

CRITICAL SUCCESS FACTORS OF GREEN SUPPLY CHAIN MANAGEMENT: CASE EVIDENCE OF A MALAYSIAN AUTOMOTIVE MANUFACTURER

Noor Sufiawati Khairani¹, Eley Suzana Kasim²
Indra Devi Rajamanoharan³, Faridah Najuna Misman⁴

¹Faculty of Accountancy, Universiti Teknologi MARA, Segamat Campus,

³Faculty of Accountancy, Universiti Teknologi MARA Negeri Sembilan

³Faculty of Accountancy, Universiti Teknologi MARA Shah Alam, Selangor,

⁴Faculty of Business Management, Universiti Teknologi MARA Johor,

ABSTRACT

This study examines the critical success factors (CSFs) of green supply chain management (GSCM) practices in the Malaysian automotive industry. Proponents of supply chain management (SCM) suggest that understanding the CSFs of SCM practices allows firms to realize supply chain benefits. However, few researchers consider the environmental aspects while discussing the CSFs of SCM, particularly in the automotive industry, the focus of this study. Despite the plethora of CSFs of SCM suggested in the literature, it is still unclear whether the identified CSFs of SCM lead to similar resulting benefits within the GSCM environment. This paper therefore contributes to filling these gaps by examining the CSFs of GSCM practices in the automotive industry in Malaysia. The study adopts a single case study method, with data collected through semi-structured interviews, observation and document reviews from an automotive manufacturing firm operating in Malaysia. Consistent with the literature, our findings indicate that the CSFs which consist of generic CSFs for SCM and GSCM-related CSFs represent the main pre-requisites for the success of green automotive SCM practices.

Keywords: critical success factors, green supply chain management, automotive industry, Malaysia

ARTICLE INFO

Article History:

Received: 11 May 2017

Accepted: 16 October 2017

Published: 30 December 2017

INTRODUCTION

The automotive industry represents a significant contributor to Malaysian economic growth (Malaysian Industrial Development Authority (MIDA, 2010); Malaysian Automotive Institute (MAI, 2014). Recent development in the industry shows an increasing attention being drawn towards how the industry's operational supply chain activities significantly affect the natural environment. Apart from higher concern for the environment, firms tend to consider the adoption of green supply chain management (GSCM) approaches as a way to achieve long term success. GSCM has been viewed as an important corporate strategy deployed for sustainability in the automotive industry (Zhu, Sarkis, & Lai, 2007; Khairani, Kasim, Rajamanoharan, & Misman, 2017). In particular, the Malaysian National Automotive Policy (2006) which was later revised in 2014, focuses on the objectives of enhancing the competitive advantage of the local automotive industry through environmental friendly automotive manufacturing ecosystems and their outputs. In other words, automotive firms are encouraged to advance sustainable manufacturing processes that are compatible with sustaining the natural environmental systems.

As a key player within the Malaysian automotive industry, the tremendous impact of the car makers' final product to the natural environment demands an investigation on their environmental behavior. The Malaysian government is committed to reduce carbon dioxide (CO₂) releases by 40% by 2020 (Bakar, 2009). Hence, obtaining a clear understanding on the car makers' environmental responses is warranted. Despite this development, GSCM of the automotive supply chain in Malaysia has yet to be widely practiced. Furthermore, there is currently a lack of literature that addresses the GSCM and the CSFs, particularly within the automobile industry in a developing country such as Malaysia. As a result many companies in Malaysia may have embarked on introducing GSCM, with limited understanding of the key elements needed for its long term success.

Extant literature suggests a plethora of CSFs pertinent to supply chain management (SCM). Understanding these CSFs allows firms to realize supply chain benefits through identification of potential facilitators and inhibitors of the SCM practices (Fawcett, Magnan & Carter, 2008). Common CSFs include communication (Carr & Kaynak, 2007), cross-functional

orientation (Monczka, Handfield, Guinipero, Patterson & Walters, 2010), performance measures (Lee & Billington, 1992; Langfield-Smith & Smith, 2006), technology, information and measurement systems (Fawcett et al., 2008), Ghani & said (2010), trust (Chin, Tummala, Leung & Tang, 2004; Kwon & Suh, 2005), accounting system (Axelsson, Laage-Hellman & Nilsson, 2002), and corporate culture (Chin et al., 2004). CSFs may also be identified for SCM in specific contexts. For example, Kasim (2014) noted that six CSFs have been found to be critical factors for successful SCM practices in the automotive industry. These CSFs, termed as the 6Cs CSFs framework, include communication, culture, commitment, competence, capabilities and control.

Despite these studies, research gaps and weaknesses are identified. These gaps clearly indicate that researchers are not considering the environmental aspects in the SCM while discussing CSFs of SCM. Hence, current literature still lacks discussion on whether the identified CSFs of SCM lead to similar resulting benefits within the GSCM environment. In addition, studies that examine CSFs of GSCM in the local context are still sparse as most of the previous studies on SCM focuses on developed countries (Schoenherr, 2009). Hence, the issue of how these CSFs promote benefits for GSCM implementation particularly in the developing nations such as Malaysia needs to be addressed.

This paper therefore contributes to filling these gaps by examining the CSFs of GSCM practices particularly in the automotive industry in Malaysia. This study is particularly motivated by the environmentally-sensitive nature of the automotive industry which represents the backbone of the Malaysian economy. In other words, the nature of the automotive industry provides potential significant threat to the natural environment throughout the stages of the product's life cycle (e.g: GRI, 2004; Koplin et al., 2007; Nunes & Bennett, 2010; Malaysian Automotive Institute (MAI), 2012). The automotive industry also plays a key role towards Malaysian economic growth (Malaysian Automotive Institute (MAI), 2014; National Automotive Policy (NAP), 2014). Finally, it is the nation's aspiration to become an industrialised and developed nation by the year 2020 (The Edge Financial Daily, 2009; Wad & Govindaraju, 2011) through the development of the automotive industry. Given these research gaps, this study aims to address the following research question: What are the CSFs for the implementation of GSCM practices within the automotive industry?

LITERATURE REVIEW

Green Supply Chain Management (GSCM)

It is widely noted that GSCM practices include any action to eliminate or mitigate any adverse environmental impact across the supply chain (Rao, 2008; Zhu, Sarkis, & Lai, 2008a; Shukla, Deshmukh, & Kanda, 2009; Ninlawan, Seksan, Tossapol, & Pilada, 2010; ElTayeb, Zailani, & Ramayah, 2011). GSCM practices are directly associated with all three phases of the supply chain consisting of upstream supplier, operational supply chain (OSC) of the focal firm itself and the downstream customer. While the upstream green practices are directly associated with supplier initiatives, the green practices in the OSC of a focal company typically involves activities such as interactions between a focal firm and their suppliers as well as green internal practices. Finally, the downstream green practices mainly consist of customer-related green initiatives, including inverse flow practice (Azevedo, Carvalho, & Machado, 2011; Khairani, Rajamanoharan, & Thirumanickam, 2012).

Previous studies have examined GSCM practices from all three phases. For instance, within the upstream/supplier side, Lee (2008) attempted to describe what facilitates small and medium-sized suppliers in deploying GSCM practices. Meanwhile from an OSC of the focal company perspective, several GSCM studies conducted globally have widely recognised the need to identify the type of green practices and their impact on the firms' performance. For instance, Azevedo et al. (2011) investigated the relationships between GSCM practices and OSC performance in the Portuguese automotive industry. Similarly, in Japan, Zhu, Geng, Fujita, & Hashimoto (2010) explored the GSCM practices in Japanese leading manufacturers. Extant literature suggests ten key GSCM practices which form the firms' operational supply chain phases. These include green purchasing, green inbound logistics, green manufacturing, design for environment, green building, green marketing, green packaging, green transportation, green waste management, and inverse flow practice (e.g. Rao, 2008; Sanghavi, Rana, Shenoy, & Yadav, 2015). From a downstream/demand side perspective, Rogers & Tibben-Lembke (1998) concentrated on the inverse flow practice whilst, De Brito, Dekker, & Flapper (2004) provided a review and content analysis of more than sixty case studies to gain insights about the diversity of inverse flow practices.

Despite the chain-wide nature of GSCM, it has been noted that of the three levels of supply chain analysis, the OSC of the focal company – particularly manufacturing companies, has drawn much interest among proponents of GSCM. This is because the activities within the OSC of manufacturing firms have been noted as the prime contributors of ecological problems. Within the OSC of the focal firm, four distinct stages of GSCM are identified: GSCM practices within the (1) input stage, (2) throughput stage, (3) output stage and (4) end to start/inverse phase. The input stage of the OSC consists of green purchasing and green inbound logistics (Sarkis, 1999; Zhu & Sarkis, 2007; Zhu et al., 2008b). Hamner (2006) highlights the importance of greening suppliers as well as the business partners. Rao (2005) added that conducting businesses with green suppliers enabled firms to improve their own environmental performance through reduced operating costs; increased market shares; and, higher export demand. Rao (2008) added that requiring suppliers to use environmental packaging (degradable and non-hazardous); and, reusable / recyclable containers helped the wider promotion of green purchasing practices within the input stage.

Within the throughput stage, GSCM commentators found several types of green practices: 1) green manufacturing; 2) design for environment; 3) green building; and, 4) internal environmental management (internal EM). According to Rao (2008), the basic tenet of green manufacturing is pollution prevention at source whereby closed-loop manufacturing is one of the internal measures (Sarkis, 1999). In addition, Rao (2008), Sarkis (2003) and Talbot, Lefebvre, & Lefebvre (2007) suggested that internal 3Rs (reuse, recycle, and remanufacture) activities are inverse flow activities which strongly supports manufacturing firm's internal closed-loop system.

Proponents of the GSCM concepts (Sarkis, 1999; Rao & Holt, 2005; Rao, 2008) extended the distribution and outbound logistics in the output stage to include waste management activities. Green initiatives within this stage include: 1) green marketing; 2) green packaging; 3) green transportation; and, 4) green waste management (e.g., Rao, 2008; Zhu, Geng, Sarkis, & Lai, 2011). The integration of environment in the distribution and outbound logistics function contributes to environmental preservation while simultaneously meeting cost and efficiency objectives (Wu & Dunn, 1995; Sarkis, 1999; Rao, 2008).

The end to start/inverse stage corresponds to the development of the reverse logistics phase in the green OSC. Reflecting an inverse flow of items such as used products and materials, the reverse logistics phase is essential to transform a firm's traditional forward OSC into a closed-loop design (Koetz, Klippel, & Pampanelli, 2004). This means an inverse flow of items back into the manufacturing firm's forward OSC. The closed-loop design promotes reduced consumption of energy and resources, waste minimization, and re-use (Talbot *et al.*, 2007). The literature suggests that the process involved within the reverse logistics phase is broadly referred to as inverse flow practice, which forms an integral part of GSCM (Sarkis, 2003; Rao, 2008; Nunes & Bennett, 2010; ElTayeb *et al.*, 2011).

Critical Success Factors of SCM Practices

Previous studies acknowledge that understanding the critical enablers and inhibitors of SCM, also known as the critical success factors (CSFs), allow companies to successfully implement SCM (Fawcett *et al.*, 2008). A review of the literature suggests that the CSFs for GSCM implementation is associated with more specific CSFs related to environmental management than generic CSFs for SCM implementation in general. In this study, it is proposed that in order for firms to successfully implement GSCM, both the CSFs for traditional SCM and the CSFs specifically for GSCM needs to be considered. Hence, in this study, the CSFs are differentiated as follows: generic CSFs for SCM and GSCM-related CSFs.

Generic Critical Success Factors for SCM

Tummala, Phillips and Johnson (2006) specifically examined the strategic success factors in implementing SCM plans within an organization. Based on a survey on manufacturing firms, they found that corporate culture, top management support, the use of information and communication technologies including the internet, and SCM performance measures are among the key success factors of SCM practices. In contrast, Chong, Shafaghi and Tan (2011) identified several internal and external critical factors for supply chain management in China. They concluded that successful customer relationships, supply chain facilities, global competition, information system/information technology (IS/IT) infrastructure and performances, information visibility, top management

support and commitment, government encouragement and commitment, security and trust, and cultural consideration as critical factors for successful supply chains.

From a local perspective, Kasim (2014) examined the CSFs pertinent to the automotive industry and suggests six interrelated CSFs known as the 6Cs for successful SCM implementation. These consist of communication, culture, commitment, competencies, capabilities and control which represent key factors to ensure successful automotive SCM practices. It was also noted that the 6Cs were found to be inter-linked with one another and collectively leads to successful implementation of SCM in the automotive industry.

GSCM Related Critical Success Factors

A review of recent literature reveals that researchers have started to recognize the importance of examining *Critical Success Factors* pertaining to GSCM. For example, Digalwar, Agalpallewar and Sunnapwar (2013) suggested that understanding thoroughly the green manufacturing systems and their critical success factors is important. More specifically, it was noted that performance measures for GSCM represents a key success factor. Based on the view that the traditional performance measures have become increasingly invalid for the measurement of green manufacturing practices, several CSF for the performance measures of GSCM have been identified. These include top management commitment, knowledge management, employee training, green product and process design, employee empowerment, environmental health and safety, suppliers and materials management, production planning and control, quality, cost, customer environment performance requirement, customer responsiveness and company growth.

In addition, Sharma, Chandana and Bhardwaj (2015) examine and rank eight critical factors of GSCM practices in the dairy industry in Indian context. The findings suggest that the CSFs ranked in order of importance are: environmental-oriented management and customer cooperation; quality conscious environment; competitive drivers; green purchasing and green manufacturing; recovery on investment; collaborative transpirations and warehouses to reduce emissions; environmental management system; and finally, green transportations and reverse logistics. In the context of green

manufacturing, Seth, Shrivastava and Shrivastava (2016) offers a generalised green manufacturing framework linking performance measures with six CSFs, *viz* top management, human resource management, organisational culture, green practices, process management and SCM. They noted that understanding the relationship between critical success factors of GSCM and the associated performance measures should enable firms to measure the effectiveness and the success of implementing green manufacturing strategies.

As noted in the previous GSCM studies, apart from the generic CSFs for SCM, several critical success factors specifically identified for environmental issues have been added. These include green product and process design, environmental health and safety, environmental-oriented management, green purchasing and green manufacturing and green practices in general.

METHODOLOGY

A qualitative methodology involving a single case study approach was used for this study. This research process consists of five phases: Phase 1: Literature review and practical input of GSCM and its associated critical success factors from practitioners; Phase 2: Review and revision of variables of GSCM and critical success factors of GSCM; Phase 3: Pilot case study; Phase 4: Main case study; and, Phase 5: Data analysis and report writing.

In Phase 1, the research process began with an extensive review of the literature to identify the current state of knowledge in the field, relevant frameworks and key variables to be considered in the current study, as well as the appropriate research methodology and procedures. In order to obtain better understanding of GSCM and the associated critical success factors, a number of practitioners from the industry were interviewed. These practitioners consisted of the head of environmental, health and safety (EHS) department and environmental representatives, who are experts in Environmental Management (EM) practices in their firms.

The second phase involved reviewing and revising the key research variables identified in Phase 1 based on the practical input obtained from

the practitioners. Following this process, a final list of GSCM variables and the associated critical success factors was prepared. These critical success factors were appropriately categorized into generic critical success factors and GSCM-related critical success factors. During the third phase, a pilot case study to test the applicability of factors identified in Phase 2 was conducted, as suggested by Yin (2009). During this phase, semi-structured interviews were conducted involving environmental management experts from several pilot case firms. Based on the initial findings, the key research variables identified in Phase 2 were consequently reviewed and revised.

Subsequently, the main study was conducted using a single case study approach involving an automotive manufacturing operating in Malaysia. The key research issues were mainly addressed using semi-structured interviews, direct observation, and review of documentations such as annual reports, websites, newspaper clippings, and archival records. The qualitative data was recorded with respondents' permission and later transcribed. The transcribed data was then coded and analysed in Phase 5 by applying Yin's (2009) pattern-matching logic together with more specific analysis as suggested by Bloomberg & Volpe (2008) and Miles & Huberman (1994). This process was subsequently concluded with report writing.

Background of Case Firm

The case firm, which is referred to as Suprema¹, is mainly identified as the commercial manufacturer and assembler of passenger vehicles models. Besides manufacturing passenger vehicles, the company also manufactures related product lines such as accessories, spare parts and components. The manufacturing plant adheres to several environmental-friendly criteria. For instance, the plant is built with a concept of providing conducive working conditions with ergonomic features such as high roof, natural ventilations, brightly colored floors and well-lit interiors. In line with the parent company's "caring" culture, the case firm has also taken into consideration environmental concerns in its business activities. This is evidenced by the ISO 14001 EMS certification awarded in October 2009 and the setting up of an EHS department to lead its environmental management (EM) practices. These, among others, act to indicate the company as a responsible corporate citizen that is always willing to invest not only for health and safety, but also for the environment. Hence, the selection of the firm as the

¹ The name of the company is not disclosed due to confidentiality issues.

case participant permits a good demonstration of the key research issues related to the current study.

FINDINGS

Generic Critical Success Factors of GSCM Practices

The case findings indicate that several generic Critical success factors are viewed as the main pre-requisites for GSCM practices to be successfully implemented within the case firm. This is consistent with the 6Cs framework of critical success factors suggested by Kasim (2014). In particular, all the elements of the 6Cs framework, *viz*, communication, commitment, culture, capabilities, competence and control play a role in ensuring success of GSCM in the case firm.

Communication

Consistent with prior studies (e.g. Tummala *et al.*, 2006), communication forms a critical enabler for the case firm to support GSCM practices both at the strategic as well as the operational level. From the strategic perspective, board level communication is mainly found to involve positive reporting and communication of contributions to society and all stakeholders to maximize goodwill. For instance, the board level communication of commitment and targets via websites and Corporate Social Responsibility (CSR) reports. In contrast, at the operational level, the findings indicate that effective communication, both in the form of formal and informal, is important in the implementation of the Plan-Do-Check-Act cycle of the Environmental Management System (EMS).

Within the *Plan* stage, communication mainly involves dissemination of information to relevant staff on the environmental policy of the case firm. This policy serves as an important commitment statement that dictates the EMS direction for the whole firm. At the *Do* stage, operational controls are developed to address the identified significant environmental aspects consistent with the case firm's environmental policy, environmental objectives and targets, and legal and other requirements. Here, external communication with outsiders such as suppliers and contractors is important. For example, this stage involves clarifying the critical functions or related activities of

operations, establishing and maintaining procedures and standards to control situations, establishing and maintaining procedures related to article and services used by the case firm, establishing and maintaining emergency preparedness and response measures, and communication or transmission of applicable procedures and requirements to Suprema's suppliers and contractors. Furthermore, the personnel at Suprema are given appropriate education and training to ensure competency and awareness. Suprema also has internal and external communications channels for communicating its environment-related information.

Subsequently, in the *Check* stage, written communication is found to be prevalent. More specifically, within this stage, reports generated follow two mandatory audits (the Evaluation of Compliance and Internal Audits) need to be communicated to the intended recipients. Suprema periodically evaluates its compliance with all applicable legislation and regulations as well as other requirements or interest of interested parties if any, that the case firm has to adhere to. At Suprema, the Evaluation of Compliance refers to the annual evaluation of the case firm's compliance for legal and other requirements associated with its significant environmental aspects. Finally at the *Act* stage, the management review is conducted and this requires that all relevant information is communicated for continuous improvement purposes. In particular, during the management review meeting, top management from Suprema will review the EMS periodically (yearly intervals) to ensure its continuing suitability, adequacy, and effectiveness.

Culture

The findings highlight shared core values as the main binding element among the employees of the case firm. The core values focus on seven key areas *viz* quality, customer, innovation, teamwork, speed, caring and honesty. According to the EMS Co-ordinator at Suprema, the core values in each of these seven areas are embedded throughout the case firm's business processes and subsequently internalised as being the firm's work culture. Of the seven areas, the 'Caring' core value statement directly promotes the notion of a responsible corporate citizen investing among other matters, in the environment. The caring value towards environment is further emphasized in their corporate mission. In the striving towards operations excellence, the case firm finds it necessary to ensure no harm is inflicted

upon the natural environment by any of its business units. This is formally stated and communicated to Suprema through the Group's corporate mission statement as:

“The Company's mission is to strive towards excellence in all aspects of Suprema's operations. In achieving our goal, it is necessary to promote and protect the health and safety of Suprema employees and ensure that the environment is unharmed”

(Suprema's Annual Report)

Following the direction of the group, Suprema also provides a specific EHS vision documented in the EHS policy which is endorsed by the Managing Director of the holding company. Their vision is:

“SUPREMA fully committed in environmental protection and to ensure a healthy and safe working place.”

The EHS vision statement focuses on two main issues: environmental protection and, a healthy and safe working place. While the latter focuses on health and safety, the former concentrates on the natural environment.

Commitment

Consistent with the literature (e.g. Zhu, Sarkis, & Geng, 2005; Mittal, Gupta, & Pareek, 2013; Kasim, 2014), the findings noted that a successful GSCM implementation in the case firm requires support and commitment from top and senior management. In the case firm, ISO 14001 EMS is used as the framework for an effective EMS in ensuring firm's commitment towards environmental sustainability. The case firm's environmental policy quotes that Suprema is “committed to provide environmental friendly, conducive, safe and healthy working environment for our employees as well as to produce environmentally friendly and safe cars to our customers.” Their commitment is evident through continuous improvement efforts of their EMS.

From the top management perspective, commitment from the board of directors among others includes: 1) deciding on the time frame for the case firm to successfully obtain the ISO 14001 EMS certification; 2)

communication mediums such as banners are used for company-wide announcement on the endorsed intent for certification; 3) budget allocation to fund the certification and its continuous operation; 4) nomination of the patron of Suprema's EMS Committee to ensure successful certification of the EMS standard; 5) hire of a third party professional consultant to assist Suprema for a successful ISO 14001 EMS certification exercise.

Competence

Competence, training, and awareness are among the elementary support requirements for the PDCA-ISO 14001 EMS. Accordingly, Suprema's environmental policy statement listed two means for awareness and communication: 1) raise awareness in environment responsibilities through training, education and empowerment; and, 2) ensure the environmental policy is available to business associates as well as public. Case evidence shows training, education and empowerment measures undertaken by the case firm include training including skills enhancement training for personnel such as the schedule waste handlers; educational programs and campaigns particularly for the case firm's first tier suppliers and e-mails and bulletins through the case firm's intranet facility; and the public announcement system for ad-hoc announcements on environmental-related events such as internal EMS audit and plant-wide KAIZEN ISO 14001. Meanwhile measures undertaken by Suprema to raise awareness of the environmental policy to external parties includes annual reports and printed environmental policy which is available for distribution. To date, the case firm has invested in environmental-related trainings. As affirmed by the EM representative:

"...If you look at our training budget, it's not small. Because that's the only way we can get this environmental thing embedded – by training people."

Capabilities

The findings in the case firm highlight that besides its own capability in ensuring supply chain superior performance, the success also depends on its suppliers' capabilities. This is because suppliers who lack capabilities to ensure supply of parts and components to the case firm at the right time,

quantity and quality will eventually affect its performance. This is consistent with previous studies such as Wu, Lin, Chien & Hung (2011) and Kasim (2014). However, in this study, the suppliers' capabilities relate more specifically on the ability to support GSCM in the case firm.

From a supplier perspective, a Senior Manager of SCM division at Suprema confirmed that several of their vendors are environmentally proactive. According to him, those vendors are ahead in the implementation of green practices in their operations and in supplying greener products to the holding company including Suprema. These vendors are advanced in their response to the environmental regulations such as on end-of-life vehicle (ELV) and delimiting the usage of substances of concern (SOC). Nevertheless, with the recent EMS ISO 14001 certification, Suprema has plans to extend green purchasing practices to its component suppliers as well. This is because with the certification, the case firm is focused on greening the internal operations of the plant first. Any initiatives to green the supply chain partners particularly the suppliers of materials, parts and components required in production will only be possible when environmental care is inculcated fully in its own OSC operations. As highlighted by an Executive from the SCM division at Suprema:

“...We have just got it (ISO 14001). To make our vendors as our green partners..its not the time yet... It's good to be green. ISO 14001 is good. When we are really strong with ISO 14001, we can make it compulsory for vendors to be ISO 14001 too.”

Control

The literature suggests that key performance measures and metrics that measures the key purposes of the processes involved in the GSCM should be developed within the automotive industry (e.g. Olugu, Wong, & Shaharoun, 2011). At Suprema, The environmental PMS (e-PMS) serves as a monitoring and tracking mechanism for the case firm's EMS performance. In accordance with the requirement of ISO 14001 EMS, five key environmental performance areas (KEPAs) are identified at Suprema in measuring environmental performance : 1) internal EMS audit report ; 2) legal compliance; 3) regulatory / community complaints; 4) Objective and Target (O&T) achievement; and, 5) discharge/emission level. These

KEPAs in turn, leads to the development of relevant key environmental performance indicators (KEPIs). This finding concurs with Drucker (1954) and Christopher (2011) who viewed setting of objectives and performance measures in key performance areas for sustaining a firm's success. In addition, the case findings at Suprema show that the KEPIs are closely linked to the ISO 14031 Environmental Performance Evaluation standards requirement. Therefore, the case findings concur with Jasch (2000) and Perotto, Canziani, Marchesi, & Butelli (2008) whereby the environmental measurements selected at Suprema are associated to the ISO 14031 Environmental Performance Evaluation's Management Performance Indicators and Operational Performance Indicators.

Along this line of discussion, the EM Representative highlighted that environmental monitoring and measurement is conducted to reflect the ISO 14001 EMS / system performance. The EMS Coordinator also admits that the performance measurement is conducted in line with the environmental policy which among others, dictates for compliance with any legal and other requirements that the firm subscribes. This thus indirectly suggested that an appropriate environmental performance measurement is put in place to ensure proper compliance with the regulations. As commented by the EMS Coordinator:

“Yes. Environmental performance – we have... Yes (The environmental performance measurement also in line with the EHS policy). It is part of the policy for us to comply with any regulation & requirement that we subscribe. It is part of the policy...”

GSCM-Related Critical Success Factors

Case findings indicate that the GSCM-related Critical success factors are mainly concerned with the technical requirements for the case firm to be environmentally focused. For example, the case firm was awarded the ISO 14001 EMS certification in 2009. This has led to a more conscious effort for the case firm to adhere to environmental regulations. Besides that, the setting up of an EHS department has enabled more effective environmental management (EM) practices within the case firm. In addition, green policies adopted by the company have also facilitated more serious commitment to

environmental aspects. For instance, the procurement managers at Suprema use a standard green purchasing policy/guideline for procurements.

Despite introducing a green purchasing policy, the guideline set by Suprema contains only a general statement for environmental compliance. Among other details, the guideline stipulates the need for environmental-friendly packaging, the use of environmental-friendly materials, and green supplier selection criteria. The integration of green specifications in the purchasing process of non-component items is the second key initiative associated with green purchasing. The Procurement Executive (Engineering Procurement & Contract) highlighted that the green specifications include requirements for green materials and green packaging. These initiatives form part of the green policy/guidelines at Suprema.

At Suprema, the deployment of green purchasing also extends to the supplier selection process. According to the Procurement Executive (Engineering Procurement & Contract), suppliers of non-components and services must possess special environmental-related license. This is because those suppliers who are certified with the special license must comply with regulatory body.

CONCLUSIONS

The examination of the critical success factors of GSCM practices was mainly conducted with reference to the 6Cs Critical success factors of automotive SCM practices as posited by Kasim (2014) and the GSCM-related Critical success factors proposed by GSCM proponents. The main findings were that the success of the GSCM practices is associated with six critical factors which consist of communication, culture, commitment, competence, capabilities as well as control. These findings are consistent with the results of Kasim (2014) which examined the Critical success factors of SCM from a more general perspective.

In addition, the results also support previous studies (e.g., Digalwar et al., 2013; Seth et al., 2016) which suggest that GSCM-related Critical success factors also play a role in ensuring the success of GSCM implementation within the case firm. These include among others the “greening” of

products and process design, focus on environmental health and safety, and environmental-oriented management. Thus, this research provides an opportunity for practitioners to gain a better understanding of how GSCM could be leveraged to enhance firm performance. In particular, this study supports the National Automotive Policy 2014 which emphasizes on developing and implementing initiatives to green the overall supply chain of the domestic automotive industry. In line with the government's commitment to enhance the competitiveness of the local automotive industry, this study highlights the key success factors for successful implementation of GSCM.

Overall, the findings contribute to the body of knowledge in the critical success factors of SCM area. This contribution is important since it adds to the limited extant research on the Critical success factors of SCM particularly in the green automotive supply chain management area. Moreover, the additional insights in understanding the impact of Critical success factors of GSCM in a Malaysian context may serve as a useful knowledge to Malaysian firms which plan to improve supply chain performance.

REFERENCES

- Axelsson, B., Laage-Hellman, J., & Nilsson, U. (2002). Modern management accounting for modern purchasing. *European Journal of Purchasing & Supply Management*, 8, 53–62.
- Azevedo, S. G., Carvalho, H., & Machado, V., C. (2011). The influence of green practices on supply chain performance: A case study approach. *Transportation Research Part E*, 47, 850-871.
- Bakar, W. H. (2009, December 18). Malaysia kurang pelepasan karbon, gas 40 peratus. *Berita Harian*, 4.
- Bloomberg, L. D., & Volpe, M. (2008). *Completing your qualitative dissertation: A roadmap from beginning to end*. California, USA: SAGE Publications.
- Carr, A. S., & Kaynak, H. (2007). Communication methods, information sharing, supplier development and performance: An empirical study of

- their relationships. *International Journal of Operations & Production Management*, 27(4), 346-370.
- Chin, K., Tummala, V. M. R., Leung, J. P. F., & Tang, X. (2004). A study on supply chain management practices: The Hong Kong manufacturing perspective. *International Journal of Physical Distribution & Logistics Management*, 34(6), 505-524.
- Chong, W. K., Shafaghi, M., & Tan, B. L. (2011). Development of a business-to-business critical success factors (B2B CSFs) framework for Chinese SMEs. *Marketing Intelligence & Planning*, 29(5), 517-533.
- Christopher, W. F. (2011). A new management for enduring company success. *Kybernetes*, 40(3/4), 369-393.
- De Brito, M. P., Dekker, R., & Flapper, D. P. (2004). Reverse logistics: A review of case studies. Retrieved January 28, 2012, from people.few.eur.nl
- Digalwar, A. K., Tagalpallewar, A. R. & Sunnapwar, V. K. (2013). Green manufacturing performance measures: An empirical investigation from Indian manufacturing industries. *Measuring Business Excellence*, 17(4), 59-75,
- Dinesh Seth, R. L. Shrivastava, Sanjeev Shrivastava, (2016). An empirical investigation of critical success factors and performance measures for green manufacturing in cement industry. *Journal of Manufacturing Technology Management*, 27 (8), 1076-1101,
- Drucker, P.F. (1954). *The Practice of Management*. New York, NY: Harper & Row.
- ElTayeb, T. K., Zailani, S., & Ramayah, T. (2011). Green supply chain initiatives among certified companies in Malaysian and environmental sustainability: Investigating the outcomes. *Resources, Conservation and Recycling*, 55, 495–506.

- Fawcett, S. E., Magnan, G. M., & McCarter, M. W. (2008). Benefits, barriers, and bridges to effective supply chain management. *Supply Chain Management: An International Journal*, 13(1), 35–48.
- Ghani, E. K., & Said, J. (2010). Digital reporting practices among Malaysian local authorities. *Electronic Journal of e-Government*, 8(1), 33-44.
- Global Reporting Initiative (2004). GRI automotive sector supplement (Pilot version 1.0). Retrieved June 25, 2008, from www.globalreporting.org
- Hamner, B. (2006). Effects of green purchasing strategies on supplier behavior. In Sarkis, J. (Ed.). *Greening the Supply Chain*, pp. 25 – 37, London: Springer.
- Jasch, C. (2000). Environmental performance evaluation and indicators. *Journal of Cleaner Production*, 8, 79-88.
- Kasim, E. S. (2014). *Supply chain management practices and performance measures: Case evidence from Malaysian automotive manufacturers*. (Unpublished doctoral thesis). Universiti Teknologi MARA, Shah Alam, Malaysia.
- Khairani, N. S., Kasim, E. S., Rajamanoharan, I. D., & Misman, F. N. (2017). Green supply chain management in the Malaysian automotive industry: A systems thinking perspective. *International Journal of Supply Chain Management*, 6(2), 38-48.
- Khairani, N. S., Rajamanoharan, I. D., & Thirumanickam, N. (2012). Green supply chain management practices: Evidence from Malaysia. *Malaysian Accounting Review*, Special Issue, 11(2), 121 - 136.
- Koetz, A. L., Klippel, M., & Pampanelli, A. B. (2004). *Reverse logistics and remanufacturing in automotive industry: The GKN Brazil case*. Paper presented at the Second World Conference on POM and 15th Annual POM Conference, Cancun, Mexico, Apr. 30-May 3, 2004.
- Koplin, J., Seuring, S., & Mesterharm, M. (2007). Incorporating sustainability into supply management in the automotive industry: The

- case of the Volkswagen AG. *Journal of Cleaner Production*, 15(15), 1053-1062.
- Kwon, I. G., & Suh, T. (2005). Trust, commitment and relationships in supply chain management: a path analysis. *Supply Chain Management: An International Journal*, 10(1), 26–33.
- Langfield-Smith, K., & Smith, D. (2006). Performance measures in supply chains. Articles of Merit Award Program for Distinguished Contribution to Management Accounting, Professional Accountants in Business Committee, Information Paper, 1-18.
- Lee, H. L., & Billington, C. (1992). Managing supply chain inventory: Pitfalls and opportunities. *Sloan Management Review*, 33(3), 65-73.
- Lee, S-Y. (2008). Drivers for the participation of medium-sized suppliers in green supply chain initiatives. *Supply Chain Management: An International Journal*, 13(3), 185-198.
- Malaysian Automotive Institute (MAI) (2012). MAI supply chain management news: MAARA works with MAI to systemize the automotive recycling activities. *Supply Chain Management*, 6, February 2012. Retrieved from www.mai.org.my
- Malaysian Automotive Institute (MAI) (2014). Retrieved from www.mai.org.my.
- Malaysian Industrial Development Authority (MIDA) (2010). Malaysia's Automotive Industry. Retrieved October 24, 2016, from www.mida.gov.my
- Miles, M. B., & Huberman, A. M. (1994). *An expanded sourcebook: Qualitative data analysis* (2nd ed.). California, USA: SAGE Publications.
- Mittal, R., Gupta, S., & Pareek, S. (2013). Pressures, practices and performance of green supply chain (A study in Indian perspective). *Interdisciplinary Journal of Contemporary Research in Business*, 5(3), 472 – 487.

Monczka, R. M., Handfield, R. B., Guinipero, L. C., Patterson, J. L. & Walters, D. (2010). *Purchasing and supply chain management*. Hampshire: Cengage Learning.

National Automotive Policy (2014). Retrieved from www.miti.gov.my.

Ninlawan, C., Seksan, P., Tossapol, K., & Pilada, W. (2010). Implementation of green supply chain management practices in electronics industry. *Proceedings of the International MultiConference of Engineers and Computer Scientists 2010 Vol. III*, March 17 – 19, Hong Kong.

Nunes, B. & Bennett, D. (2010). Green operations initiatives in the automotive industry: An environmental reports analysis and benchmarking study. *Benchmarking: An International Journal*, 17(3), 396 – 420.

Olugu, E. O., Wong, K. Y., & Shaharoun, A. M. (2011). Development of key performance measures for the automobile green supply chain. *Resources, Conservation and Recycling*, 55, 567-579.

Perotto, E., Canziani, R., Marchesi, R., & Butelli, P. (2008). Environmental performance, indicators and measurement uncertainty in EMS context: A case study. *Journal of Cleaner Production*, 16, 517-530.

Rao, P. H. (2005). The greening of suppliers-in the South East Asian context. *Journal of Cleaner Production*, 13, 935 – 945.

Rao, P. H. (2008). *Greening the supply chain: A guide for Asian managers*, New Delhi: SAGE Publications.

Rao, P., & Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance? *International Journal of Operations & Production Management*, 25(9), 898-916.

Rogers, D. S., & Tibben-Lembke, R. S. (1998). *Going backwards: Reverse logistics trends and practices*. Nevada, USA: Reverse Logistics Executive Council.

- Sanghavi, P., Rana, Y., Shenoy, S., & Yadav, R. (2015). A review on green supply chain management in automobile industry. *International Journal of Current Engineering and Technology*, 5(6), 3697–3702.
- Sarkis, J. (1999). *How green is the supply chain: Practice and research*. Worcester, MA: Graduate School of Management, Clark University.
- Sarkis, J. (2003). A strategic decision framework for green supply chain management. *Journal of Cleaner Production*, 11, 397 – 409.
- Schoenherr, T. (2009). Logistics and supply chain management applications within a global context: An overview. *Journal of Business Logistics*, 30(2), 1-25.
- Sharma, V. K., Chandana, P. & Bhardwaj, A. (2015). Critical factors analysis and its ranking for implementation of GSCM in Indian dairy industry. *Journal of Manufacturing Technology Management*, 26(6), 911-922.
- Shukla, A. C., Deshmukh, S. G., & Kanda, A. (2009). Environmentally responsive supply chains: Learnings from the Indian auto sector. *Journal of Advances in Management Research*, 6(2), 154-171.
- Talbot, S., Lefebvre, E., & Lefebvre, L. (2007). Closed-loop supply chain activities and derived benefits in manufacturing SMEs. *Journal of Manufacturing Technology Management*, 18(6), 627–658.
- The Edge Financial Daily (2009). *New National Automotive Policy*. Article dated 28 October 2009, downloaded from <http://www.theedgemaalaysia.com> on 15 April 2010.
- Tummala, V. M. R., Phillips, C. L. M., & Johnson, M. (2006). Assessing supply chain management success factors: A case study. *Supply Chain Management: An International Journal*, 11(2), 179-192.
- Wad, P. & Govindaraju, V. G. R. C. (2011). Automotive industry in Malaysia: An assessment of its development. *International Journal of Automotive Technology and Management*, 11(2), 152-171.

- Wu, H-J., & Dunn, S.C. (1995). Environmentally responsible logistics systems. *International Journal of Physical Distribution & Logistics Management*, 25(2), 20-38.
- Wu, H-Y., Lin, Y-J., Chien, F-L., & Hung, Y-M. (2011). A Study on the relationship among supplier capability, partnership and competitive advantage in Taiwan's semiconductor industry. *International Journal of Electronic Business Management*, 9(2), 122-138.
- Yin, R. K. (2009). *Case study research: Design and methods* (4th Ed.). California, USA: SAGE Publications.
- Zhu, Q. & Sarkis, J. (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance. *International Journal of Production Research*, 45(18-19), 4333 – 4355.
- Zhu, Q., Geng, Y., Fujita, T., & Hashimoto, S. (2010). Green supply chain management in leading manufacturers: Case studies in Japanese large companies. *Management Research Review*, 33(4), 380-392.
- Zhu, Q., Geng, Y., Sarkis, J., & Lai, K-H. (2011). Evaluating green supply chain management among Chinese manufacturers from the ecological modernization perspective. *Transportation Research Part E*, 47, 808–821.
- Zhu, Q., Sarkis, J., & Geng, Y. (2005). Green supply chain management in China: Pressures, practices and performance. *International Journal of Operations & Production Management*, 25(5/6), 449 – 468.
- Zhu, Q., Sarkis, J., & Lai, K-H. (2007). Green supply chain management: Pressures, practices and performance within the Chinese automobile industry. *Journal of Cleaner Production*, 15(1-2), 1041 – 1062.
- Zhu, Q., Sarkis, J., & Lai, K-H. (2008a). Green supply chain management implications for “closing the loop”. *Transportation Research Part E*, 44(1), 1–18.
- Zhu, Q., Sarkis, J., & Lai, K-H. (2008b). Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics*, 111(2), 261–273.