structural equation model (SEM) empirically examined the factors influencing the firms' SSCM adoption. The study revealed that instrumental, moral, and knowledge factors influence the adoption of SSCM. Based on the study outcomes presented and discussed, the study concluded that instrumental, relational, moral and knowledge factors affected the adoption of SSCM practices by firms in Ghana. Further studies on the subject can adopt a case study approach, as this method will be able to investigate the topic in a manner that allows for a more in-depth comprehension of the subject in a particular context.

Keywords: Sustainability Supply Chain Management, Moral Factors, Instrumental Factor, Knowledge Factors

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INTRODUCTION

Concern about the use of natural resources in supply chain management (SCM) is increasing because all kinds of corporate activities use natural resources that have some form of environmental impact. These environmental impacts include environmental degradation, carbon emission, the depletion of rare natural resources without replacement, the inequitable use of resources affecting future generations and the pollution of the environment (Ahi & Searcy, 2013; Maama et al., 2021). Ensuring environmental protection when carrying out business activities should not only occur at a single firm level but also by other firms in the supply chain. Thus, because of the increasing concern about the environment, firms are supposed to practice sustainability supply chain management (SSCM). This involves all supply chain activities and members ensuring the environmental tolerability of their goods from raw material to production, from production to retail and then lastly to the end-user (consumer).

With the unfolding of a new economic order, people have recognized that profit and profitability are not the only aspects of the long-term success of businesses and economies, and the future of planet Earth and its people are also determining factors (Kleindorfer et al., 2005). Therefore, businesses have been pressured to lessen their adverse effects on the environment and

society and have incorporated environmental and social policies to enhance their business operations, which has led to SSCM as a strategy (Hsu et al., 2016).

According to Seuring et al. (2008), SSCM is the management of capital flows, information, material and a firm's integration into the supply chain in line with sustainable development's social, environmental and economic pillars. Moreover, SSCM stems from and considers the requirements of stakeholders and customers. It is believed that policies to protect the environment can also enhance innovation and lead to profit. This suggests that sustainable production and the supply chain must ensure a balance when achieving economic, environmental, and social goals (Borel-Saladin & Turok, 2013; de Camargo et al., 2018), which may be possible by following SSCM as a key strategy for improving the general performance of a business (Al-Odeh & Smallwood, 2012).

In addition, Alzoubi, Ahmed, and Al-Gasaymeh (2020) contend that sustainability in the supply chain has gained the attention of researchers as global warming has increased. Hence, the development of the manufacturing sector, however, must include addressing environmental sustainability issues by minimizing waste generation, chemical emissions, deforestation and air pollution, and water and soil pollution. Furthermore, socio-economic sustainability issues, such as wealth creation, employment and social projects, need to be addressed. SSCM theory has been developed to address these issues, although businesses still seek ways to apply it in their practice. However, research on SSCM has mostly been conducted in developed nations (Geng, Mansouri & Aktas, 2017), which indicates the need to investigate it in the context of developing nations such as Ghana. However, since SSCM is an embryonic phenomenon, there is limited evidence of how firms embrace it in their activities. Therefore, the study examines the factors influencing the adoption of SSCM practices by manufacturing firms in Ghana.

METHODS

Study Site. The study was carried out within the Ghana manufacturing sector. The country has sixteen (16) regions and is the second-largest economy in West Africa, and has been identified as one of the fastest-growing economies in 2019 (IMF, 2020). Each region has its particular economic activities. However, the manufacturing sector is dominated by four regions: the Ashanti, Greater Accra, Bono, and Western regions. In each of these regions, the manufacturing activities take place in their regional capitals, which are Kumasi, Accra/Tema, Sunyani, and Takoradi, respectively. Therefore, the study was carried out in these cities.

Research Approach. This study used a quantitative data collection method to gather data from the study respondents. This comprises measurement and observation, cause and effect thinking, reduction to specific variables and hypotheses and questions, and the test of theories. The quantitative data were collected through an open-ended questionnaire from procurement officers, accountants and chief executive officers of the various firms under study.

Target Population. The study population comprised manufacturing firms in four dominant regions (in terms of manufacturing) in Ghana. The staff of the selected firms constituted the population of the study.

In ascending order, the topmost five manufacturing subsectors in Ghana are textiles (9%), other non-metallic products (9%), chemicals and chemical products (13%), paper and paper products (19%), and food and beverages (30%). The number of manufacturing firms in the study area is 1900 (Nti, 2015; Adarkwah et al., 2018).

Sample Size and Sampling Techniques. This study made use of purposive sampling techniques. Purposive sampling, sometimes referred to as subjective, selective, or judgemental sampling, is a form of non-probability sampling technique in which researchers depend on their judgment to choose respondents from a population to take part in a study.

A purposive sampling method was used to select firms with an annual turnover of not less than one million dollars (\$1,000,000) within the study area. Moreover, the selected firms' staff (particularly procurement officers) were purposively selected. In this case, only some firms or staff members within the study area were selected.

The number of respondents was selected based on the guidelines of Krejcie and Morgan (1970). According to the authors, a sample size from a population is determined using the following formula.

$$s = \frac{X^2 NP(1 - P)}{d^2(N - 1) + X^2 P(1 - P)}$$

Where:

s = required sample size

X² = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

N = the population size

P = the population proportion (assumed to be 0.50) since this would provide the maximum sample size

d = the degree of accuracy expressed as a proportion (0.05)

Therefore, based on the formula, the sample size from an estimated population of 1900 was determined as follows.

$$s = \frac{X^2 NP(1 - P)}{d^2(N - 1) + X^2 P(1 - P)}$$

$$s = \frac{3.841 \times 1900 \times 0.50(1 - 0.50)}{0.05^2(1900 - 1) + 3.841 \times 0.50(1 - 0.50)}$$

$$s = \frac{3648.95(0.50)}{0.0025(1899) + 1.92(0.50)}$$

$$s = \frac{1824.46}{4.75 + 0.96}$$

$$s = \frac{1824.46}{5.70}$$

$$s = 320$$

Data Collection Methods. Throughout the study, questionnaires were adopted for the data collection. A questionnaire was employed in this study because it reached many study populations. Only closed-ended questions were employed to construct the questionnaire to enable easy analysis. Closed-ended questions suggest answers to research questions, hence making it simpler for respondents to choose an answer. Closed-ended questions also make it easier for the researcher to compare responses provided by participants.

The questionnaires principally consisted of Likert scale questions. This research used five categories, e.g., Strongly Disagree (SD), Disagree (D), Neutral (N), Agree (A), and Strongly Agree (SA) (Bryman & Bell, 2007). Three hundred and twenty (320) questionnaires were distributed; however, 303 questionnaires (94.9%) were returned.

Measurements. The questions on adopting SSCM practices were grouped into four key sections. The sections were instrumental, relational, moral, and knowledge factors (Table 1). The questionnaire consisted of closed-ended questions that were answered according to a five point-Likert scale.

Table 1. Measurement Models for the Study

Construct	Variables	Number of questionnaire items	Literature source
Factors influencing the	*Instrumental factors (IF)	5	McWilliams and Siegel (2011)
	*Relational factors (RF)	5	Tate et al. (2010), Hofer et al.



adoption of SSCM			(2012)
	*Moral factors (MF)	4	Logsdon and Wood (2002),
	*Knowledge factors (KF)	3	Paulraj et al. (2017)

RESULT AND DISCUSSION

The study's objective was to determine the factors influencing the adoption of SSCM practices by manufacturing firms in Ghana. Several factors have an impact on the intensity (suppliers involved) and the level of integration (diversity and the number of initiatives taken) of SSCM chain practices. Numerous studies have focused on the benefits of implementing SSCM practices and their impact on an organization's performance as factors influencing adoption. In general, companies understand the advantages of switching from traditional SCM to SSCM and adopt the practices to improve environmental, social and economic performance, with the latter contributing to a country's GDP.

To investigate the factors influencing the adoption of SSCM practices by manufacturing firms in Ghana, the questionnaire included several items categorized into instrumental, relational, moral and knowledge factors. In addition, participants had to indicate the extent to which they agreed or disagreed that the factors listed influenced the adoption of SSCM practices in their firms. Their responses to the statements were measured according to a five-point Likert scale ranging from "Strongly disagree" (1) to "Strongly agree" (5).

Table 2 presents the descriptive statistics (means and standard deviations) generated by the analysis of the data gathered from the participant's responses to the items on the factors influencing the adoption of SSCM practices by manufacturing firms in Ghana. The instrumental, relational, moral and knowledge factors to which the participants had to agree or disagree in varying degrees are indicated in the table with the means and standard deviations of the responses.

Table 2. Factors influencing the adoption of SSCM by manufacturing firms in Ghana

Item code	Item	Mean	Std. deviation
Instrumental factors			
IF01	To prevent poor publicity	4.505	0.684
IF02	Shareholders demand for sustainability improvements	4.548	0.605
IF03	To satisfy our shareholders	4.535	0.673
IF05	For long-term profitability	4.482	0.664
Relational factors			
RF01	To distinguish our firm from our competitors	4.564	0.615
RF02	To multiply our customer base	4.518	0.634
RF03	Sustainability regulation	4.607	0.581
RF04	Clients' awareness of green initiatives	4.505	0.664
RF06	Source of sustained competitive advantage	4.545	0.589
Moral factors			
MF01	As it is the correct thing to do	4.528	0.654
MF02	Due to genuine concern for the environment	4.472	0.702
MF03	Because we feel responsible for the environment	4.508	0.703
MF04	As top management deems environmental	4.545	0.627

Item code	Item	Mean	Std. deviation
	responsiveness as a crucial element of corporate strategy		
Knowledge factors			
KF01	Information availability	4.531	0.623
KF02	Training and Education	4.578	0.629
KF03	Health and Safety	4.587	0.688

Source: Field survey (2022)

Instrumental factors influence the adoption of SSCM. Among the factors influencing SSCM adoption were instrumental factors. The instrumental factors comprised factors such as preventing poor publicity, shareholders' demand for sustainability improvements to satisfy our shareholders, getting short-term profitability, and for long-term profitability (Table 2). In terms of instrumental factors influencing the adoption of SSCM practices, the study recorded a mean score ranging from 4.482 - 4.548, with an average score of 4.5175, which shows that the manufacturing firms strongly agreed that they had adopted SSCM practices. Shareholders' demand for sustainability improvement recorded the highest mean score (mean score = 5.548, SD = 0.605), followed by to satisfy our stakeholders (mean score = 5.535, SD = 0.673), to prevent poor publicity (mean score = 4.505, SD = 0.684) and for long term profitability (mean score = 4.482, SD = 0.615).

Moral factors influence the adoption of SSCM. Further, among the factors influencing SSCM adoption were moral factors. All the moral factors assessed in this study significantly and positively influenced SSCM adoption. These moral factors included; SSCM adoption is the correct thing to do, SSCM adoption is due to genuine concern for the environment, SSCM adoption is because we feel the responsibility to the environment, and SSCM adoption is because top management deems environmental responsiveness as a crucial element of corporate strategy (Table 2).

The moral factors influencing the adoption of SSCM practices recorded a mean score ranging from 4.472 - 4.545, with an average score of 4.5133, which shows that the manufacturing firms strongly agreed that they had adopted SSCM practices as top management deems environmental responsiveness as a crucial element of corporate strategy recorded the highest mean score (mean score = 5.545, SD = 0.627), while due to genuine concern for the environment recorded the lowest mean score (mean score = 5.472, SD = 0.627).

Relational factors influence the adoption of SSCM. The study also examined relational factors influencing the adoption of SSCM. Six relational factors influencing SSCM adoption were assessed, but half (three) of the relational factors significantly influenced SSCM adoption. These relational factors were; to multiply our customer base, client's awareness of green initiatives and source of sustained competitive advantage (Table 2).

The relational factors influencing the adoption of SSCM practices recorded mean scores ranging from 4.505 - 4.607, with an average score of 4.548, which shows that the manufacturing firms strongly agreed that they had adopted SSCM practices. From the study, sustainability regulation recorded the highest mean score (mean score = 4.607, SD = 0.581), and the client's awareness of green initiatives recorded the lowest mean score (mean score = 4.505, SD = 0.664).

Knowledge factors influence the adoption of SSCM. In the study, the last factor influencing SSCM adoption was knowledge factors. The knowledge factors assessed were information availability (mean score = 4.531, SD = 0.623), training and education (mean score = 4.578, SD = 0.629), and health and safety (mean score = 4.587, SD = 0.688).

Relational factors. The measurement model identified relational factors as the need for a firm to distinguish itself from its competitors, multiply its customer base, have sustainability

regulations for staff, make clients aware of its green initiatives and maintain a competitive advantage. According to Vasileiou and Morris (2006), all SC players are concerned about the economic and commercial issues affecting their ability to remain in business and maintain a competitive edge, so they adopt SSCM practices. In addition, cooperation with suppliers in promoting environmental, social and economic sustainability mitigates uncertainty and risk.

In their study, Markley and Davis (2007) point out that competitive advantage is a factor influencing firms to adopt SSCM practices. Therefore, it can be inferred that relational factors significantly affect SSCM practices. Awaysheh and Klassen's (2010) study implies that socially responsible practices should be regulated, although Colicchia et al. (2011) posit that some firms voluntarily practice SSCM to gain a competitive advantage in the market.

Instrumental factors. In the measurement model, instrumental factors were identified as a firm's need to prevent poor publicity, meet the demands from stakeholders concerning sustainability, satisfy the shareholders and ensure short- and long-term profitability. These factors represent pressure from the public, stakeholders and shareholders and the economic pillar of the TBL, which is profit, as opposed to the social and environmental pillars (people and the planet). This has been discussed in detail by Laosirihongthong et al. (2020), Gold et al. (2013) and Khokhar et al. (2022). According to Vasileiou and Morris (2006), firms feel the need to implement SSCM practices when they are concerned about their industry's declining profitability and a growing level of financial uncertainty.

Knowledge factors. In the measurement model, knowledge factors were identified as the availability of information, training and education, and health and safety. Therefore, the study results suggest that a firm would implement SSCM practices if its managers were informed, trained and educated about the benefits, especially the health and safety of the environment and society. However, if these factors were ignored, a company's environmental, social and economic performance would be inadequate (Gold et al., 2013; Laosirihongthong et al., 2020).

Moral factors. In the measurement model, moral factors were identified as the need to do what is right, genuine concern about the environment, a sense of responsibility for the environment and compliance with a corporate strategy of environmental responsiveness. Thus, moral factors are principles of right and wrong compelling manufacturing firms to promote sustainability in the SC. Therefore, sustainability is no longer an option and is an ethical priority and requirement infusing the SC (Khan et al., 2018). Suppliers, investors, customers and other stakeholders would agree on the rectitude of SSCM practices and put pressure on a firm to adopt them.

CONCLUSION

Based on the study outcomes presented and discussed, the study concluded that instrumental, relational, moral and knowledge factors affected the adoption of SSCM practices by firms in Ghana. Therefore, managing firms adopt SSCM practices to do the following:

1. Prevent poor publicity.
2. Maintain a good image.
3. Satisfy shareholders.
4. Achieve long-term profitability.
5. Stand out amongst their competitors.
6. Multiply their customer base.
7. Comply with sustainability regulations.
8. Gain a sustained competitive advantage.
9. Do what is right.

10. Show their genuine concern for the environment.
11. Comply with a corporate strategy of environmental responsiveness.
12. Respond to continuously increasing information.

Implication for practice. The study outcomes imply that more Ghanaian manufacturing firms might adopt SSCM practices, especially those listed in the previous section, to improve their contribution to environmental sustainability and the betterment of society and achieve economic objectives.

Implications for research and policy. The study made a unique contribution to the literature on the adoption of SSCM practices by manufacturing firms. In particular, the study identified the relational, instrumental, knowledge and moral factors that influence the adoption of SSCM practices.

The study has implications for the environmental protection and socio-economic development policies of African governments and the United Nations that might use the outcomes to promote SSCM practices in the manufacturing sector to ensure the achievement of the SDGs. On a firm level, the outcomes might assist management in formulating SDG-orientated corporate policy, the implementation of which would ensure that SSCM practices are carried out as stipulated in a firm's performance strategies.

Recommendations for future research. Future research could expand on the methods used in the study by following a mixed-methods approach instead of the quantitative approach adopted by the current study. In addition, future studies could investigate SSCM practices in other industrial sectors in Ghana or other developing countries. Nevertheless, they could focus on SSCM in manufacturing sectors but in developing countries other than Ghana.

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