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Exploring the Internal Factors of the Successful Implementation of Green Supply Chain Management in Manufacturing in Saudi Arabia

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Abstract:

Purpose: Widespread awareness of environmental issues; like global warming; has forced organizations to develop an environmental objective in their supply chains. Green Supply Chain Management aims to reduce the negative impact of supply chain practices in organizations. This research explores internal factors influencing the successful implementation of GSCM in manufacturing companies in Saudi Arabia. Internal factors influencing GSCM were identified from the literature review, which include top management commitment, organisational strategy, and economic benefits. Methodology: An explorative study has been conducted, based on 40 questionnaires that were filled by supply chain professionals, working in factories in Saudi Arabia. Statistical Program for Social Sciences (SPSS) was used to analyse the relationship between each factor and the successful implementation of GSCM. Findings: According to the results, the evidence did not support the influence of top management commitment factor on the successful implementation of GSCM. Originality: Despite the investment of Saudi Arabia in the field of education, health etc.; there are still few internal factors that hinder the implementation of GSCM. Hence, the study holds significance since it discusses the context of Saudi Arabia which was found to be ignored in the literature review. However, all other factors showed a significant influence on the supply chain management. In addition, the research model helped to provide an understanding of the internal factors that can influence the successful implementation of GSCM in Saudi Arabia.

Keywords: Green supply chain, environmental management system, Saudi manufacture industry, internal factors

1. Introduction

The initiation of the Green Supply Chain Management (GSCM) debate can be traced from the 1990s (Srivastava, 2007). GSCM intends to minimize or reduce negative environmental impacts (Kamolkitiwong & Phruksaphanrat, 2015). The supply chain concept becomes directly related to the environment when “green” concept is added to the supply chain. Modern production processes could affect the environment, and the consequences go beyond the time and place of an organization (Setthasakko, 2009). However, negative environmental and social effects can be mitigated by the activities of suppliers, manufacturers, and traders (Handfield et al., 2004). The GSCM objective is to make products that is environmentally friendly with minimum resources (Kamolkitiwong & Phruksaphanrat, 2015).

This study has focused on GSCM in the manufacturing sector in Saudi Arabia. According to the McKinsey Global Institute analysis report (2015), Saudi Arabia could raise its GDP by investing in eight main sectors; petrochemicals, mining and metals, retail and wholesale trade, tourism and hospitality, health care, finance, construction, and manufacturing. Specifically, manufacturing was among the main sectors that boost non-oil growth (Al-Kibsi et al., 2015). However, the aim of this study is to explore the internal factors that influence the successful implementation of a GSCM in manufacturing in Saudi Arabia. To achieve this aim, the following objectives were determined:

- To identify the internal factors that influence the successful implementation of GSCM in literature.
- To divide internal factors to include: top management commitment, organizational strategy, and economic benefits.
- To identify the supply chain professionals’ opinions about the factors.
- To explore the relationship between the above-mentioned internal factors and the successful implementation of GSCM.
- To draw conclusions and recommendations for organizations for successful implementation of GSCMs.

2. Literature Review

2.1. Definition of GSCM

The concept of GSCM has started with greening the purchasing by viewing it from an environmental perspective (Green, Morton, & New, 1996). It was evolved to include; setting environmental policies and taking actions related to all aspects of a supply chain, and not just purchasing (Zsidisin & Siferd, 2001). After the development of GSCM, a broader definition was developed to include the end-user usage and the disposal of products (Zhu & Sarkis, 2006a). Sunil et al (2014) stated that a GSCM is all about performing environmental practices in a supply chain context, while considering the economy.

2.2. Internal Factors

Internal factors include top management commitment, organizational strategy, and economic benefits with respect to the organization (Luthra, Grag, & Haleem, 2014) (Table 1).

[Insert Table 1 here]

2.3. Top Management Commitment

Commitment to a GSCM from senior managers, support for GSCMs from midlevel managers, cross-functional cooperation for environmental improvements, and ISO 14001 certification determine top management commitment. The ethical and personal values of a company's founder can affect the whole organisation (Walker, Di Sisto, & McBain, 2008). Therefore, it is very important to incorporate stakeholders' interests when approaching green initiatives. It is top management's responsibility to enable stakeholders' involvement (Lam, Chan, Poon, Chau, & Chun, 2010).

It is believed that support from senior management is necessary for the implementation of most GSCM practices and helps to improve an organisation's environmental performance (Zhu, Sarkis, & Lai, 2008). Commitment to a GSCM from senior managers can strongly affect the implementation of a GSCM. Most programs can fail without upper management's commitment (Zhu & Sarkis, 2006b). Top management commitment is reflected in the green environmental management progress in an organisation (Zhu et al., 2008). Moreover, one of the factors for GSCM implementation is cross-functional cooperation. Its cooperation is needed for more than a single department or functional orientation (Zhu & Sarkis, 2006a). An organisation's compliance with environmental regulations presents an organisation's commitment (Diabat & Govindan, 2011).

Organisations recognise environmental management as a strategic issue that could potentially have a lasting impact on their performance (Diabat & Govindan, 2011). Environmental management systems (EMSs) are strategic management approaches that define the way in which an organisation will identify its environmental impact. Once an EMS is implemented in an organisation, it could be elected to receive ISO 14001 certification. ISO 14001 certification implies that an organisation has implemented an EMS, which documents an organisation's aspects and effects of pollution. It also helps in the identification of continuously improving process of pollution prevention (Darnall, Jolley, & Handfiel, 2008).

2.4. Organizational Strategy

The support of top management is critical in implementing strategic decisions and communicating a shared vision in an organisation (Youn, Yang, Hong, & Park, 2013). An organisation's environmental mission could affect its supply chain practices; for example, it is a driver of green purchasing (Qadri, Haleem, & Arif, 2011). It is not just the commitment and conscience of top management that is essential, but all employees should be aware of the green environmental issue (Hojjati & Jahangiri, 2010). Employee involvement has been found to be positively correlated to the environmental improvements in an organisation (Walker et al., 2008). Hence, the habits, the culture, education, and training of employees are very important (Hojjati & Jahangiri, 2010). It is the responsibility of supply chain managers to comply with environmental programs (Hu & Hsu, 2010). Therefore, organisations that have environmental regulatory compliance tend to do business with those that meet environmental regulations after screening (Obiso, 2011).

2.5. Economic Benefits

Generating profits is the ultimate goal of organisations. Saving costs by adopting GSCMs can come from the conservation of water, energy, and raw material (Kamolkitiwong & Phruksaphanrat, 2015). Financial performance was found to be the most important factor for the implementation of GSCMs in Japanese manufacturers, whereas no significant financial benefits from GSCM implementation were found for Chinese manufacturers. This could be due to the fact that financial benefits are a long-term achievement and that Chinese manufacturers are still in their early stage of GSCM implementation (Zhu, Geng, Fujita, & Hashimoto, 2010). Economic benefits can include reducing cost, which was found in several studies to be the reason behind the adoption of GSCM (Qadri et al., 2011). Also, investment recovery includes the sale of excess material, inventories, scraps, used materials, and excess capital equipment (Zhu & Sarkis, 2006b).

Improving the environmental performance of the organisation can enhance customer loyalty and satisfaction, which can positively impact business performance (Youn et al., 2013). According to Qadir et al. (2011), the organisation's environmental performance has a positive effect on its performance, resulting in cost and waste reduction. There is also an economic benefit in the organisation's social responsibility, which may affect its market performance and improve brand image. Eventually, the organisation's reputation amongst customers and increasing market value due to its environmental practices could result in a growth in sales (Youn et al., 2013). However, the risk of neglecting green practices could damage the organisation's reputation and make it lose its market share (Nishat Faisal, 2010).

3. Methods

This is an explorative study based on questionnaires provided to supply chain professionals working in factories. The study was conducted to explore the internal factors associated with the successful implementation of GSCM in manufacturing in Saudi Arabia, in which manufacturing industries were randomly selected. The questionnaire was developed based on measures from literature review. Originally, 52 questionnaires were collected from which only 40 were complete and suitable for use. A non probability sampling procedure; mainly convenience sampling was used; where participants were selected as per their accessibility and volunteering. Subsequently, collected data was analysed statistically using the five-point Likert scale and regression analysis.

For the purpose of this study, a conceptual model (Figure 1) has been developed to test the research hypotheses, which can be listed as follows:

- Hypothesis (H₁): Top management commitment has a positive influence on the successful implementation of a GSCM.
 - Hypothesis (H₂): Organisational strategy has a positive influence on the successful implementation of a GSCM.
 - Hypothesis (H₃): Economic benefits have a positive influence on the successful implementation of a GSCM.
- [Insert Figure 1 here]

4. Results

First part of the questionnaire presents general information, which consists of age, educational level, work position, experience, and organization size. The majority of participants were at the age of 38 years or less; presenting 72.5% of the total percentage. Whereas the remaining 27.5% were between 39 to 56 years old. A percentage of 50% of participants held a master's degree. This was followed by 42.5% with bachelor's degree. The remaining 7.5% held a high school / diploma certificate. 32.5% of participants were in a mid-level managerial position, 25% senior managerial position, 22.5% non-managerial position, 12.5% supervisor position, and finally 7.5% were first line managers. As for work experience, it was found that 45% of participants had more than 10 years of experience in work, 32.5% had 1 to 4 years, 12.5% had 5 to 7 years, and 10% had 8 to 10 years of work experience. Apart from this, 80% participants were working in organizations with more than 100 employees. Whereas, the remaining 20% were working in organizations with 100 employees or less.

4.1. Top Management Commitment

The results in table 2 showed that the overall mean value of participants' perceptions about the influence of top management commitment is equal to (3.79) with standard deviation of (0.77). When breaking down the elements of top management commitment for ranking; it is clear that cross-functional cooperation for environmental improvements come at first, with mean value of (3.88) and standard deviation of (1.02). The second element is commitment for GSCM from senior managers with a mean value of (3.88) and standard deviation of (0.99). The third element is ISO 14001 certification with a mean value equal to (3.73) and standard deviation of (0.91). The fourth and last element is the support of GSCM from mid-level managers with a mean value of (3.70) and standard deviation of (1.04).

[Insert Table 2 here]

4.2. Organizational Strategy

The results in table 3 showed that the overall mean value to participants' perceptions about the influence of organization strategy is equal to (3.77) with a standard deviation of (0.74). When breaking down the elements of organization strategy, organizational training programs contribute to the overall employee's knowledge about green practices with a mean value of (4.05) and standard deviation of (1.02). The second element is the higher the education of an employee, the higher his/her awareness of green practices, which has a mean value of (3.83) and standard deviation of (1.08). The third element is the company's environmental vision & mission application, which has a mean value of (3.83) and standard deviation of (1.15). The fourth element is the support of regulation environment with a mean value of (3.80) and standard deviation of (1.02). The environmental compliance and auditing programs come as the fifth element with a mean value of (3.75) and standard deviation of (1.10). The sixth element is that, employees have awareness about GSCM, with a mean value equal to (3.35) and standard deviation of (1.05). The seventh element is support of regulation environment, with a mean value of (3.80) and standard deviation of (1.08).

[Insert Table 3 here]

4.3. Economic Benefits

The results in table 4 shows that the overall mean value to participants' perceptions about the influence of economic benefits on green supply chain management equals to (3.86) with standard deviation of (0.59). The first element of economic benefits is the company's environmental reputation, with a mean value of (4.10) and standard deviation of (0.96). The second element is the company's overall environmental performance, with a mean value of (4.10) and standard deviation of (0.81). The third element is, decrease in the cost of waste treatment which has a mean value of (3.85), and standard deviation of (0.95). Recycle returned products comes as the fourth element with a mean value of (3.83) and standard deviation of (0.93). The fifth element is, decrease in the cost of energy consumption which has a mean value of (3.75) and standard deviation of (1.01). The sixth element is decrease in the cost of material purchase with a mean value of (3.73) and standard deviation of (0.82). Finally, the seventh element is investment recovery; sale of excess inventories/materials which has a mean value of (3.65) and standard deviation of (0.83).

[Insert Table 4 here]

4.4. Testing Hypotheses

4.4.1. Test Result for H₁

Hypothesis (H₁): Top management commitment has a positive influence on the successful implementation of a GSCM. As shown in table 5, regression coefficient of this factor is (0.45), which is insignificant as the P-value of T-test is (0.11) and rejects H₁. Top management commitment has a negative influence on the successful implementation of GSCM in manufacturing in Saudi Arabia.

[Insert Table 5 here]

4.4.2. Test Result for H₂

Hypothesis (H₂): Organisational strategy has a positive influence on the successful implementation of a GSCM. As shown in table 6, regression coefficient of this factor is (0.58), which is statistically significant as the P-value of T-test is (0.002) and accepts H₂. Organizational strategy has a positive influence on the successful implementation of GSCM in manufacturing in Saudi Arabia. The adjusted R-squared value equals to (0.21), which indicates that organizational strategy is responsible for 21% of the successful implementation of GSCM in manufacturing industry in Saudi Arabia.

[Insert Table 6 here]

4.4.3. Test Result for H₃

Hypothesis (H₃): Economic benefits have a positive influence on the successful implementation of a GSCM. As shown in table 7, regression coefficient of this factor is (0.51) which is statistically significant as the P-value of T-test is (0.015) and accepts H₃. Economic benefits have a positive influence on the successful implementation of GSCM in manufacturing industry in Saudi Arabia. The adjusted R-squared value equals to (0.12), which indicates that economic benefits are responsible for 12% of the successful implementation of GSCM in manufacturing in Saudi Arabia.

[Insert Table 7 here]

5. Discussion

Based on the results of this study, there is no supporting evidence about the positive influence of top management commitment for the successful implementation of GSCMs in Saudi Arabian manufacturing (H₁), despite the fact that commitment from top management has been repeatedly reported as a factor in the successful implementation of GSCMs in the literature (Luthra et al., 2014). In a similar study, support from the top management of organizations was found to be imminent in the implementation of GSCM, after government regulation, which was revealed to be the most important factor for the development of environmental strategy in organizations (Kamolkittiwong & Phruksaphanrat, 2015). The contradictory result with respect to the commitment of the top management, could be due to the fact that GSCM is still in its infancy and there is limited awareness about it at the top management level in the Saudi Arabian manufacturing industries. However, there is some evidence about the positive influence of organisational strategy on the successful implementation of GSCMs in manufacturing industry in Saudi Arabia (H₂). Similarly, there is some evidence about the positive influence of economic benefits on the successful implementation of GSCMs in manufacturing industry in Saudi Arabia (H₃). This result supports results from previous studies (Zhu et al., 2010; Isaac Obiso, 2011).

Amongst the different internal factors that influence the implementation of GSCMs in Saudi Arabian manufacturing industry, the top management commitment has shown to negative influence on the successful implementation of GSCM. However, organisational strategy has a positive influence on the effective implementation of a GSCM. Organizational training programs contribute to the overall employee's knowledge about green practices. Moreover, it is imperative for an organization to support the regulation environment. Furthermore, economic benefits too have a positive influence on the successful implementation of GSCM in manufacturing in Saudi Arabia. The economic benefits include decrease in the cost of materials purchase and in the cost of energy consumption. It is recommended that; more attention should be paid to top management commitment and its role in the successful implementation of GSCMs in manufacturing in Saudi Arabia. Internal factors related to organizational strategy and economic benefits are both considered as strengths in the successful implementation of GSCMs in Saudi Arabian manufacturing industry. Organizations are recommended to invest in these factors. Organizations are also advised to focus on their training programs to create a positive attitude toward GSCM amongst its employees.

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Appendix

Construct	Measures	Source
Top Management Commitment (ITMC)		
ITMC 1	Commitment of GSCM from senior managers.	(Zhu & Sarkis, 2006a) (Ninlawan, Seksan, Tossapol, & Pilada, 2010)
ITMC 2	Support for GSCM from mid-level managers.	(Zhu & Sarkis, 2006a)
ITMC 3	Cross-functional cooperation for environmental improvements.	(Zhu & Sarkis, 2006a) (Hu & Hsu, 2010)
ITMC 4	ISO 14001 certification.	(Zhu & Sarkis, 2006a)
Organization Strategy (IOS)		
IOS 1	Company's environmental vision & mission application.	(Qadri et al., 2011) (Isaac Obiso, 2011)
IOS 2	Environmental compliance and auditing programs.	(Isaac Obiso, 2011; Ninlawan et al., 2010)
IOS 3	Support of regulation environment.	(Isaac Obiso, 2011)
IOS 4	The higher the education of an employee, the higher his/her awareness of green practices.	(Hojjati & Jahangiri, 2010)
IOS 5	Organizational training programs contribute to the overall employee's knowledge about green practices.	(Hojjati & Jahangiri, 2010)
IOS 6	Employees have awareness about GSCM.	(Hojjati & Jahangiri, 2010)
Economic Benefits (IEB)		
IEB 1	Decrease the cost of purchase of materials	(Isaac Obiso, 2011)
IEB 2	Decrease the cost of energy consumption.	(Zhu, Geng, Fujita, & Hashimoto, 2010)
IEB 3	Decrease the cost of waste treatment.	(Ninlawan et al., 2010)
IEB 4	Investment recovery, sales of excess inventories/materials.	(Ninlawan et al., 2010)
IEB 5	Recycle returned products.	(Isaac Obiso, 2011)
IEB 6	Company's environmental reputation.	(Isaac Obiso, 2011)
IEB 7	Company's overall environmental performance.	(Isaac Obiso, 2011)

Table 1: List of Measures of Internal Factors

Item No.	Top Management Commitment	Mean	Standard Deviation	Result	Ranking
1	Commitment of GSCM from senior managers	3.88	0.99	Agree	2
2	Support for GSCM from mid-level managers	3.70	1.04	Agree	4
3	Cross-functional cooperation for environmental improvements	3.88	1.02	Agree	1
4	ISO 14001 certification	3.73	0.91	Agree	3
	Overall mean value	3.79	0.77	Agree	

Table 2: Likert Scale Analysis for Top Management Commitment Influence

Item No.	Organizational Strategy	Mean	Standard Deviation	Result	Ranking
1	Company's environmental vision & mission application.	3.83	1.15	Agree	3
2	Environmental compliance and auditing programs	3.75	1.10	Agree	5
3	Support of regulation environment	3.80	1.02	Agree	4
4	The higher the education of an employee, the higher his/her awareness of green practices	3.83	1.08	Agree	2
5	Organizational training programs contribute to the overall employee's knowledge about green practices	4.05	1.01	Agree	1
6	Employees have the awareness about GSCM	3.35	1.05	Neutral	6
	Overall mean value	3.77	0.74	Agree	

Table 3: Likert Scale Analysis for Organizational Strategy Influence

Item No.	Economic benefits	Mean	Standard deviation	Result	Ranking
1	Decrease in the cost of materials purchase	3.73	0.82	Agree	6
2	Decrease in the cost of energy consumption	3.75	1.01	Agree	5
3	Decrease in the cost of waste treatment	3.85	0.95	Agree	3
4	Investment recovery; sale of excess inventories/materials	3.65	0.83	Agree	7
5	Recycle returned products	3.83	0.93	Agree	4
6	Company's environmental reputation	4.10	0.96	Agree	1
7	Company's overall environmental performance	4.10	0.81	Agree	2
	Overall mean value	3.86	0.59	Agree	

Table 4: Likert Scale Analysis for the Influence of Economic Benefits

Model	B	Beta	t-test	P-value	F-test	P-value
Constant	24.547		5.71**	0.00	2.623	0.11
Top management commitment	0.450	0.254	1.620	0.11		

Table 5: Results of Linear Regression Analysis for the First Hypothesis

R = 0.254
 R2 = 0.065
 Adj. R2 = 0.04

Model	B	Beta	t-test	P-value	F-test	P-value
Constant	18.229		4.531***	0.00	11.08***	0.002
Organization strategy	0.582	0.475	3.329***	0.002		

Table 6: Results of Linear Regression Analysis for the Second Hypothesis

R = 0.475
 R2 = 0.226
 Adj. R2 = 0.205

Model	B	Beta	t-test	P-value	F-test	P-value
Constant	17.753		3.282***	0.002	6.485**	0.015
Economic benefits	0.505	0.382	2.547**	0.015		

Table 7: Results of Linear Regression Analysis for the Third Hypothesis

R = 0.382
 R2 = 0.146
 Adj. R2 = 0.123

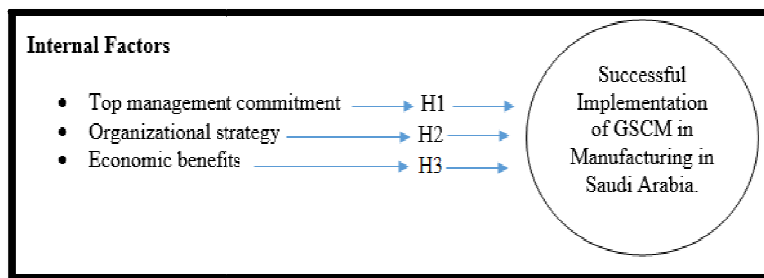


Figure 1: The Study Model