South Asian Journal of Marketing & Management Research (SAJMMR)
ISSN: 2249-877X Vol. 11, Issue 12, December 2021 SJIF 2021= 7.642
A peer reviewed journal

AN EMPIRICAL STUDY OF THE INDIAN AUTOMOTIVE INDUSTRY'S EFFECT ON KEY SUCCESS CRITERIA FOR ADOPTING GREEN SUPPLY CHAIN MANAGEMENT TOWARDS SUSTAINABILITY

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DOI: 10.5958/2249-877X.2021.00138.7

ABSTRACT

The management of 'sustainable' supply chain problems is gaining a lot of interest from academics and business. Organizations that integrate ecological and societal issues into their business strategy have found sustainability to be a major concern. As a result, this article examines the significance of Critical Success Factors (CSFs) in implementing Green Supply Chain Management (GSCM) for long-term sustainability, using the Indian automotive sector as a case study. The suggested framework's predicted connections were put to the test by examining data from 123 Indian automotive companies. Using multiple regression analysis, this research looked at the effects of CSFs to adopt GSCM towards sustainability on existing green practices in the Indian automotive sector and anticipated organizational performance results. According to the findings, the 'Regulatory' CSF is the one that plays the most important role in promoting green practices. The CSFs 'Internal Management' and 'Competitiveness' are critical in achieving anticipated performance results. The current study will help practitioners and managers better understand various GSCM implementation issues and improve their practices and performance in the direction of long-term sustainability.

KEYWORDS: *Critical Success Factors (CSFs), Descriptive Statistics, Empirical Investigation, Green Supply Chain Management (GSCM), Multiple Linear Regression Analysis, Questionnaire based Survey.*

1. INTRODUCTION

Organizations are working hard to improve their sustainability through various strategies such as environmental management systems, lean, agile, resilient, green and world-class manufacturing, eco-effectiveness, and competency in today's competitive environment (Cabral et al., 2012; Gunasegaram and Spalanzani, 2012; Haleem et al., 2012; Hsu et al., 2013; Seuring, MANU, 2013). In recent years, changing financial, regulatory, and competitive pressures, as well as increasing customer demands and complex environmental regulations, have heightened interest in sustainable supply chains and reverse logistics activities within them (Jain, 2012; Jindal and Sangwan, 2013; Diabat et al., 2014; Shaharudin et al., 2015). Organizations are increasingly under pressure to decrease emissions across the supply chain as environmental awareness grows throughout the globe (Kumar et al., 2014a). To get a competitive advantage over others, they must carefully consider combining their manufacturing and service sector business processes

with sustainability and reducing supply chain costs (Seuring and Müller, 2008; Gunasekaran and Spalanzani, 2012).

With growing concerns about environmental issues, Green Supply Chain Management (GSCM) issues have piqued the interest of a large number of academicians and SC practitioners around the world in recent years (Mudgal et al., 2009; Luthra et al., 2011; Mishra et al., 2012; de Sousa Jabbour et al., 2013; Luthra et al., 2013; Mangla et al., 2013 GSCM has been identified as a critical component in promoting organizational sustainability (Sarkis et al., 2011; Rath, 2013). As environmental problems worsen, it has become a long-standing community concern in developed countries and has recently reawakened the green/sustainable movement in developing countries (Chen and Chai, 2010; Govindan et al., 2013; Jay ram and Avittathur, 2014; Kumar et al., 2014b; Neves et al., 2014; Luthra and Haleem, 2015; Tyagi et al., 2015). In the past several years, GSCM research has sparked widespread interest throughout the world, including in India (Mohanty and Prakash, 2014; Mangla et al., 2014b; Luthra et al., 2015a). In India, the automotive industry is one of the most important employment generators. Furthermore, the Indian automotive industry is engaged in the business in one or more ways, accounting for approximately 22% of the country's manufacturing GDP (GDP). India is also the world's seventh-largest car producer, and by 2015, it is expected to become the fourth-largest automotive market by volume (http://www.ibef.org) [1]. Due to competitive, governmental, and community pressures, the Indian automotive industry has begun to recognize the significance of GSCM (Luthra et al., 2014a) [2].

Although a number of studies exist in the literature to measure the impacts of GSCM practices on expected performance outcomes (Zhu et al., 2007a, 2007b; Azevedo et al., 2011; Eltayeb et al., 2011; Yusuf et al., 2013; Zhu et al., 2013; Grimm et al., 2014; Mitra and Date. 2014; Mohanty and in the age of globalization, Indian businesses are under more pressure to discover ways to improve profitability and long-term viability in today's market (Sundharam et al., 2013; Govindan et al., 2016b). It is difficult for businesses to be sustainable while retaining their competitive advantage, resulting in economic advantages and environmentally pleasant surroundings (Wu et al., 2015). There has been many research that have found sustainability patterns in industrialized nations, but there have been few studies in developing economies like India (Jayaram and Avittathur, 2014). From an Indian viewpoint, there is little information on the implementation of GSCM/SSCM procedures (Mitra and Datta. 2014; Gandhi et al., 2016). As a result, it is necessary to understand the effects of CSFs on green practices and anticipated results in order to apply GSCM towards sustainability in the Indian automotive industry. Figure 1 discloses the impacts of CSFs to implement GSCM towards sustainability on expected performance outcomes [3].

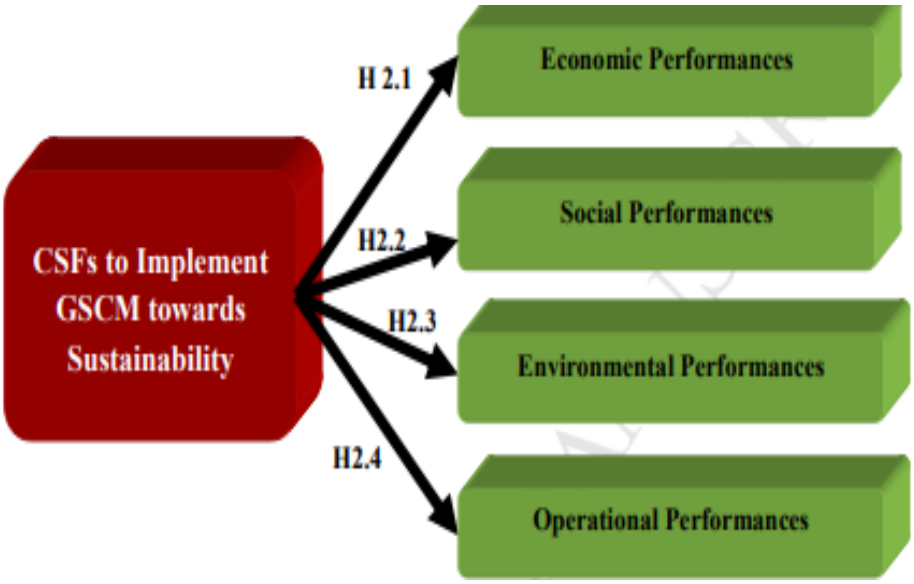

Figure 1: The impacts of CSFs to implement GSCM towards sustainability on expected performance outcomes.

2. DISCUSSION

For GSCM techniques to be implemented, management of the internal environment, including commitment and support from top and middle level managers, may be required (Zhu et al., 2005). One of the most important CSFs for businesses to adopt GSCM processes is internal management. Changes/increases in adoption of environmental practices and implementation level may be influenced by pressure from existing employees, leadership and support from environmentally motivated top management, and perceptions of environmental risks (Holt and Ghobadian, 2009; Hu and Hsu, 2010; Yusuf et al., 2013).

2.1.2 Customer service

Kumar et al., 2013; Kumar et al., 2014b) believe that customers may play an important and significant role in greening supply chains. In reality, emerging nations like India have been under a lot of pressure to adopt green supply chain techniques in order to meet their consumers' growing demands and compete in the market (Xu et al., 2013; Omkareshwar, 2013). To realize GSCM advantages, customer participation becomes critical (Zhu et al., 2007a).

2.1.3 Regulatory As environmental concerns have grown in significance throughout the world, regulatory and other government agencies have been compelled to develop tougher rules (Jayaram and Avittathur, 2014). Organizations are obliged to reduce the negative effects of their supply chains on the environment in order to make it green, and regulatory agencies have been drafting tough environmental laws to limit environmental harm (Mathiyazhagan et al., 2013; Mangla et al., 2014a; Mathiyazhagan et al., 2014). Since, conformity with regulations is becoming increasingly important for conducting proactive ecological strategies and necessary to achieve environmental performances (Ageron et al., 2012; Lin, 2013; Brandenburg et al., 2014), industry must maintain competitiveness while also complying with regulatory requirements (Tseng and Chiu, 2013).

2.1.4 Managing Suppliers

Suppliers and consumers must be actively involved in GSCM processes (Hu and Hsu, 2006; Srivastava, 2007; Hu and Hsu, 2010; Testa and Iraldo, 2010; Awasthi and Kannan, 2016). Regular interactions with vendors' staff, green partnership agreements, and openness in adopting innovative practices may lead to improvements in environmental and business performance toward ach (Kaushik et al., 2014). (Iraldo et al., 2009) [4].

2.1.5 Social Issues

Sarkis et al., 2011; Zhu et al., 2012; Gunasekaran et al., 2013; Ketikidis et al., 2013; Wang and Sarkis, 2013; Yusuf et al., 2013) showed the significance of social aspects in attaining green/sustainable supply chain practices. Organizations must provide full information about their activities' impact on society to the public as public knowledge and concern about environmental problems grows (Hughey and Sulkowski, 2012; Shen et al., 2015). NGO groups may be successful in putting pressure on businesses to accomplish social goals (Yusuf et al., 2013).

2.1.6 The ability to compete

Kagan et al., 2003; Zhu and Sarkis, 2007; Mudgal et al., 2009; Kim and Rhee, 2012; Toke, 2012; Wang and Sarkis, 2013) have all shown that competition and related variables may play a bigger role in GSCM/SSCM implementation. Competitiveness has been shown to enhance GSCM practices more than governmental laws or a company's desire to preserve the environment (Yusuf et al., 2013). Additional voluntary and competitive factors may have influenced the adoption of sustainable SCM methods (Wang and Sarkis, 2013).

2.2 Environmentally friendly methods

Literature has identified and described six green practices (Green Design, Green Purchasing, Green Production, Green Management, Green Marketing, and Green Logistics Practices) for achieving environmental sustainability. In their study, Büyüközkan and ifçi (2012) claimed that green design approaches may decrease approximately 80% of product and process-related environmental effects. Sarkis, 1998; Beamon, 1999; Gungor and Gupta, 1999; Parikka-Alhola, 2008; Eltayeb et al., 2011) utilize green design techniques to minimize the environmental effect of goods throughout their useful life. Many ideas, such as green raw materials, cleaner technological processes, and reverse logistics techniques, are included into green product and process design (Hasan, 2013) [5].

2.2.2 Environmentally friendly buying methods

Buying products that have desirable environmental characteristics such as recyclability, reusability, and the absence of hazardous materials (Hand field et al., 2002; Rao, 2002, 2004; Hu and Hsu, 2010; Eltayeb et al., 2011) are examples of green purchasing practices. Environmental concerns have prompted buying experts to rethink their purchasing strategy and position in the supply chain network (Min and Galle, 2001; Handfield et al., 2002; Hu and Hsu, 2010; Govindan et al., 2015d).

2.2.3 Environmentally friendly manufacturing methods

Green manufacturing techniques are the use of environmentally and socially responsible methods to reduce the negative effects of industrial operations while still achieving economic advantages (Baines et. al., 2012; Govindan et al., 2015b). GSCM production methods and associated concepts assist a company in achieving profit and improving process efficiency (Zhu and Sakis,

2006; Chien and Shih, 2007; Mangla et al., 2014b; Zailani et al., 2015). Green manufacturing methods enhance suppliers' and manufacturers' worldwide competitiveness in the automotive sector (Gunasekaran and Spalanzani, 2012; Tseng, 2013; Canils et al., 2013; Subramanian and Gunasekaran, 2014). The biasness of convenience sampling was evaluated by splitting 123 answers from Indian automotive companies into two groups: convenience sampling (44.71 percent) and late responses from random sampling (25.71 percent) (55.29 percent). The responses obtained from these subgroups are as follows:

"Early respondents" are those who responded before the first reminder was sent (i.e., within 6 weeks of the initial mailing), while "late respondents" are those who responded after that. The Chi-square test was performed to see whether there were any significant variations in answers between early and late respondents for the nine variables of respondents and businesses studied. [6]there are no significant variations in the answers of early and late responders across all categories of respondents and businesses. As a result, on-response bias is not a[7] problem in this research, and the whole data set of 123 answers obtained[8] from Indian automotive companies may be used to assess the suggested propositions. The two most essential properties of any measuring method are reliability and validity. Descriptive statistics are critical for understanding current trends in variables and using GSCM effectively. Multiple regression analysis is used to forecast changes in the dependent variable (actual GSCM practices, anticipated performance results) as a result of changes in the independent factors (CSFs to implement GSCM towards sustainability). All factor loadings in our research are considerably over 0.5. Due to low factor loading, one of the twenty-six variables, "Efficient strategic planning," was removed from the EFA findings. The other 25 variables were divided into six CSFs (internal management, customer management, regulations, supplier management, social and competitiveness) in order to apply GSCM in the Indian automotive sector, which accounted for 67.893 percent of the total variation. Similarly, by implementing GSCM to achieve sustainability in the Indian automobile industry, sixteen expected organizational performance outcomes were extracted into four categories of expected performances (Economic, Social, Environmental, and Operational), accounting for 73.91 percent of the total variance (Luthra et al., 2015b). Furthermore, the key items selected in this study have been subjected to reliability, validity analysis, and descriptive statistics [9].

3. CONCLUSION

Environmental and sustainability problems have become significant concerns for governments, international organizations, and corporate groups in recent years. As a result, corporate organizations are battling to become more sustainable. The automobile business is one of India's most important industries. As a result, using the Indian automotive sector as a case study, an effort has been made to objectively evaluate the effect of CSFs to adopt GSCM towards sustainability on current green practices and anticipated organizational performance results. Using extensive research, six CSFs (25 components), six green practices (37 sub practices), and four anticipated performance outcomes (sixteen performances by adopting GSCM practices) were found. To identify the significance of CSFs in implementing GSCM practices, the current state of green practices, and the importance of anticipated performance results, a questionnaire-based survey was performed. The significance of different constructs utilized in this research was explained using descriptive statistics. The identification of critical success criteria for implementing GSCM, green practices, and significant organizational anticipated performance results by its implementation is based on empirical study of collected data. According to empirical findings, the majority of green practices in the Indian automotive sector are in the early

stages of implementation, i.e., the implementation plan is in the works or the practice has just been adopted. Internal management and competitiveness CSFs have been critical in achieving anticipated performance results and ensuring sustainability [10].

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