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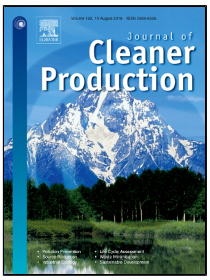

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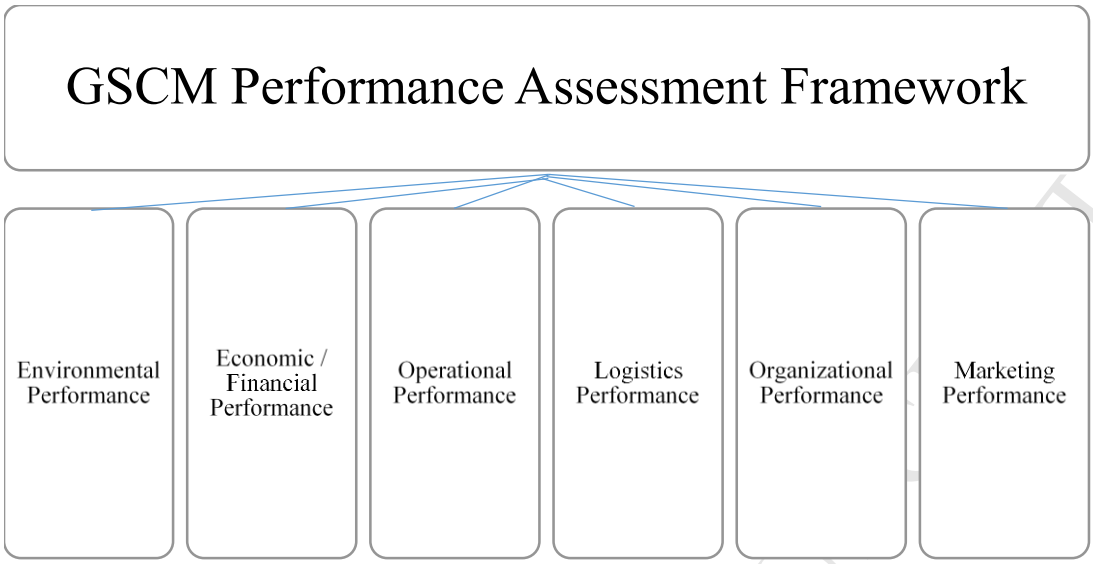

A NEW HOLISTIC CONCEPTUAL FRAMEWORK FOR GREEN SUPPLY CHAIN MANAGEMENT PERFORMANCE ASSESSMENT BASED ON CIRCULAR ECONOMY

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ABSTRACT

In circular economy, the Green Supply Chain Management (GSCM) provides the resource optimization and it is seen as a solution to solve environmental problems and consumption patterns within the whole supply chain. The GSCM implementation and performance assessment is relatively important for survival in an ever-increasingly competitive environment. Within the circular economy context; companies that aim to improve GSCM must constantly monitor their performance. In order to integrate the circular economy concept into GSCM, it is required to achieve an optimal balance of environmental, economic, logistics, organizational, and marketing performance indicators. However, in the literature, these indicators were investigated separately in terms of GSCM performance assessment, therefore, to achieve this optimal balance, it is necessary to assess these different indicators. Within this context, the aim of this paper is to propose a new holistic conceptual GSCM performance assessment framework which integrates environmental, economic, logistics, operational, organizational and marketing performance. The framework has three-dimensional hierarchy which includes the main criteria, sub-criteria, and the measures for the GSCM performance assessment which have great significance to implement effective GSCM.

Key Words: Circular Economy, Green Supply Chain Management, GSCM Framework, Performance Measures

1. INTRODUCTION

Nowadays, the sustainable supply of natural resources, increasing cost pressures with economic sustainability, environmental and political constraints in the supply chain, and environmental problems gained importance for businesses to have sustainable economic models. With the transition of linear economy to circular economy, companies need to consider sustainability and closed-loop cycle. Circular economy emphasizes minimal resource consumption and environmental protection, thus companies consider implementing green supply chain. Especially traditional supply chain produces waste, cause ecological problems and does not consider society and environment. Due to stricter regulations, high level of commercial competition and increased public pressure, companies increasingly need to include environmental concerns into their strategic planning and their practices as a corporate environmental strategy (Zhu et al., 2008; Vanalle et al., 2017). Between the late 1980s and the early 1990s, green awareness emerged as new competitive strategic weapon for firms. Also, several factors caused companies to engage in environmental considerations including, economic and legislation concerns, social responsibility, ethics and stakeholder pressures (Walton et al., 1998; Beamon, 1999; Bansal and Roth, 2000; Carter et al., 2000; Sarkis, 2003; Hervani et al., 2005; Ferguson and Toktay, 2006; Walker et al., 2008). Environmental and

social concerns lead the closed loop processes to prevent disposal of consumed goods. Within this closed loop, circular economy proposes a system based approach on recycling and reusing materials and to reduce the amount of materials, therefore it makes sustainability more possible (Sauvé et al., 2016). Companies became more environmentally-conscious in the supply chain aiming to reduce waste, preserve the quality of product life, and conserve natural resources to serve customers better (Walton et al., 1998; Min and Kim, 2012). Wei et al. (2014) emphasized that GSCM within the circular economy plays an important role in the development of manufacturing industry.

In circular economy, a need to propose a business strategy raised to gain economic benefit, minimize environmental impacts and increase the efficiency of resource consumption. GSCM emerged as a corporate strategy for companies to attain these goals (Zhu and Sarkis, 2006; Lai et al., 2011). Therefore, GSCM make comprehensive consideration to focus on environmental protection and resource conservation problem with integrated information, logistics and energy flow in the entire supply chain (Ying and Li-jun, 2012). Organizations have begun to implement GSCM in order to increase profit and market share, by reducing environmental risks and increasing responsiveness to customer demand through a wide range of products and services (Green et al., 1998; Murray, 2000) and also in order to obtain competitive advantage (Humphreys et al., 2003; Shu and Zhang, 2004; Lee et al., 2009).

According to Zhu and Sarkis (2006), and Li et al. (2006), GSCM practices can be described as green procurement and manufacturing activities, which encompasses green design, manufacturing, recycling, according to green standards. In order to implement effective GSCM, companies should combine internal and external GSCM practices by encouraging the collaboration of suppliers and customers to increase profit and market share and achieve competitive advantage. According to Zhu et al. (2005), GSCM activities and practices are not single company-based activities, but rather depend on inter-organizational environmental management, incorporating industrial ecosystems, product life-cycle analysis, and increased manufacturer responsibility. Inter-organizational and cross-functional integration of environmental, production, engineering, marketing, and logistics personnel and their concerns are the characteristics of effective GSCM (Sarkis, 2006). GSCM integration has been associated with improved operational performance, such as lead time, productivity, and timely delivery (Frohlich and Westbrook, 2001; Chen et al., 2004).

The aim of GSCM is to reduced costs and resource consumption, decreased environmental pollution through green production, improved market share, stronger brand image, and increased economic performance by improving environmental and social performance (Daweiet al., 2015). GSCM demands improving performance of the processes and products in line with the environmental regulations (Hsu and Hu, 2008). Therefore, many industries have focused on the assessment of their green performance. As a business target, sustainable development involves the attempt to balance economic, environmental and social performance (Jabbour and Jabbour, 2009; Lee et al., 2009). The main driver for “green” supply chain is to reduce cost and reach profitability (Srivastava and Srivastava, 2006; Srivastava, 2007; Darnall et al., 2008; Fortes, 2009). GSCM focuses on improving environmental and financial performance, encompassing a wide range of aspects from environmental management to green design (Zhu and Sarkis, 2004; Rao and Holt, 2005).

In the literature review, within the green perspective, studies focus on different aspects such as supplier selection, design, purchasing and quality, performance assessment, waste, barriers and drivers of GSCM (Malviya and Kant, 2015).

According to the Holt and Ghobadian (2009), and Dubey et al. (2017), the literature is insufficient based on a holistic view of GSCM performance. Also, Shafique et al. (2017) emphasized this lack in a systems theory perspective. System theory is the interaction between the activities of the companies to achieve the objectives. Likewise, this interaction provides link between the human resources, machine, and environmental activities. In GSCM, nearly all activities such as inventory management, purchasing management, supplier and customer relationship management are interrelated to each other to improve the organizational performance.

The theoretical contribution of this study is to reveal the different indicators of GSCM such as environmental, economic/financial, operational, logistics, organizational, and marketing performances within the context of circular economy. Therefore, this study supports the understanding of the systems theory within the holistic assessment of GSCM performance.

The second contribution is to propose a systematic framework in order to assess GSCM performance. Assessment process stands on the measures. According to Sagnak and Kazancoglu (2016), an organization should measure, monitor and evaluate its environmental performance in a continuous manner. To ensure successful data analysis in all stages of measuring, monitoring, and evaluation processes, it is essential to implement an effective data gathering process. Therefore, this study integrates 6 criteria, 21 sub-criteria and 189 measures to propose an assessment framework.

The third contribution is the inclusion of the marketing criterion in GSCM performance assessment. Liang and Chan (2008) indicated that the main effect of GSCM is green marketing activities. Therefore, it was necessary to add sub-criteria of marketing criterion, i.e., increasing customer satisfaction, marketing measures, and improving cooperation/collaboration with customers and their related measures.

Therefore, the objective of this study is to propose a holistic approach based on systems theory to the investigation of the GSCM performance factors, and to propose an integrated framework combining the environmental, economic, logistics, operational, organizational and marketing criteria. The GSCM framework includes three-dimensional hierarchy which includes the main criteria, sub-criteria, and the measures, respectively. Environmental, economic, logistics, operational, organizational, and marketing performance are identified as the main criteria for the GSCM performance assessment which have great significance to implement effective GSCM. This study integrates 6 criteria, 21 sub-criteria and 189 measures to propose an assessment framework.

In this paper, following the introduction, literature review of GSCM and GSCM performance items are presented respectively in Section 2. The proposed framework presents criteria, sub-criteria and measures of GSCM performance in Section 3. Finally, section 4, the conclusion, discusses future research directions.

2. LITERATURE REVIEW

2.1. GREEN SUPPLY CHAIN BASED ON THE CIRCULAR ECONOMY

A circular economy is a new economic concept which is first adapted by China, in contrast to the linear economy. Within the circular economy, the linear sequence of “take- make-consume”, which is the classical flow of traditional business models, is transformed by the new sequence of “take-make-consume-dispose” (Lieder and Rashid 2016; Urbinati et al., 2017; Jabbour et al., 2018). Webster (2015) claimed that the aim of circular economy is to keep the maximum level utility and value of the products and materials, via design, maintenance, repair, reuse, remanufacturing, and recycling whereas Merli et al. (2018) added,

decreasing waste, to the definition. Geissdoerfer et al. (2017) stated that the circular economy is defined as a regenerative system in such a way that resource input waste, emission, and energy use are minimized by closed loops of material and energy. Zhu et al. (2011) mentioned that circular economy tries to minimize consumption of material and emissions thus it supports eco-design, cleaner production, and waste management.

The transformation from a linear economy to a circular economy requires organizations to redesign their supply chain. From this point of view, the circular economy is effective to promote from the traditional supply chain to the green supply chain and additional pressure on the firm (Zhu et al., 2010).

Circular economy characterized environmental requirements with 3R principle, namely Reduce, Reuse and Recycle to utilize resources and to protect the environment (Ying and Li-jun, 2012). The aim of circular economy is to decrease waste and pollution, minimal resource consumption, increase sustainability, collaboration, efficiently manage resources (i.e. natural resources, materials, information, and labor), gain environmental, economic, and social improvement (Yu et al., 2015; Blood-Rojas, 2017). Figure 1 represents the structure of green supply chain based on the circular economy.

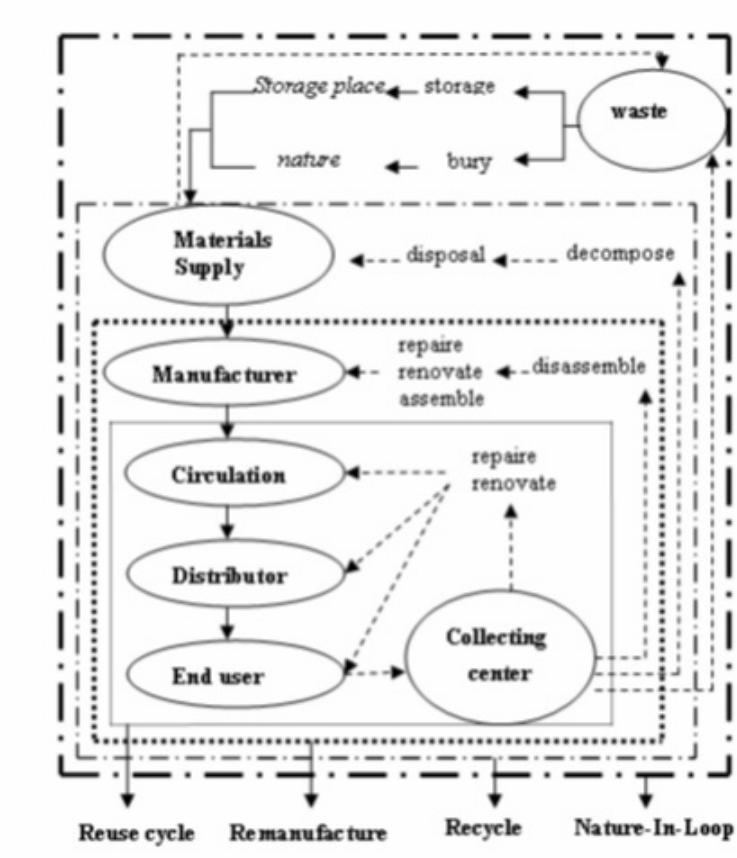

Figure 1: Green supply chain structure based on circular economy (Yang, 2011)

Circular economy emphasizes environmental protection and resource conservation and hence it supports the implementation of GSCM significantly. Thus, GSCM within the circular economy should apply the 3R principles of reduction, reuse and recycle for each cycle in the supply chain to attain the goals of environmental and economic performance (Zhu et al., 2010; Yang, 2011). Therefore, inclusion of GSCM within the circular economy is required to achieve an optimal balance of economic, social, operational and environmental performance for a company (Zeng et al., 2017).

The first step towards GSCM implementation occurred in 1994 through green purchasing activity. Later, green policies and standards were extended whole of the supply chain, due to the popularization of green and sustainability concepts (Hajikhani et al., 2012; Khaksar et al., 2016).

GSCM has a broader definition, as it aims to minimize life cycle impacts of a product, integrating green design, resource usage and allocation, decreasing the use and production of environmentally harmful material, and the concepts of recycling and reuse (Beamon, 1999; Diabat et al., 2013). The implementation of green supply chain management is a semi-closed loop that involves the green design, green material, green produce, green logistics and green consumption. Compared with traditional supply chain, GSCM is characterized by greenness in product design, selection and purchase of raw materials, production, distribution of final products, and after sale services. According to Ahi and Searcy (2013), supply chain is extended to related terms, such as green procurement, closed-loop supply chain, and reverse logistics. The extended supply chain is described as all the elements of traditional supply chain, including suppliers, facilities, distribution and customers, feed forward flow of materials and information, and integrated green activities (recycling of products and packaging, reuse and/or remanufacturing operations). Shi et al. (2012) defined GSCM strategy as the adoption of green procurement, including the purchase of less harmful materials, reduced material use, with greater use of renewable and recyclable materials as implementing circular economy.

Some GSCM definitions are more focused on the purchase/procurement as an internal environment management function, including the concepts of recycle, reuse and source savings (Min and Galle, 2001; Zsidisin and Siferd, 2001; Jabbour and Jabbour, 2016). Yet others have focused on environmental consideration as a whole organization (Zhu and Sarkis, 2004; Vachon and Klassen, 2007) into supply chain management (Gilbert, 2000; Hervani et al., 2005; Zhu et al., 2005; Srivastava, 2007; Lee and Klassen, 2008; Buyukozkan and Cifci, 2011; Sarkis et al., 2011; Wee et al., 2011). For example, Zhu et al. (2007), Srivastava (2007), and Hsu and Hu (2008) defined GSCM as bringing the green concept into the supply chain from production, material procurement, design, distribution to the end-of-life management of the product. Hervani et al. (2005), and Rao and Holt (2005) defined GSCM as involving green activities such as procurement, manufacturing, packaging, logistics, marketing, and reverse logistics. These activities refer to the forward supply chain activities, such as production, purchasing, material sourcing and selection, warehousing and inventory management, distribution, shipping, and transportation. This process involves collaboration between an organization and its vendors and customers. An integrated environmental element into supply chain management consists of suppliers, manufacturers, distributors, retailers, consumers, recyclers and governments. These partners are involved in integrated planning, organizing, directing, controlling and coordinating material, information, capital and knowledge in the GSCM. The classification of GSCM involves green production and packaging, environmental management, green marketing, green procurement, and green design (Shang et al., 2010; Sarkis et al., 2011). This type of firm applies a company-wide environmental policy, in compliance with regulations and standards. Lee and Klassen (2008) defined green procurement as integrating environmental concepts into supply chain management in order to enhance the environmental performance of vendors and customers, while McKinnon et al. (2015) defined GSCM in terms of the collaboration of environmental management within supply chain management.

Green et al. (1998), Cosimato and Troisi (2015) stated that GSCM is incorporating "innovation" term in supply chain management, and this term is generally environmental-

oriented, aimed at increasing energy efficiency, reducing companies' dependence on fossil fuels, and introducing green and renewable source of energy. Shang et al. (2010) considered that GSCM involves finance, logistics and flow of information, alignment between partners, based on environmental management with the aims of waste and cost minimization. As such, it is an important source of organizations' competitive advantages.

GSCM covers a wide range of inter-relationships between organizations designed to minimize the impact of the flow of materials, and to obtain environmental information on materials. Environmental alignment and cooperation in the supply chain requires direct involvement with its vendors or customers to arrive at environmentally sustainable solutions (Geffen and Rothenberg, 2000; Rao, 2002; Mumtaz et al., 2018).

Wang et al. (2005) proposed that GSCM model involves manufacturing contractors, i.e., suppliers, manufacturers, distributors, retailers and recyclers, consumption contractors, i.e., those involved in developing products, resources and recycling waste materials; logistics contractors, covering material, information, capital and knowledge flows; and social systems, such as regulation, culture and ethics. Zsidisin and Siferd (2001) and McKinnon et al. (2015) stated that environmental responsibilities concern design, procurement, production, purchasing, reverse logistics, utilization, reutilization, and disposal in GSCM.

GSCM provides a range of benefits for companies, such as reduction of manufacturing, logistics and overall business costs; profit maximization; environmental impact (reductions in waste, carbon, energy savings, etc.); customer satisfaction; brand image improvement; revenue and market share improvement. Other benefits are improving market share; expanding to new markets; differentiating from competitors; enhancing corporate social responsibility; improving profits; and increasing product recovery options. Additional benefits relate variously to the decrease of environmental hazardous such as emissions, waste, toxic materials usage; fuel efficiency improvement; improvement of use of recyclables/reusables; and optimization of logistics flows and manufacturing. Some benefits are related to improving employee satisfaction, employee acquisition, engagement and retention; acquiring new customers, developing new products, and increasing their ecological efficiency (Zhu et al., 2005; Zhu et al, 2007; El Saadany and Jaber, 2011; Buyukozkan and Cifci, 2011; Zhang and Yang, 2016).

The main GSCM initiatives are green or eco-design, green procurement (e.g. certified vendors, buying eco-friendly materials), eco-friendly packaging and transportation, reuse, and remanufacturing or recycling products (Eltayeb and Zailani, 2009). According to Carter and Rogers (2008), GSCM is the strategic alignment of an organization's social, environmental, and financial aims through the coordination of business processes between organizations in order to enhance the long-term economic performance.

2.2 GSCM Performance

Based on the strategic perspective of circular economy, the design of the performance evaluation in GSCM must align with the 3R principles of circular economy to achieve sustainable development. Thus, GSCM should not only focus on environmental concerns, but at the same time it should focus on reaching and maintaining operational efficiency, and focus on the economic, logistics, operational, and marketing objective. Therefore, performance assessment is crucial to all companies in planning, designing, implementing and monitoring their operations. It is used to evaluate the efficiency and effectiveness in order to assess the current situation of the organization or to benchmark with other companies.

GSCM performance can be measured by both quantitative and qualitative methods. Some companies use financial measurements, such as increasing profitability, market share, and revenue, return on investment; others focus on operational measurements, such as customer service level and performance of the inventory management. The measurement of performance may be specific to the company, or the unit within a company, depending on the main objectives and the environment. Simulation and mathematical models have rarely been used, although, Srivastava (2007) and McKinnon et al. (2015) stated that different mathematical and statistical techniques may be used to measure the GSCM performance. DEMATEL method was used by Wu et al. (2010), Lin et al. (2011), Lin (2013), and Govindan et al. (2015a), whereas ISM method was used by Lin et al. (2014). Pourjavad and Shahin (2018) stated that most researchers have focused on the green supplier selection process. In the literature, many multi-criteria decision making (MCDM) approaches are available that are used for green supply chain management performance assessment. For the supplier selection process, Mirhedayatian et al. (2014) used Data Envelopment Analysis (DEA), Buyukozkan and Cifci (2012) employed fuzzy MCDM, Tsui et al. (2015) hired PROMETHEE, Shen et al. (2013) used fuzzy TOPSIS, Kuo et al. (2015) used DANP and VIKOR techniques, Liou et al. (2016) used modified COPRAS-G method, Stevic et al. (2017) employed Rough EDAS (Evaluation based on Distance from Average Solution), Liao et al. (2013) hired grey relational analysis, Dou et al. (2014) used grey-based decision making approach, Tseng and Chiu (2013) employed a fuzzy-grey relation analysis system, Chand et al. (2016) integrated ANP with MOORA, Ghorabaee et al. (2016) and Yazdani et al. (2016) hired Weighted Aggregated Sum Product Assessment (WASPAS), Luthra et al. (2017) and Zhao et al. (2017) used compromise ranking method (VIKOR), Rostamzadeh et al. (2015) employed fuzzy VIKOR, Deng et al. (2014) hired AHP, Uygun and Dede (2016) used fuzzy ANP, Gorener et al. (2017) employed extensions of AHP and TOPSIS, and Kumar et al. (2017) hired fuzzy-extended Elimination and Choice Expressing Reality approach (ELECTRE).

These methods were also used to analyze data, to develop various models, to identify the cause and effects of the variables, and to evaluate the green suppliers related to GSCM. Research related to organizational practices, environmental issues, process, performance and sustainability were found to be most widely published topics within the GSCM domain (Malviya and Kant, 2015).

Olsthoorn et al. (2001) argued that the measurement of green performance should be based on the interaction between company and the environment, whereas Wagner and Schaltegger (2004) proposed that performance can be measured with a wide range of measures such as reductions in water usage, energy, non-renewable resources, toxic materials/components, solid waste, contamination of soil, emissions to air, water, noise, smell/odor emissions, landscape damage, and the risk of accidents.

Gandhi and Sharma (2014) researched GSCM practices and the GSCM performance literature. Hervani et al. (2005) proposed that performance assessment systems should consider both internal and external reporting, internal control and analysis within a business context. Wagner and Schaltegger (2004), and Rao and Holt (2005) defined green performance as decreasing environmental impacts via cooperation and collaboration, taking both business and environmental concerns into consideration, in order to benefit corporate image and marketing, therefore bringing competitive advantage.

Vachon and Klassen (2008) stated that environmental alignment and cooperation in supply chains may contribute to manufacturing and environmental performance. Greater collaboration and coordination across the supply chain - both intra and inter-organizational -

leads to improved financial and organizational performance (da Silveira and Arkader, 2007; Lai et al., 2005). In order to improve environmental and economic performance, collaboration with green suppliers and their integration may play a strategic role in GSCM.

Zhu et al. (2008) used different forms of scales to measure GSCM for continuous improvements, implementation of GSCM and benchmarking. According to Green et al. (2012), environmental performance involves reducing environmental pollutant levels, while economic performance focuses on the decrease of environmentally related material and energy consumption costs. Zhu et al. (2008) showed that there is a relation between environmental measures and economic performance. Zhu et al. (2013) highlighted that the existence of the mediation effects indicates the need for producers to integrate internal and external GSCM activities in order to realize the full performance potential. Also, enhancing environmental performance will contribute to the corporate image and thus, greater sales and profits in the long run.

Table 1 shows the list of related literature including the researchers, performance indicators, objectives, type of firm/industry, and research method.

Table 1: Literature Review on GSCM Performance

Researcher (year)	Performance Indicators	Objectives	Type of firm/Industry	Research Method
Zhu and Sarkis (2004)	Environmental, Economic	Study the relationship between GSCM practices and performance based on the moderating effects of quality and just-in-time.	186 respondents on GSCM from Chinese manufacturing companies	Survey
Hervani et al. (2005)	Environmental	Explain internal/external pressures, variety of metrics, designs of performance measurement for GSCM	The Taiwanese plants of COM Co., Ltd.	Balanced Scorecard
Wang et al. (2005)	Environmental	Introduced a green supply chain management performance assessment index.	Materials manufacturer	Case study, the fuzzy assessment method
Zhu et al. (2005)	Environmental, Operational, Economic (Negative and Positive)	Evaluate GSCM drivers, practices and performance. Proposed a measurement scale for it.	314 responses in different industry sectors from China	Survey
Chien and Shih (2007)	Environmental, Financial	Investigate the GSCM practices and financial performance, environmental performance.	Electrical and electronic industry	Survey
Zhu et al. (2007)	Environmental, Economics, Operational	Investigate the GSCM pressures, drivers, initiatives and performance of the a supply chain	89 automotive enterprises in China	Survey
Zhu et al. (2008)	Environmental, Economics, Operational	Investigated the scale for evaluating GSCM practices.	341 Chinese manufacturers	Survey
Wu et al. (2010)	Environmental, Economic	Explore the relationships between knowledge transfer and GSCM performance.	High-tech industry in Taiwan.	Survey, Fuzzy set theory, DEMATEL method, Cause-and-Effect diagram
Zhu et al. (2010)	Environmental, Economics, Operational	Explore the mediation effect between external and internal GSCM activities on environmental, operational, and economic performance.	396 Chinese manufacturing enterprises	Survey
Azevedo et al. (2011)	Operational– customer satisfaction, quality Environmental -business wastage Economics – Efficiency, cost, environmental cost	Investigate the relationships between green supply chain activities and supply chain performance.	5 Portuguese automotive company	Case studies through semi-structured interviews
Duarte et al. (2011)	Financial, Customer, Internal process, Learning and growth	Proposed a conceptual model combining lean and GSCM in performance measurement	-	Conceptual model and Balanced Scorecard
Lin et al. (2011)	Environmental, Positive/Negative Economic, Operational	Find the criteria in developing green performance of the manufacturing companies	Automobile manufacturing industry	Fuzzy set theory, DEMATEL Method
Giovanni and Vinzi (2012)	Environmental, Economic	Explore the relationship between environmental management and	Executives of 1400 companies in Italy.	Survey

		performance.		
Green et al. (2012)	Environmental, Operational, Organizational	Investigate the impact of GSCM practices on performance.	159 manufacturing managers	Survey
Chan et al. (2012)	Corporate	Investigate the moderating effect between market condition and the effect of environmental orientation on performance.	194 foreign investors in China	Survey
Björklund et al. (2012)	Environmental	Framework of dimensions on environmental measurement in supply chain management.	Reverse chain for used aluminum and plastic in Sweden	A case study
Zhu et al. (2013)	Environmental, Economic, Operational	Examine variety of pressures motivating companies to conduct GSCM practices and performance	Sample of 396 Chinese Manufacturers	Survey
Wang and Chan (2013)	Operational	Assess green initiatives, economic and environmental improvement areas when conducting green practices.	The case Company is a UK-based multinational retailer.	A hierarchical fuzzy TOPSIS approach
Yang et al. (2013)	Green performance and firm competitiveness (Reduction of pollutant, Decrease of green cost, Firm competitiveness)	Examine an evaluation of green activities and green cooperation in container shipping sector and how those variables affect green performance and firm competitiveness.	163 container shipping companies from Taiwan	Survey
Diabat et al. (2013)	Environmental, Economic, Operational, Intangible	Investigate the GSCM practices and performances among companies with fuzzy TOPSIS method.	Automotive supply chain	Fuzzy multi-criteria decision-making method.
Lin (2013)	Organizational: Environmental, Economic	Explore the effecting factors among eight criteria of GSCM practices, performances, and external pressures.	Taiwanese electronic industry	Fuzzy set theory and DEMATEL method
Stefanelli et al.(2014)	Environmental	Investigate the relationship between GSCM practices and environmental performance	Bioenergy sector in Brazil	Survey
Dubey et al. (2014)	Environmental, Institutional pressures (moderator variable)	Examine the effects of supplier relationship management and total quality management on environmental performance under the impact of leadership and institutional pressures.	358 Indian rubber firms	Survey
Chuang (2014)	Green performance	Propose a compound approach with a five-staged process to evaluate and enhance green performance.	Two footwear companies from Taiwan.	Six Sigma approach with DMAIC.
Lin et al. (2014)	GSCM Performance	Suggest twenty critical factors to the four Balanced scorecard (BSC) dimensions based on GSCM practices and performance.	The Taiwanese plants of COM Co., Ltd.	Case study, the fuzzy set theory to determine linguistic preferences, ISM
Mangla et al. (2014)	GSCM performance	Evaluate and analyze the attribute/factors for improving overall performance	A plastic manufacturing company	DEMATEL Method
Bhattacharya et al. (2014)	Social (Business ethics, CSR activities, employment generation, positive image); Sustainable (environmental, economic, operational)	Investigate GSCM performance by using a BSC based collaborative decision making approach.	A UK-based carpet-manufacturing firm	A fuzzy ANP-based a green-balanced scorecard (GrBSC) method
Tyagi et al. (2015)	GSCM performance	Suggest the fuzzy TOPSIS approach on alternative selection on various dimensions in order to enhance the performance of GSCM.	Alternatives: Suppliers, web based technologies and advanced manufacturing technologies	Fuzzy TOPSIS approach
Diab et al. (2015)	Organizational (Environmental, Financial, Operational)	Analyze the effect of GSCM practices on organizational performance	Industrial food sector in Jordan	Survey
Jabbour et al. (2015)	Environmental and Operational	Identify the effect of GSCM practices on environmental and operational performance.	4 Large companies in Brazil	Case Study
Govindan et al. (2015a)	Environmental and Economic	Investigate to figure out the GSCM practices to enhance economic and environmental performance	A case-study from the automotive industry	DEMATEL Intuitionistic fuzzy set
Vijayvargy et al. (2016)	Organizational	Examine the effect of GSCM practices on organizational	161 Indian companies	Survey

		performance		
Kusi-Sarpong et al. (2016)	Economic and environmental sustainability	Investigates relationships among key GSCM practices for Ghanaian mining industry	Mining industry in Ghana	DEMATEL, AHP
Khaksar et al. (2016)	Environmental	Explore the relationship between a green supplier, green innovation, environmental performance, and competitive advantage.	Cement industry in Iran	Survey
Zhang and Yang (2016)	Operational, Environmental, Financial	Explore the impact of green practices on the environmental performance, operational performance, and financial performance	Manufacturing companies in China	Survey
Jabbour et al. (2016)	Operational and Green	Examine direct and indirect effects of external and internal barriers on green operational practices and green and operational performance.	75 companies in Brazil	Survey
Younis et al. (2016)	Corporate performance (operational, environmental, economic and social)	Explore the implementation of GSCM practices and its effects on corporate performance	117 manufacturing companies in the UAE	Survey
Laari et al. (2016)	Environmental and Financial	Investigate the direct and indirect relationships between customer-driven GSCM practices and environmental and financial performance.	119 micro-sized manufacturing companies in Finland	Survey
Yu et al. (2017)	Environmental and Operational	Investigate the relationship between green supply management (green purchasing personnel, green supplier selection and green supplier collaboration) and performance	Automotive manufactures in China	Survey
Sharma et al. (2017)	Environmental design, internal environmental management, green purchasing, green manufacturing, collaborative green transportation, reverse logistic, cooperation with suppliers and customers, environmental, economic, operational performance, market share, regulatory pressure, competitive pressure	Examine the performance indicators and sub-indicators for GSCM	350 agro based companies in northern India	Survey, AHP
Zhu et al. (2017)	Environmental and Economic	Investigate to propose moderation and mediation effects of customer relational governance on the relationships between two GSCM practices (green innovation and green purchasing) and environmental/economic performance.	Export-orientated, small medium sized enterprises in China	Survey
Mishra et al. (2017)	GSCM Performance	Evaluate the literature review on GSC performance measures between 1995-2016	-	Bibliometric and network analysis
Vanalle et al. (2017)	Economic, Operational and Environmental	Examine the GSCM pressures, practices, and performance	Brazilian automotive industry	Survey
Geng et al. (2017)	Economic, Environmental, Operational, Social	Investigate the relationship between GSCM practices and performance in the manufacturing sector.	11127 manufacturing companies in the Asian emerging economies (AEE)	Survey
Roehrich et al. (2017)	GSCM Performance	Examine the effect of green supplier selection (GSS) drives GSCM performance and realization of improved GSCM performance	Aerospace industry	Semi-structured interviews and secondary data
Islam et al. (2018)	Environmental	Evaluate the significant GSC practices on their importance, and identify the performance level	Leather industry in Bangladesh	Fuzzy importance and performance analysis (FIPA)
Thanki and Thakkar (2018)	GSCM Performance	Investigate the cause-effect relationship among BSC perspectives and performance	Textile and clothing supply chain in India	Balanced scorecard (BSC) perspective, fuzzy DEMATEL,

		measures.		and ANP
Chand et al. (2018)	Economic and environmental	Determine and analyze selected issues (internal environment management, green purchasing, cleaner production, eco-design) in GSCM for the implementation of the green concept.	430 manufacturing companies in India	Analytical network process-multi-objective optimization using rational analysis (ANP-MOORA) techniques
Mumtaz et al. (2018)	Organizational (Environmental pollution, operational cost and organizational flexibility)	Investigate the effects of GSCM practices on organizational performance	Several industries in Pakistan	Survey
Pourjavad and Shahin (2018)	GSCM Performance	Evaluate GSCM performance of companies in terms of green dimensions (green design, green purchasing, green manufacturing and reverse logistics)	4 paint companies in Iran.	Fuzzy inference system (FIS)

3. PROPOSED FRAMEWORK

In the GSCM literature, the researchers mentioned green and environmental performance more than logistics, operational, economic/financial, and organizational performance. An appropriate analysis of the supply chain as a whole is needed to determine precise plans. Many studies focus on the need to determine the related sustainable measures for performance management, and discuss the difficulty of measuring and assessing these (Beamon, 1999; Hervani et al., 2005; Aronsson and Brodin, 2006; McKinnon et al., 2015). Therefore, this study proposed a holistic approach based on systems theory to the investigation of the GSCM performance factors involving environmental, economic, logistics, operational, organizational and marketing criteria.

3.1. Need for a Holistic Framework

Sarkis (2003) preferred a general definition for GSCM, linking product design, all manufacturing stages, distribution and reverse logistics (Hajikhani, et al., 2012; McKinnon, et al. 2015). McKinnon et al. (2015) asserted that the scope of the performance studies should encompass economic and social measures rather than being limited to environmental measures, allowing a broader assessment. Malviya and Kant (2015) pointed to the following as a priority for research: the study of the relationships among GSCM practices, measures, technical and social aspects, and their effect on performance. They asserted that despite many studies in GSCM, there is a lack of overall understanding of the theoretical and methodological dimensions of the subject. They pointed to a deficiency in strategic planning aspect, despite the large number of studies in GSCM implementation and also mentioned another important gap in the GSCM literature; the need to understand and capture interrelationships among GSCM processes, technical and social aspects of the company and their effect on performance measures. Fang and Zhang (2018) determined a research gap emphasizing a lack of integrated and holistic framework for GSCM performance assessment. Green et al. (2012) argued that a holistic and integrated empirical research should be taken towards the relationship between GSCM and performance. In performance assessments, both tangible and intangible measures should be hired; these measures should be dynamic and the investigation should be conducted on multiple levels (Hervani et al., 2005).

There is a need for a holistic framework which encompasses and integrates tangible or intangible measures, including environmental, economic, logistics, operational, organizational and marketing. This study is therefore unique in that, it investigates not only environmental performance, but also logistics, manufacturing, organizational, operational and marketing performance, employing multiple levels as criteria, sub-criteria and measures.

In order to achieve a systematic GSCM performance assessment, the proposed framework is constructed as three-dimensional hierarchy which includes main criteria, sub-criteria, and measures, respectively. Figure 2 represents the general GSCM performance assessment framework.

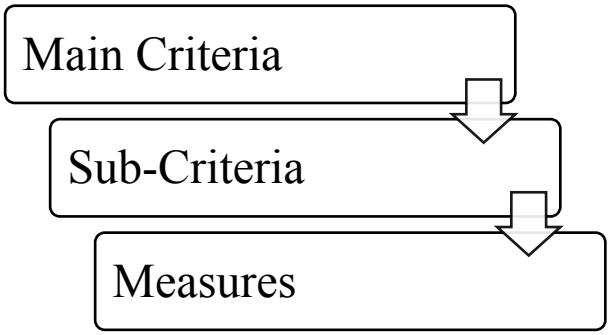

Figure 2: General GSCM Performance Assessment Framework

Environmental, economic, logistics, operational, organizational and marketing performance are identified as the main criteria for the GSCM performance assessment which have great significance to implement effective GSCM. Therefore, this study integrates 6 criteria, 21 sub-criteria and 189 measures to propose an assessment framework. Figure 3 represents the framework for the GSCM performance which includes the main criteria.

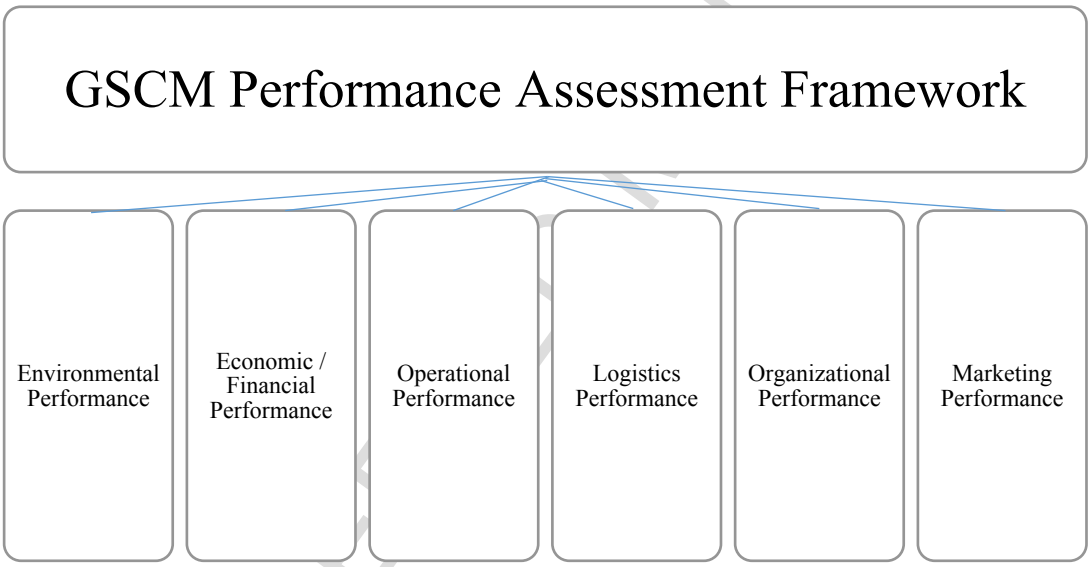

Figure 3: The Main Criteria of GSCM Performance Assessment Framework

In this proposed GSCM framework, the main criteria include sub-criteria which are filtered through the detailed literature review. Table 2 shows main criteria, sub-criteria and related references for GSCM performance assessment.

Table 2: Main Criteria and Sub-Criteria for GSCM Performance Assessment

ENVIRONMENTAL PERFORMANCE	
Decreasing Emissions	Azevedo et al. (2011); Bhattacharya et al. (2014); Govindan et al.(2015a); Jabbour et al. (2015); Jabbour et al. (2016)

Decreasing Energy Consumption	Epstein and Wisner (2001); Wagner and Schaltegger (2004); Hervani et al. (2005); Rao and Holt (2005); Zhu et al. (2005); Zhu et al. (2007); Zhu et al. (2008); Holt and Ghobadian (2009); Paulraj (2009); Azevedo et al. (2011); Diabat and Govindan (2011); Duarte et al. (2011); Giovanni and Vinzi (2012); Green et al. (2012); Diabat et al. (2013); Dubey et al. (2015) ; Ahi and Searcy (2015); Tyagi et al.(2015); Jabbour et al. (2016); Laari et al. (2016); Foo et al. (2018)
Decreasing Business Waste	Wagner and Schaltegger (2004); Esty and Winston (2006); Zhu et al. (2007); Zhu et al. (2008); Shang et al. (2010); Duarte et al. (2011); Azevedo et al. (2011); Green et al. (2012); Yang et al. (2013); Malviya and Kant (2015); Tyagi et al.(2015); Jabbour et al. (2015); Laari et al. (2016); Jabbour et al. (2016); Laari et al. (2016); Zhang and Yang (2016); Vanalle et al. (2017); Paulraj et al. (2017); Mumtaz et al. (2018)
Decreasing Environmental Cost	Wagner and Schaltegger (2004); Zhu et al. (2007); Zhu et al. (2008); Duarte et al. (2011); Azevedo et al. (2011); Yang et al. (2013); Ahi and Searcy (2015); Jabbour et al. (2016); Laari et al. (2016); Dubey et al. (2016)
Increasing Environmental Revenues	Azevedo et al. (2011); Govindan and Popiuc (2014)
ECONOMIC / FINANCIAL PERFORMANCE	
Cost Oriented	Chuang (2014) ; Ahi and Searcy (2015); Chavez et al. (2016); Younis et al. (2016); Dubey et al. (2016); Foo et al. (2018)
Revenue Oriented	Epstein and Wisner (2001);Hervani et al. (2005); Duarte et al. (2011); Younis et al. (2016); Mishra et al. (2017)
OPERATIONAL PERFORMANCE	
Increase in Quality	Azevedo et al. (2011); Zhu et al. (2008); Duarte, et al. (2011); Diabat et al. (2013); Jabbour et al. (2013); Zhu et al. (2013); Bhattacharya (2014); Rostamzadeh et al. (2015); Jabbour et al. (2015); Chavez et al.(2016); Younis et al. (2016);
Increasing Efficiency	Azevedo et al. (2011); Duarte et al. (2011); Dubey et al. (2016)
Improving Green Manufacturing	Shang et al.(2010) ; Chuang (2014) ; Malviya and Kant (2015); Uygun and Dede (2016); Sharma et al. (2017) ; Pourjavad and Shahin (2018)
Improving Green Packaging	Zhu et al. (2007); Diabat et al. (2013); Chuang (2014) ; Chaudharya and Chanda (2015); Dubey et al. (2016); Uygun and Dede (2016)
Improving Green/Eco Design	Sarkis (1998); Zhu et al. (2005, 2007, 2008); Hu and Hsu (2006); Zhu and Sarkis (2006); Shang, et al. (2010); Wu et al.(2010); Diabat and Govindan (2011) ; Green et al. (2012) ; Lin (2013) ; Lin et al. (2014); Wu et al. (2015) ; Tyagi et al. (2015) ; Chaudharya and Chanda (2015); Uygun and Dede (2016); Younis et al. (2016); Sharma et al. (2017); Foo et al. (2018); Chand et al. (2018); Mumtaz et al. (2018)
LOGISTICS PERFORMANCE	
Improving Green Logistics	Malviya and Kant (2015); Chaudharya and Chanda (2015); Uygun and Dede (2016)
Improving Reverse Logistics	Lau (2011); Chaudharya and Chanda (2015); Govindan et al. (2015b); Jabbour and Jabbour (2016); Uygun and Dede (2016); Younis et al. (2016); Geng et al. (2017); Sharma et al. (2017)
Improving Green Purchasing	Zhu and Geng (2001); Zhu et al. (2008); Green et al. (2012) ; Lau (2011); Diabat et al. (2013); Wu et al.(2015); Chaudharya and Chanda (2015); Jabbour and Jabbour (2016); Uygun and Dede (2016); Younis et al. (2016); Sharma et al. (2017); Vanalle et al. (2017); Pourjavad and Shahin (2018); Chand et al. (2018)
ORGANIZATIONAL PERFORMANCE	
Improving Green Image	Rao and Holt (2005); Pochampally et al. (2009); Azevedo et al. (2011); Duarte et al. (2011); Diabat et al. (2013); Yang et al. (2013); Geng et al. (2017)
Incorporating environmental management	Zhu et al. (2008); Green et al. (2012); Govindan et al.(2015a); Diabat et al. (2013); Chaudharya and Chanda (2015); Vanalle et al. (2017); Geng et al. (2017); Sharma et al. (2017); Foo et al. (2018) ; Chand et al. (2018)
Green information systems	Esty and Winston (2006); Harris (2007) ; Green et al.(2012) ; Tyagi et al. (2015)

MARKETING PERFORMANCE	
Increasing Customer Satisfaction	Epstein and Wisner (2001); Dreyer and Gronhaug (2004); Hervani et al. (2005); Kainuma and Tawara (2006); Xiaoping and Chen (2008); Chia et al. (2009); Wu et al.(2010); Duarte et al. (2011); Azevedo et al. (2011); Wu et al.(2015); Ahi and Searcy (2015); Dubey et al. (2016); Geng et al. (2017)
Improving Cooperation/Collaboration with Customers	Bowen et al. (2001); Vachon and Klassen (2007; 2008); Zhu et al. (2008); Paulraj (2009); Holt and Ghobadian (2009); Eltayeb et al. (2011); Green et al. (2012); Yang et al. (2013); Diabat et al. (2013); Lin et al. (2014) ; Chaudharya and Chanda (2015); Wu et al. (2015); Diab et al. (2015); Jabbour and Jabbour (2016); Younis et al. (2016); Laari et al. (2016); Chavez et al. (2016); Sharma et al. (2017); Vanalle et al. (2017)
Marketing Measures	Duarte et al. (2011); Wu et al. (2015)

3.1.1. Environmental Performance

Environmental performance is evaluated according to factors such as consumption of resources, compliance level with regulations, processes, products and services of the company towards environment (Sharma and Vredenburg, 1998).

The two indicators of environmental performance are operative and management performance. Operative performance indicators consist of consumption of materials and energy, production of waste and emission, and the assessment of company's environmental effects. The indicators of management performance are related to the organizational environmental policies and measures, and the improvement in public relations and corporate image (Chien and Shih, 2007; Papadopoulos and Giama, 2007), through activities such as certification and accreditation of environmental initiatives, pollution prevention, recycling, reuse, and the reduction of waste (Schoenherr, 2012; Dubey et al., 2015; Diab et al., 2015; Jabbour et al., 2015; Jabbour et al., 2016; Zhang and Yang, 2016; Vijayvargy et al., 2016; Sharma et al., 2017; Geng et al., 2017; Islam et al., 2018; Thanki and Thakkar, 2018; Mumtaz et al., 2018).

The measures of environmental performance are reductions in carbon dioxide, air and water emissions, effluent and solid wastes, sulfur dioxide (SO_2), nitrogen oxide (NO), energy, fuel and water use, air and water pollution, and reductions in hazardous and toxic material consumption and gas emissions caused by the activities of the supply chain network (Maxwell and van der Vorst, 2003; Wagner and Schaltegger, 2004; Zhu and Sarkis, 2004; Zhu et al., 2008; Green et al., 2012; Lo et al., 2012; Diabat et al., 2013; Lin, 2013; Stefanelli et al., 2014; Dubey et al., 2015; Jabbour et al., 2015; Laari et al., 2016; Zhu et al., 2017; Paulraj et al., 2017). From a logistics perspective, Aronsson and Brodin (2006)'s study identified the measurement of emissions as one of the most important measures for environmental effect assessment.

In the literature, there is a significant linkage between environmental performance and supply chain management, but this linkage also depends on organizational capacity (Judge and Elenkov, 1995). The implementation of GSCM improves environmental performance not only for the corporation itself, but also for those suppliers which conform to environmental regulations (Laari et al., 2016). Reverse logistics, green packaging, and green distribution are all activities that may contribute to the improvement of environmental performance of the company and its supply chain. Suppliers can also be encouraged to reduce transaction costs, waste and hazardous substances, and engage in the reuse and recycling of raw

materials/components as a result of environmental regulations (Sarkis, 2003; Sharma et al., 2017; Yu et al., 2017; Pourjavad and Shahin, 2018).

The indicators of environmental performance are essential in the assessment of the environmental performance of business activities, processes, products and services. Due to the demands of environmental performance, companies must take steps to improve their capabilities in evaluating their performance. The balanced scorecard can be used in order to measure environmental performance, through the use of green products, cost of waste disposal, certified suppliers and ratio of renewable resources (Hervani et al., 2005). Organizational activities that offer compensation/reward systems for the environmental performance of workers seem to enhance economic gains from investment recovery initiatives.

The reasons for the implementation of environmental performance vary from regulatory standards and contractual requirements, to corporate image and competitive advantage (Theyel, 2001; Gotschol, et al., 2014; Khaksar et al., 2016; Jabbour et al., 2016; Younis et al., 2016). Companies must focus on corporate environmental management and GSCM, which positively affect environmental performance, and therefore influence organizational and financial consequences (Rao and Holt, 2005; Malviya and Kant, 2015; Govindan et al., 2015a; Wu et al., 2015; Vanalle et al., 2017).

Table 3 represents the sub-criteria and the measures for the environmental performance main criterion.

Table 3: The sub-criteria and the measures for the environmental performance main criterion

ENVIRONMENTAL PERFORMANCE				
Decreasing Emissions	**Decreasing Energy Consumption**	**Decreasing Business Waste**	**Decreasing Environmental Cost**	**Increasing Environmental Revenues**
• Green House Gas Emissions	• Energy Utilization Ratio	• Solid Waste	• Cost of Scrap	• Revenues from Green Products
• Air Emissions	• Usage of Green Fuels	• Liquid / Water Waste	• Cost of Rework	• Sale of Recycled Materials and Products
• Carbon Emissions	• Less Consumption	• Total Flow Quantity of Scrap	• Additional Cost for Environmentally-Friendly Products and Materials	• Sale of Scrap and Used Materials
	• Usage of Alternative Energy Sources	• Waste generated by Suppliers	• Disposal Costs	• Sale of Excess Inventories and Materials
		• Percent of Materials Recycled or Reused	• Recycling Costs	• Sale of Excess Capital Equipment
		• Total Amount of Hazardous and Toxic Waste	• Cost of Waste Treatment	
		• Usage of Hazardous / Harmful / Toxic Materials	• Waste Discharge Fee	
		• Compliance of effluents with national and local environmental rules and regulations	• Environmental Accidents Fine	
			• Cost for Energy Consumption	
			• Frequency of Environmental Accidents	

3.1.2. Economic/Financial Performance

Economic performance is related to the cost reduction or minimization of environmental activities related to material procurement, market share growth, consumption of energy, treatment of waste, discharge of waste, environmental accidents and profit increase (Chien and Shih, 2007; Zhu et al., 2008; Duarte et al., 2011; Green et al., 2012; Diabat et al., 2013; Lin, 2013; Cosimato and Troisi, 2015; Diab et al., 2015; Zhang and Yang, 2016; Vijayvargy et al., 2016; Zhu et al., 2017; Sharma et al., 2017; Paulraj et al., 2017; Thanki and Thakkar, 2018).

Economic performance is considered as the crucial factor by companies applying environmental management activities via more advanced management and control mechanisms for environmental risks, and the development of capacity and capability for continuous improvement (Epstein and Wisner, 2001; Hervani et al., 2005; Zhu et al., 2008). GSCM affects economic performance in terms of cost savings, improving product quality, increasing product price, increasing sales and profit margin, increasing market share and efficiency, new market opportunities, employee motivation and satisfaction, improvements on corporate image and access to financial opportunities (Shrivastava, 1995; Zhu and Sarkis, 2004;Lin et al., 2014; Malviya and Kant, 2015; Wu et al., 2015; Chavez et al., 2016; Laari et al., 2016; Younis et al., 2016; Geng et al., 2017).

Some studies measure economic performance on the basis of the decrease in costs (Diab et al., 2015; Vijayvargy et al., 2016) and expenditures as a result of internal and external green programs (Zhu et al., 2005), while others prefer major economic indicators, such as profit or sales (Rao, 2002). The findings of studies clearly indicate a relationship between economic performance and environmental management (Wagner et al., 2001; Laari et al., 2016).

Several papers identify a positive relation between internal and external environmental management activities, each of which have their own specific targets, which are investments that benefit the organization's economic performance, e.g., increase in sales, market share, or profits (Alvarez Gil et al., 2001; Fuentes-Fuentes et al., 2004; Rao, 2004; Zhu and Sarkis, 2004; Laari et al., 2016; Paulraj et al., 2017). However, in other studies, negative relationships had been found, e.g., TQEM (Total Quality Environmental Management) and ISO 14000 (Islam et al., 2018). Implementing internal and external environmental management increase operational costs, and as a result, may negatively affect economic/financial performance (Laari et al., 2016; Vanalle et al., 2017; Thanki and Thakkar, 2018; Mumtaz et al., 2018). In contrast, a sustainable environmental management can lead the company to cost savings, opportunities to enter new markets and the productive usage of waste (Tsoulfas and Pappis, 2006).

Table 4 represents the sub-criteria and the measures for the economic / financial performance main criterion.

Table 4: The sub-criteria and the measures for the economic / financial performance main criterion

ECONOMIC / FINANCIAL PERFORMANCE	
Cost-Oriented	**Revenue-Oriented**
• Warranty Cost	• Average Profit from Green Products
• Transportation Cost	• Profit Growth Rate for Green Products
• Labor Cost per Hour	• Average Return on Sales from Green Products
• Training and Orientation Cost	• Average Return on Investment from Green Products
• Manufacturing Cost	• Average Return on Net Assets from Green Products
• Cost of Raw Materials	
• Cost of Procurement	

3.1.3. Operational Performance

Operational performance is defined as the capability of a company to satisfy customers in terms of efficiency in production and delivery of quality products, through decreased scrap and inventory levels (Zhu et al., 2008; Jabbour et al., 2015; Diab et al., 2015; Chavez et al., 2016; Zhang and Yang, 2016; Jabbour et al., 2016; Vijayvargy et al., 2016; Yu et al., 2017; Geng et al., 2017; Sharma et al., 2017). There are three significant criteria for production companies aiming to improve their operational performance: customer satisfaction, flexibility of supplier and interaction with suppliers, and internal service quality (Yeung, 2008; Wu et al., 2010; Green et al., 2012; Diabat et al., 2013; Diab et al., 2015; Chavez et al., 2016; Zhang and Yang, 2016).

The organizational environmental awareness level depends on the advantage that can be gained from developing the operational performance. Organizational internal GSCM practices (integrated environmental management systems and staff involvement) and activities (recycling and reuse) are needed in order to improve operational performance (Hanna et al., 2000; Younis et al., 2016; Yu et al., 2017). Producing an environmentally-friendly product may create not only a safer and less costly product, but also a higher and more consistent quality level and a greater scrap value (Sarkis, 2001; Diab et al., 2015; Yu et al., 2017). Also, eco-design products result in savings, in terms of, reduction in energy consumption, and waste discharge and treatment fees (Jabbour and Jabbour, 2016; Vanalle et al., 2017; Foo et al., 2018). This type of product has a significantly positive effect on environmental performance (Zhu et al., 2005), but a less significant effect on economic performance (Lewis and Gretsakis, 2001). Green products adopt green materials, designs, manufacturing appropriate materials, and packaging to reduce resources, hazardous emission, environmental pollution (Humphreys et al., 2003; Shu and Zhang, 2004; Lee et al., 2009; Malviya and Kant, 2015; Wu et al., 2015; Diab et al., 2015).

Table 5 represents the sub-criteria and the measures for the operational performance main criterion.

Table 5: The sub-criteria and the measures for the operational performance main criterion

OPERATIONAL PERFORMANCE				
Increase in Quality	**Increasing Efficiency**	**Improving Green Manufacturing**	**Improving Green Packaging**	**Improving Green / Eco Design**
• Customer Rejection Rate	• Overhead Expense	• Redefine Operation and Production Processes	• Use of Non-Toxic and Hazardless Materials in Packing	• Reduction in Energy Consumption
• Finished Product Yield Rate	• Operating Expense	• Use of Non-Toxic and Hazardless Materials in Production	• Use of Recyclable Materials in Packing	• Reused Materials in New Designs
• In Plant Defect Rate	• Capacity Utilization	• Use of Recyclable Materials in Production	• Use of Recycled Materials in Packing	• Recycled Materials in New Designs
• Total Quality Environmental Management	• Energy Efficiency	• Use of Recycled Materials in Production	• Cooperation with Customers for Green Packaging	• Reduction of Resource Consumption and Waste Generation during the Use of Product
• Employee Satisfaction from Green Processes		• Waste Reduction and Pollution Monitoring Equipment	• Cooperation with Suppliers for Green Packaging.	• Reduction of Hazardous Manufacturing Process and materials
• Poka-Yoke Equipment		• Structure for Easy Disassembly	• Use of Eco-Label on Package	• Less Volume for Storage
• Continuous Improvement System		• Monitoring and Maintenance System	• Labeling for Retrieval Purposes	• Easy Setup for Energy Saving
• Scrap Rate		• Inventory Levels		• Longer Service / Product Life

• Rework Rate	• Reduction in Operation Steps • Reduction in Number of Hazardous Production Processes • Reduction in Number of Hazardous Machines • Reduction of Health and Safety Risks • Green Technology Adoption • Structure for Easy Assembly • Scheduling and Input / Output Control in Production Planning and Control for Waste Reduction • Process Design for Reducing Energy Consumption • Process Design for Minimization of Waste • Reducing the Noise Pollution • Use of Renewable Energy Resources • Acquisition of Green Production Technology / Equipment • Cooperation with Customers for Green Production		• Reduction of Material Consumption • Design for Remanufacturing • Concurrent Engineering • Cooperation with Customers for Eco-Design • Cooperation with Suppliers for Eco-Design • The Number of Patents for Green Products • Life Cycle Costing • Life Cycle Assessment

3.1.4. Logistics Performance

Green logistics is defined as an environmentally-friendly and efficient transportation mode as opposed to road and air transport which consume fossil fuels, in turn, producing emission of CO_2, and polluting the air, soil and water (Green et al., 2008; Lau, 2011; Min and Kim, 2012; Green et al., 2012). The development of logistics implementation must be coordinated with green production, marketing, consumption and other economic activities (Hang, 1996). Green logistics cover a variety of activities, such as green procurement, green material/component management and production, green distribution, green marketing, and reverse logistics (Hervani et al., 2005), which can have a positive influence on different processes (e.g. purchasing, packaging and transportation) (McKinnon et al., 2015). Reverse logistics is named green recycling activities that express increase recycling value with decreasing cost (Yang and Li-jun, 2012; Mahaboob Sheriff et al., 2012; Jabbour and Jabbour, 2016; Younis et al., 2016; Geng et al., 2017; Pourjavad and Shahin, 2018). Rao and Holt (2005) noted a positive effect of outbound logistics, especially on competitiveness with respect to improved quality, productivity, efficiency, and cost saving. The level collaboration with suppliers positively affects the environmental management practices (Simpson et al., 2007; Khaksar et al., 2016).

Table 6 represents the sub-criteria and the measures for the logistics performance main criterion.

Table 6: The sub-criteria and the measures for the logistics performance main criterion.

LOGISTICS PERFORMANCE		
Improving Green Logistics	**Improving Reverse Logistics**	**Improving Green Purchasing**
• On time delivery • Eco-driving to decrease fuel consumption • Just in time for logistics • Order cycle time • Environmental friendly transportation • Recyclable or reusable packaging/containers in logistics	• Remanufacturing of materials • Reusing and recycling of materials • Reduction of time for recycling • Incorporating third party logistics for customer cooperation • The number of customers cooperated for reverse logistics • Design for reverse logistics	• Eco labeled materials and products • Environmentally friendly materials • Supplier education • Supplier support • Cooperation with suppliers for green purchasing. • Understand environmental risk and responsibilities with suppliers

- Order fulfillment
- Delivery dependability

- Modal split (weight of goals transported by road)
- Average handling factor (Road tons-lifted)

- Average length of haul (tons-km)

- Average load on laden trip (weight/volume)

- Average percentage of empty running

- A recycling system for used and defective products
- Products with take-back policies
- Mode of transport
- Greener vehicles
- Route optimization
- Vehicle utilization
- Fuel efficiency

- Environmentally-audited suppliers
- Certified suppliers other than ISO 1400
- ISO14000 certified suppliers

- Providing design specifications to suppliers with environmental requirements
- Second-tier supplier environmental evaluation
- Requiring certification of testing for green product conformance
- Urging/forcing suppliers to conduct environmental actions

3.1.5. Organizational Performance

Organizational performance is a measure for evaluating the company's success level to achieve its objectives (Daft, 1995). Companies hire GSCM activities that incorporate organizational and environmental performances (Walton, et al., 1998; Zhu and Cote, 2004; Zhu et al., 2008; Green et al., 2012). GSCM includes a significant organizational performance indicator, so as to diminish environmental risks.

Industry collaboration and multi-stakeholder partnerships are strategic tools employed to achieve a company's supply chain sustainability objectives, and impact the efficiency of supply chain sustainability efforts. Prepared by United Nations (UN) Global Compact Office, "Supply Chain Sustainability Report" stated that supply chain sustainability strategies need to be internal, integrated, and coordinated with business strategies, such as product design, business development, legal, human resources, finance risk and strategy, logistics, marketing and sales (United Nations, 2010). This integration is expected to have an effect on enterprises' performance and competitiveness (Flynn et al., 2010).

According to Walton et al. (1998), Zhu and Cote (2004) and Chien and Shih (2007), organizational performance should be taken into consideration in order to improve financial/economic and environmental performance. GSCM can enhance environmental performance through decreasing emissions and waste, thus improving environmental commitment and competitiveness via productivity, quality, efficiency, reducing costs, which in turn, improve economic performance via new opportunities marketing, increased market share, profit margin, and sales volume (Purba, 2002). GSCM requires the employment of internal environmental management in order to transform all activities and processes to "green". Supporting this view, Jabbour and Jabbour (2016) claimed that internal environmental management supported by the strategic and operational workforce can lead to better organizational performance. Geng et al. (2017) asserted that organizational performance assessment should include strategic and financial support from top management; therefore, top management is responsible of maximizing shareholder wealth, and training of the operational workforce about how to collect and measure data in order to apply the performance assessment system. Chien (2014) stated that organizational performance includes social performance, which involves the organizational providing a healthy work environment, showing social commitment and participation, offering education and training, and engaging in human resources development.

Wu et al. (2010) asserted that incorporating environmental management activities lead to the development of green suppliers, design, production, procurement, products, and marketing. This type of implementation requires collaboration as a prerequisite. This collaboration allows expertise, knowledge, and competency on environmental management to be acquired. Shen et al. (2013) stated that stakeholders' concerns based on corporate social responsibility (CSR) are essential to supply chains in order to attain supply chain sustainability.

Table 7 represents the sub-criteria and the measures for the organizational performance main criterion.

Table 7: The sub-criteria and the measures for the organizational performance main criterion.

ORGANIZATIONAL PERFORMANCE		
Improving Green Image	**Incorporating Environmental Management**	**Green Information Systems**
• Number of related fairs/symposiums participated	• Commitment from managers	• Monitoring the environmental information (such as toxicity, energy used water used, air pollution)
• Reduction of environmental accidents	• Commitment from employees	• Accurate and prompt information exchange between trading partners
• Improved employee and community health	• Green initiatives and eco-service	• Environmental information sharing with customers
• Sponsoring to environmental events/collaboration with ecological organizations	• A Clear environmental policy statement.	• Environmental information sharing with suppliers
• CSR activities on GSCM	• Cross functional teams for environmental management • Environmental auditing • Keeping the website updated on environmental issues • Activity report on environmental management • Taking stakeholders' opinions and requirements into consideration. • Business ethics and code of conduct • R&D budget on green products • Compensation/incentive linked to environmental factors • Environmental management on accounting practices • Training for workers on environmental issues • Employee suggestion system on environmental issues • Participation in environmental programs and research projects • Increase the proportion of employee recommendations and proposes for improvement in quality, social and environment health and safety performance	• Customer relationship management related with GSCM • Informing trading partners prior to changing environmental needs

3.1.6. Marketing Performance

The performance assessment of marketing is the evaluation of the relationship between marketing practices/activities and corporate performance (Clark and Ambler, 2001). Marketing performance is defined as the corporation's capability to increase sales and market share against its competitors (Zhu and Cote, 2004; Green et al., 2012; Khattab et al., 2015). According to Green et al. (1995), the performance assessment of marketing is the level of market success reached by a product at the maturity stage of the market. Other indicators of performance are revenue, sales volume, return on investment (ROI), and return on satisfaction (ROS), customer satisfaction and loyalty, purchase intention and the level of quality. Ambler

and Kokkinaki (1997) stated that sales growth and market share, the profit contribution and customer preference/purchase intention are the main indicators of marketing performance.

Zampese et al. (2016) stated that green marketing is based on marketing performance in terms of branding, increase in sales, market share, customer satisfaction and loyalty. GSCM implementation is the balance between marketing performance and environmental issues. Companies need to attain sustainable environmental solutions of their products/services, so that they comply with customer needs (Zhu and Sarkis, 2006; Dubey et al., 2016). Collaboration/cooperation with customers helps companies improve their economic performance (Diab et al., 2015; Chavez et al., 2016; Zhu et al., 2017), and environmental performance (Laari et al., 2016; Islam et al., 2018).

Table 8 represents the sub-criteria and the measures for the marketing performance main criterion.

Table 8: The sub-criteria and the measures for the marketing performance main criterion.

MARKETING PERFORMANCE		
Increasing Customer Satisfaction	**Improving Cooperation/Collaboration with Customers**	**Marketing Measures**
• After sales service performance • Out of stock for green products • Service response rate • Customer returns • Customer lost rate • Number of customers retained • Number of recalls	• Sharing common goals with customers • Resolve environmental problems with customers • Understand environmental risk and responsibilities with customers • Cooperation with customers to decrease environmental impact of operations • Communicating firm's strategic needs to customers • Cooperation with customers to encourage green purchasing behavior.	• Conservation of energy and resources in marketing mix. • Use of environmental arguments in marketing • Customer profitability on green products • Number of green products • Number of new customers on green products • Customer complain rates on green products • Average market share growth on green products • Average sales growth (volume and dollar) on green products • Increasing customer value on green products • Budget on green marketing activities

3.2. Need for Marketing Criterion

Previous research on GSCM performance focused on environmental, economic and operational performance, and also general corporate performance (Younis et al., 2016). However, green marketing is not taken into consideration in GSCM performance. It is important to remember that GSCM is composed of not only green purchasing, green manufacturing, reverse logistics, but also includes green marketing (Hervani et al., 2005). Liang and Chang (2008) indicated that GSCM involves green purchasing, green production and green marketing.

Green et al. (2012) revealed the linkage between supply chain management strategy and marketing performance. Zhu and Cote (2004) stated that the aim of GSCM is to level marketing performance in compliance with environmental issues.

Nowadays, the customers are becoming increasingly responsible about the natural and environmental issues and concerns. Customers' pressures affect suppliers to carry out environmental efforts and enhance environmental performance as a consequence of their

environmental activities such as the implementation of GSCM principles (Johansson, 2014; Chavez et al., 2016; Zhu et al., 2017). If customers play such important roles in collaboration with suppliers, then GSCM may yield economic gains through operational performance (Kim and Wemmerlöv, 2015; Yu et al., 2017; Mumtaz et al., 2018).

Khattab et al. (2015) asserted that companies are able to satisfy customer demands with more sustainable and environmental products, which translates into general improvement in environmental, financial and marketing performance of the company. The results of Khattab et al. (2015) and Mumtaz et al. (2018) studies indicated that GSCM should encompass environmental management, information systems, green procurement, alignment with customers, green design and packaging, and investment recovery, and eventually these elements will benefit environmental-based marketing performance. Therefore, since the marketing criterion has so far been neglected in the GSCM performance literature, it is incorporated in the proposed framework.

The adoption of the performance assessment framework will have impact on companies by assisting them in reducing wastes and costs, improving efficiency and effectiveness of operations and logistics, and enhancing corporate image and customer satisfaction.

4. DISCUSSION

Circular economy is a resource-saving economy that adopted reduction, reuse, and recycle principles to decrease raw material consumption, and energy resources, pollution in the closed loop cycle. The success of green supply chain in circular economy does not depend only on all levels of enterprise but also involves coordination with manufacturer and suppliers to get eco-friendly inputs and cooperation with seller and customers to implement product return, reuse, and recycling activities (Ying and Li-jun, 2012; Chavez et al., 2016) to implement green design, green logistics, green production, and green consumption (Yang, 2011; Pourjavad and Shahin, 2018). Inclusion of green supply chain management into the circular economy is required to achieve an optimal balance of economic, social, operational and environmental performance for a company (Zeng et al., 2017). The reasons for performance assessment are various, and include the following: analyzing progress, identifying success, reporting and evaluating performance, confirming the known and estimating the unknown, capturing the nature of processes, helping operations, understanding problems and bottlenecks, establishing new objectives and targets, stating future measures and remedies to be taken, and ranking priorities (Holmberg, 2000; Gunasekaran et al., 2004).

Fang and Zhang (2018) specified a research gap highlighting a lack of integrated and holistic framework for GSCM performance assessment. Supporting this view, as seen in Table 1, none of the researchers determined the whole list of factors for the GSCM performance assessment process. Some scholars concentrated on environmental performance (Dubey et al., 2015), and economic performance (Chand et al., 2018). Diab et al. (2015) analyzed the effect of organizational, environmental, financial, and operational activities. Zhang and Yang (2016) determined the GSCM performance indicators as operational, financial, and environmental. According to de Oliveira et al. (2018), current GSCM performance assessment literature comprehends operational and environmental performance (Jabbour et al., 2015; Woo et al., 2016; Shahryari et al., 2016), and enterprise performance (Björklund et al., 2012; Wei et al. 2014; Mirhedayatian et al., 2014). In this study, as shown in Figure 3, in order to fill the gap with an integrated and holistic view of GSCM performance assessment, six main criteria were examined.

4.1. Implication for Theory and Practice

GSCM can increase utilization of resources, minimize consumption of resources and improve corporate image by enhancing its operational performance without sacrificing the compatibility among suppliers, customers, society and environment. Hence, proposed integrated framework provides a systematic tool to achieve the ultimate aims of circular economy. In addition, this achievement is going to support the sustainable development in the macro perspective.

For scholars, there are key suggestions for GSCM implementation. Holt and Ghobadian (2009), Malviya and Kant (2015), Dubey et al. (2017), Shafique et al. (2017), and Fang and Zhang (2018) highlighted the critical lack of holistic view for GSCM performance assessment. This study will fill a lack with an integrated and holistic view of GSCM performance assessment based on systems theory, and propose an integrated framework combining the environmental, economic, logistics, operational, organizational and marketing performance.

For policy makers within governmental and non-governmental organizations, the development of the proposed integrative performance assessment framework for GSCM will provide some guideline and useful indicators in terms of regulatory enforcement, non-governmental organizations those are interested in environmental issues, and companies who wish to obtain environmental accreditation and certification. United Nations (2010) published a Supply Chain Sustainability Report indicating the need for supply chain sustainability strategies being internal, integrated, and coordinated with the strategies of the organizations such as product design, business development, legal, human resources, finance risk and strategy, logistics, marketing, and sales.

For managers, it could be discussed that the holistic framework helps companies ensure more environmentally-conscious in the supply chain activities, more responsible by reducing the wastes, and protecting the quality of the products, and more sensitive by conserving the natural resources. The proposed holistic GSCM performance assessment framework reveals a road map in terms of environmental, economic, logistics, operational, organizational and marketing activities. According to Jabbour et al. (2015), if companies need to enhance their environmental performance, they may adopt procedures to follow cleaner production policies. If they aim to enhance their operational performance, they may encourage environmental innovation through concentrating on green packaging, and green/eco design activities. In order to efficiently apply GSCM principles, it is necessary to get support from senior management and require commitment of workforce involved in environmental activities.

The proposed holistic GSCM performance assessment framework may create cleaner industries. From cleaner production point of view, this study revealed that performance assessment framework can be implemented in order to decrease waste and pollution, resource consumption, increase sustainability, collaboration, efficiently manage resources (i.e. natural resources, materials, information, and labor), gain environmental, economic, and social development in the circular economy.

5. CONCLUSION

With the transition of linear economy to circular economy, companies need to consider sustainability and closed-loop cycle. Circular economy emphasizes minimal resource consumption and environmental protection; thus, companies consider implementing green supply chain.

Holt and Ghobadian (2009), Malviya and Kant (2015), Dubey et al. (2017), Shafique et al. (2017), and Fang and Zhang (2018) highlighted the critical lack of holistic view for GSCM performance assessment. The objective of the study is to propose a holistic and integrated framework based on systems theory. The GSCM framework includes three-dimensional hierarchy which includes the main criteria, sub-criteria, and the measures, respectively. The framework integrates 6 criteria, namely, environmental, economic, logistics, operational, organizational, and marketing performance. The 6 criteria have respective 21 sub-criteria, and 189 measures.

The theoretical contribution of this study is to reveal the different indicators of GSCM such as environmental, economic/financial, operational, logistics, organizational, and marketing performances. Therefore, this study supports the understanding of the systematic and holistic assessment of GSCM performance in the context of circular economy.

The second contribution is to propose a systematic framework in order to assess GSCM performance. Assessment process stands on the measures, and it consists of the data gathering process, and then, measuring, monitoring, and evaluating the gathered data. Within the framework, measures of the whole supply chain are revealed in order to assess green performance not only companywide but covering all parties throughout the supply chain.

The third contribution is the inclusion of the marketing criterion in GSCM performance assessment. Customers' pressures on suppliers enhance environmental performance as a consequence of their environmental activities. Therefore, it was necessary to add sub-criteria of marketing criterion, i.e., increasing customer satisfaction, marketing measures, and improving cooperation/collaboration with customers and their related measures.

Further research could focus on finding the causal relationships among the criteria and sub-criteria, weights of the criteria, respective weights of the measures, and an overall performance score of the company in order to reveal a road map. In addition, different methods may be hired to assess GSCM performance through pairwise comparisons.

REFERENCES

Ahi, P., Searcy, C., 2013. A comparative literature analysis of definitions for green and sustainable supply chain management. Journal of Cleaner Production, 52, 329-341.

Ahi, P., Searcy, C., 2015. An analysis of metrics used to measure performance in green and sustainable supply chains. Journal of Cleaner Production, 86, 360-377.

Alvarez Gil, M.J., Jimenez, J.B., Lorente, J.C., 2001. An analysis of environmental management, organizational context and performance of Spanish hotels. Omega, 29(6), 457-471.

Ambler, T. Kokkinaki, F., 1997. Measures of Marketing Success. Journal of Marketing Management, 13, 665-678.

Aronsson, H., Brodin, M.H., 2006. The environmental impact of changing logistics structures. The International Journal of Logistics Management, 17(3), 394-415.

Azevedo, S.G., Carvalho, H., Machado, C., 2011. The influence of green practices on supply chain performance: A case study approach. Transportation Research Part E, 47, 850-871.

Bansal, P., Roth, K., 2000. Why companies go green: a model of ecological responsiveness. Academy of Management Journal, 43(4), 717-736.

Beamon, B.M., 1999. Measuring supply chain performance. International Journal of Operations and Production Management, 19(3), 275-292.

Bhattacharya, A., Mohapatra, P., Kumar, V., Dey, P.K., Brady, M., Tiwari M.K., Nudurupati, S.S., 2014. Green supply chain performance measurement using fuzzy ANP-based balanced scorecard: a collaborative decision-making approach. Production Planning and Control, 25(8), 698-714.

Björklund, M., Martinsen, U., Abrahamsson, M., 2012. Performance measurements in the greening of supply chains. Supply Chain Management: An International Journal, 17(1), 29-39.

Blood-Rojas, 2017. The benefits of a circular supply chain. Trade Ready Blog for International Trade Expert. http://www.tradeready.ca/2017/fittskills-refresher/benefits-circular-supply-chain/

Bowen, F.E., Cousins, P.D., Lamming, R.C., Faruk, A.C., 2001. Horses for courses: explaining the gap between the theory and practice of green supply. Greener Management International, 35, 41-60.

Buyukozkan, G., Cifci, G., 2011. A novel fuzzy multi-criteria decision framework for sustainable supplier selection with incomplete information. Computer Industry, 62(2), 164-174.

Buyukozkan, G., Cifci, G., 2012. A novel hybrid MCDM approach based on fuzzy DEMATEL, fuzzy ANP and fuzzy TOPSIS to evaluate green suppliers. Expert Systems with Applications, 39(3), 3000-3011.

Carter, C.R., Kale, R., Grimn, C.M., 2000. Environmental purchasing and firm performance: An empirical investigation. Transportation Research Part E, 36, 219-288.

Carter, C.R., Rogers, D.S., 2008. A framework of sustainable supply chain management: moving toward new theory. International Journal of Physical Distribution and Logistics Management, 38(5), 360-387.

Chan, R.Y.K., He, H., Chan, H.K., Wang, W.Y.C., 2012. Environmental orientation and corporate performance: The mediation mechanism of green supply chain management and moderating effect of competitive intensity. Industrial Marketing Management, 41, 621-630.

Chand, M., Bhatia, N., Singh, R.K., 2018. ANP-MOORA-based approach for the analysis of selected issues of green supply chain management. Benchmarking: An International Journal, 25(2), 642-659.

Chaudharya, T., Chanda, A.K., 2015. Evaluation and measurement of performance, practice and pressure of green supply chain in Indian manufacturing industries. Uncertain Supply Chain Management, 3, 363-374.

Chavez, R., Yu, W., Feng, M., Wiengarten, F., 2016. The Effect of Customer-Centric Green Supply Chain Management on Operational Performance and Customer Satisfaction. Business Strategy and the Environment, 25(3), 205-220.

Chen, I.J., Paulraj, A., Lado, A.A., 2004. Strategic Purchasing, Supply Management, and Firm Performance. Journal of Operations Management, 22(5), 505-523.

Chia, A., Goh, M. Hum, S.H., 2009. Performance measurement in supply chain entities: balanced scorecard perspective, Benchmarking: An International Journal, 16(5), 605-620.

Chien, M.K., Shih, L.H., 2007. An empirical study of the implementation of green supply chain management practices in the electrical and electronic industry and their relation to organizational performances. International Journal of Environmental Science Technology, 4(3), 383-394.

Chien, M.K., 2014. Influences of green supply chain management practices on organizational sustainable performance. International Journal of Environmental Monitoring and Protection, 1(1), 12-23.

Chuang, S.P., 2014. Assessing and improving the green performance using a compound approach. Flexible Services and Manufacturing Journal, 26, 69-91.

Clark, B.H. Ambler, T., 2001. Marketing performance measurement: evolution of research and practice. International Journal of Business Performance Management, 3, 231-244.

Cosimato, S., Troisi, O., 2015. Green supply chain management: Practices and tools for logistics competitiveness and sustainability. The DHL case study. The TQM Journal, 27(2), 256-276.

da Silveira, G.J.C., Arkader, R., 2007. The direct and mediated relationships between supply chain coordination investments and delivery performance. International Journal of Operations and Production Management, 27(2), 140–158.

Daft, R.L., 1995. Organizational theory and design. West Publishing, St. Paul

Darnall N., Jolley, G.J., Handfield, R., 2008. Environmental Management Systems and Green Supply Chain Management: Complements for Sustainability?. Business Strategy and the Environment, 18, 30-45.

Dawei, Z., Hamid, A.B.A., Chin, T.A., Leng, K.C., 2015. Green Supply Chain Management: A Literature Review. Sains Humanika, 5(2), 15-21.

de Oliveira, U.R., Espindola, L.S., da Silva, I.R., da Silva, I.N., Rocha, H.M., 2018. A systematic literature review on green supply chain management: research implications and future perspectives. Journal of Cleaner Production. 187, 537-561.

Deng, X., Hu, Y., Deng, Y., Mahadevan, S., 2014. Supplier selection using AHP methodology extended by D numbers. Expert Systems with Applications, 41(1), 156-167.

Diab, S.M., AL-Bourini, F.A., Abu-Rumman, A.H., 2015. The impact of green supply chain management practices on organizational performance: a study of Jordanian food industries. Journal of Management and Sustainability, 5(1), 149.

Diabat, A., Govindan, K., 2011. An analysis of the drivers affecting the implementation of green supply chain management. Resources, Conservation and Recycling, 55(6), 659-667.

Diabat, A., Khodaverdi, R., Olfat, L., 2013. An exploration of green supply chain practices and performances in an automotive industry. International Journal of Advanced Manufacturing Technology, 68, 949-961.

Dou, Y., Zhu, Q., Sarkis, J., 2014. Evaluating green supplier development programs with a grey-analytical network process-based methodology. European Journal of Operational Research, 233(2), 420-431.

Dreyer, B., Gronhaug, K., 2004. Uncertainty, flexibility, and sustained competitive advantage. Journal of Business Research, 57, 484-494.

Duarte, S., Cabrita, R., Machado, V.C., 2011. Exploring Lean and Green Supply Chain Performance Using Balanced Scorecard Perspective. Proceedings of the 2011 International Conference on Industrial Engineering and Operations Management Kuala Lumpur, Malaysia.

Dubey, R., Gunasekaran, A., Ali, S.S., 2015. Exploring the relationship between leadership, operational practices, institutional pressures and environmental performance: A framework for green supply chain. International Journal of Production Economics, 160, 120-132.

Eltayeb, T.K., Zailani, S., Ramayah, T., 2011. Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes. Resources, Conservation and Recycling, 55(5), 495-506.

Esty, D. Winston, A., 2006. Green to Gold: How Smart Companies Use Environmental Strategy to Innovate, Create Value, and Build Competitive Advantage. New Haven, CT: Yale University Press.

El Saadany, A.M., Jaber, M.Y., 2011. A production/remanufacture model with returns' subassemblies managed differently. International Journal of Production Economics, 133(1), 119-126.

Eltayeb, T. K., Zailani, S., 2009. Going green through green supply chain initiatives towards environmental sustainability. Operations and Supply Chain Management, 2(2), 93-110.

Epstein, M.J., Wisner, P.S., 2001. Good neighbors: implementing social and environmental strategies with BSC. Balanced scorecard report. Reprint number B0105C33. Cambridge, MA: Harvard Business School Publishing.

Fang, C., Zhang, J., 2018. Performance of Green Supply Chain Management: A Systematic Review and Meta Analysis. Journal of Cleaner Production. 183, 1064-1081.

Ferguson, M., Toktay B., 2006. The effect of competition on recovery strategies. Production Operational Management, 15, 351-368.

Flynn, B.B., Huo, B., Zhao, X., 2010. The impact of supply chain integration on performance: A contingency and configuration approach. Journal of Operations Management 28(1), 58-71.

Foo, P.Y., Lee, V.H., Tan, G.W.H., Ooi, K.B., 2018. A gateway to realising sustainability performance via green supply chain management practices: A PLS-ANN approach. Expert Systems with Applications. https://doi.org/10.1016/j.eswa.2018.04.013

Fortes, J., 2009. Green Supply Chain Management: A Literature Review. Otago Management Graduate Review, 7, 51-62.

Frohlich, M.T., Westbrook, R., 2001. Arcs of Integration: An International Study of Supply Chain Strategies. Journal of Operations Management, 19(2), 185-200.

Fuentes-Fuentes, M.M., Albacate-Saez, C.A. Llorens-Montes, F.J., 2004. The impact of environmental characteristics on TQM principles and performance. Omega, 32(6), 425-442.

Gandhi, M.A., Sharma, S., 2014. A Review of Research Methodologies Linking Green Supply Chain Practices and Green Supply Chain Performance. International Journal of Supply Chain Management, 3(4), 57-62.

Geffen, C.A., Rothenberg, S., 2000. Suppliers and environmental innovation: the automotive paint process. International Journal of Operations and Production Management, 20(2), 166-186.

Geissdoerfer, M., Savaget, P., Bocken, N.M., Hultink, E. J. 2017. The Circular Economy–A new sustainability paradigm?. Journal of Cleaner Production, 143, 757-768.

Geng, R., Mansouri, S.A., Aktas, E., 2017. The relationship between green supply chain management and performance: A meta-analysis of empirical evidences in Asian emerging economies. International Journal of Production Economics, 183, 245-258.

Ghorabaee, M.K., Zavadskas, E.K., Amiri, M., Esmaeili, A., 2016. Multi-criteria evaluation of green suppliers using an extended WASPAS method with interval type-2 fuzzy sets. Journal of Cleaner Production, 137, 213-229.

Gilbert, S., 2000. Greening supply chain: enhancing competitiveness through green productivity. Report of the top forum on enhancing competitiveness through green productivity held in the Republic of China, Taipei, ISBN: 92-833-2290-825-27.

Giovanni, P.D., Vinzi, V.E., 2012. Covariance versus component-based estimations of performance in green supply chain management. International Journal of Production Economics, 135, 907-916.

Gorener, A., Ayvaz, B., Kusakci, A.O., Altinok, E., 2017. A hybrid type-2 fuzzy based supplier performance evaluation methodology: The Turkish Airlines technic case. Applied Soft Computing, 56, 436-445.

Gotschol, A., De Giovanni, P., Vinzi, V.E., 2014. Is environmental management an economically sustainable business?. Journal of Environmental Management, 144, 73-82.

Govindan, K., Popiuc, M.N., 2014. Reverse supply chain coordination by revenue sharing contract: A case for the personal computers industry. European Journal of Operational Research.233 (2), 326–336.

Govindan, K., Khodaverdi, R., Vafadarnikjoo, A., 2015a. Intuitionistic fuzzy based DEMATEL method for developing green practices and performances in a green supply chain. Expert Systems with Applications, 42, 7207-7220.

Govindan, K., Soleimani, H., Kannan, D., 2015b. Reverse logistics and closed-loop supply chain: A comprehensive review to explore the future. European Journal of Operational Research, 240, 603-626.

Green, D.H., Barclay, D.W., Ryans, A.B. 1995. Entry strategy and long-term performance: Conceptualization and empirical examination. The Journal of marketing, 1-16.

Green, K., Morton, B., New, S., 1998. Green purchasing and supply policies: do they improve companies' environmental performance?. Supply Chain Management: An International Journal, 3(2), 89-95.

Green, Jr. K.W., Whitten, D., Inman, R.A., 2008. The impact of logistics performance on organizational performance in a supply chain context. Supply Chain Management: An International Journal, 13(4), 317-327.

Green, Jr. K.W., Zelbst, P.J., Meacham J., Bhadauria, V.S., 2012. Green supply chain management practices: impact on performance. Supply Chain Management: An International Journal, 17(3), 290-305.

Gunasekaran, A., Patel, C., McGaughey, R.E., 2004. A framework for supply chain performance measurement. International Journal of Production Economics, 87(3), 333-347.

Hajikhani, M., Wahat, N.W., Idris, K.B., 2012. Considering on green supply chain management drivers, as a strategic organizational development approach, Malaysian perspective. Australian Journal of Basic and Applied Sciences, 6(8), 146-165.

Hang, C., 1996. On the formation and evolution of sea-port regional complexes. ActaGeographicaSinica, 51(6), 501-507.

Hanna, M.D., Newman, W.R. Johnson, P., 2000. Linking operational and environmental improvement through employee involvement. International Journal of Operations and Production Management, 20(2), 148-165.

Harris, I., 2007. Infrastructure modeling. http://www.greenlogistics.org.uk/SiteResources/351c6723-1103-4bd0-a230-9a1d00eb0078_WM1%20-%20Cardiff%20-%20Infrastructure%20Modelling.pdf

Hervani, A.A., Helms, M.M., Sarkis, J., 2005. Performance measurement for green supply chain management. Benchmarking: An International Journal, 12(4), 330-353.

Holmberg, S., 2000. A system perspective on supply chain measurements. International Journal of Physical Distribution and Logistics Management, 30(10), 847-868.

Holt, D., Ghobadian, A., 2009. An empirical study of green supply chain management practices amongst UK manufacturers. Journal of Manufacturing Technology Management, 20(7), 933-956.

Hsu, C.W., Hu, A.H., 2008. Green supply chain management in the electronic industry. International Journal of Environmental Science and Technology, 5(2), 205-216.

Hu, A.H., Hsu, C.W., 2006. Empirical study in the critical factors of green supply chain management (GSCM) practice in the Taiwanese electrical and electronics industries. In 2006 IEEE International Conference on Management of Innovation and Technology, 2, 853-857.

Humphreys, P.K., McIvor, R., Chan, F.T.S., 2003. Using case-based reasoning to evaluate supplier environmental management performance. Expert Systems with Applications, 25(2), 141-153.

Islam, M.S., Tseng, M.L., Karia, N., Lee, C.H., 2018. Assessing green supply chain practices in Bangladesh using fuzzy importance and performance approach. Resources, Conservation and Recycling, 131, 134-145.

Jabbour, A.B.L., Jabbour, C.J., 2009. Are supplier selection criteria going green? Case studies of companies in Brazil. Industrial Management and Data Systems, 109(4), 477-495.

Jabbour, A.B.L., de Oliveira Frascareli, F.C., Jabbour, C.J.C., 2015. Green supply chain management and firms' performance: Understanding potential relationships and the role of green sourcing and some other green practices. Resources, Conservation and Recycling, 104, 366-374.

Jabbour, C.J.C., Jabbour, A.B.L., 2016. Green human resource management and green supply chain management: Linking two emerging agendas. Journal of Cleaner Production, 112, 1824-1833.

Jabbour, C.J.C., Jabbour, A.B.L., Govindan, K., De Freitas, T.P., Soubihia, D.F., Kannan, D., Latan, H., 2016. Barriers to the adoption of green operational practices at Brazilian companies: effects on green and operational performance. International Journal of Production Research, 54(10), 3042-3058.

Jabbour, A.B.L., Jabbour, C.J.C., Godinho Filho, M., Roubaud, D., 2018. Industry 4.0 and the circular economy: a proposed research agenda and original roadmap for sustainable operations. Annals of Operations Research, 1-14. https://doi.org/10.1007/s10479-018-2772-8

Johansson, J., 2014. Why do forest companies change their CSR strategies? Responses to market demands and public regulation through dual-certification. Journal of Environmental Planning and Management, 57(3), 349-368.

Judge, W.Q., Elenkov, D., 1995. Organizational capacity for change and environmental performance: an empirical assessment of Bulgarian firms. Journal of Business Research, 58(7), 893-901.

Kainuma, Y., Tawara, N., 2006. A multiple attribute utility theory approach to lean and green supply chain management. International Journal of Production Economics, 101(1), 99-108.

Khaksar, E., Abbasnejad, T., Esmaeili, A., Tamošaitienė, J., 2016. The effect of green supply chain management practices on environmental performance and competitive advantage: a case study of the cement industry. Technological and Economic Development of Economy, 22(2), 293-308.

Khattab, S.A.A., Abu-Rumman, A.H., Massad, M.M., 2015. The Impact of the Green Supply Chain Management on Environmental-Based Marketing Performance. Journal of Service Science and Management, 8, 588-597.

Kim, Y.H., Wemmerlöv, U., 2015. Does a supplier's operational competence translate into financial performance? An empirical analysis of supplier–customer relationships. Decision Sciences, 46(1), 101-134.

Kumar, P., Singh, R.K., Vaish, A., 2017. Suppliers' green performance evaluation using fuzzy extended ELECTRE approach. Clean Technologies and Environmental Policy, 19(3), 809-821.

Kuo, T.C., Hsu, C.W., Li, J.Y., 2015. Developing a green supplier selection model by using the DANP with VIKOR. Sustainability, 7(2), 1661-1689.

Kusi-Sarpong, S., Sarkis, J., Wang, X., 2016. Assessing green supply chain practices in the Ghanaian mining industry: A framework and evaluation. International Journal of Production Economics, 181, 325-341.

Laari, S., Töyli J., Solakivi, T., Ojala, L., 2016. Firm performance and customer-driven green supply chain management. Journal of Cleaner Production, 112(3), 1960-1970.

Lai, K.H., Ngai, E.W.T., Cheng, T.C.E., 2005. Information technology adoption in Hong Kong's logistics industry. Transportation Journal, 44(4), 1-9.

Lai, K.H., Cheng, T.C.E., Tang, A.K.Y., 2011. Green retailing: factors for success. California Management Review, 52(2), 6-31.

Lau, K.H., 2011. Benchmarking green logistics performance with a composite index. Benchmarking: An International Journal, 18(6), 873-896.

Lee, S.Y., Klassen, R.D., 2008. Drivers and enablers that foster environmental management capabilities in small-and medium-sized suppliers in supply chains. Production and Operations management, 17(6), 573-586.

Lee, A.H., Kang, H.Y., Hsu, C.F., Hung, H.C., 2009. A green supplier selection model for high-tech industry. Expert Systems with Applications, 36(4), 7917-7927.

Lewis, H. Gertsakis, J., 2001. Design + Environment: A Global Guide to Designing Greener Goods, Greenleaf Publishing, Sheffield.

Li, S., Ragu-Nathan, B., Ragu-Nathan, T.S., Subba Rao, S., 2006. The impact of supply chain management practices on competitive advantage and organizational performance. Omega, 34(2), 107-124.

Liang, S., Chang, W.L., 2008. An empirical study on relationship between green supply chain management and SME performance in China. International Conference on Management Science and Engineering, 611-618.

Liao, M.S., Liang, G.S., Chen, C.Y., 2013. Fuzzy grey relation method for multiple criteria decision-making problems. Quality and Quantity, 47(6), 3065-3077.

Lieder, M., Rashid, A., 2016. Towards circular economy implementation: a comprehensive review in context of manufacturing industry. Journal of Cleaner Production, 115, 36-51.

Lin, Y.T., Yang, Y.H., Kang, J.S., Yu, H.C., 2011. Using DEMATEL method to explore the core competences and causal effect of the IC design service company: an empirical case study. Expert Systems with Applications, 38(5), 6262-6268.

Lin, R.J., 2013. Using fuzzy DEMATEL to evaluate the green supply chain management practices. Journal of Cleaner Production, 40, 32-39.

Lin, Y., Tseng, M.L., Chiu, A.S.F., Wang, R., 2014. Implementation and Performance Evaluation of a Firm's Green Supply Chain Management under Uncertainty. Industrial Engineering and Management Systems, 13(1), 15-28.

Liou, J.J., Tamošaitienė, J., Zavadskas, E.K., Tzeng, G.H., 2016. New hybrid COPRAS-G MADM Model for improving and selecting suppliers in green supply chain management. International Journal of Production Research, 54(1), 114-134.

Lo, C.K., Yeung, A.C., Cheng, T.C.E., 2012. The impact of environmental management systems on financial performance in fashion and textiles industries. International Journal of Production Economics, 135(2), 561-567.

Luthra, S., Govindan, K., Kannan, D., Mangla, S.K., Garg, C.P., 2017. An integrated framework for sustainable supplier selection and evaluation in supply chains. Journal of Cleaner Production, 140, 1686-1698.

Mahaboob Sheriff, K.M., Gunasekaran, A., Nachiappan, S., 2012. Reverse logistics network design: a review on strategic perspective. International Journal of Logistics Systems and Management, 12(2), 171-194.

Malviya, R.K., Kant, R., 2015. Green supply chain management (GSCM): a structured literature review and research implications. Benchmarking: An International Journal, 22(7), 1360-1394.

Mangla, S., Kumar, P., Barua, M.K., 2014. An Evaluation of Attribute for Improving the Green Supply Chain Performance via DEMATEL Method. International Journal of Mechanical Engineering and Robotics Research, 1(1), 30-35.

Maxwell, D., van der Vorst, R., 2003. Developing sustainable products and services. Journal of Cleaner Production, 11(8), 883-895.

McKinnon, A., Browne, M., Piecyk, M., Whiteing A., 2015. Green Logistics: Improving the Environmental Sustainability of Logistics, Third Edition, Kogan Page.

Merli, R., Preziosi, M., Acampora, A., 2018. How do scholars approach the circular economy? A systematic literature review, Journal of Cleaner Production, 128, 703-722.

Min, H., Galle, W.P., 2001. Green purchasing practices of US firms. International Journal of Operations and Production Management, 21(9), 1222-1238.

Min, H., Kim, I., 2012. Green supply chain research: past, present, and future. Logistics Research, 4(1), 39-47.

Mirhedayatian, S.M., Azadi, M., Saen, R.F., 2014. A novel network data envelopment analysis model for evaluating green supply chain management. International Journal of Production Economics, 147, 544-554.

Mishra, D., Gunasekaran, A., Papadopoulos, T., Hazen, B., 2017. Green supply chain performance measures: A review and bibliometric analysis. Sustainable Production and Consumption, 10, 85-99.

Mumtaz, U., Ali, Y., Petrillo, A., 2018. A linear regression approach to evaluate the green supply chain management impact on industrial organizational performance. Science of the Total Environment, 624, 162-169.

Murray, G.J., 2000. Effects of a green purchasing strategy: the case of Belfast City Council. Supply Chain Management: An International Journal, 5(1), 37-44.

Olsthoorn, X., Tyteca, D., Wehrmeyer, W., Wagner, M., 2001. Environmental indicators for business: a review of the literature and standardization methods. Journal of Cleaner Production, 9, 453-463.

Papadopoulos, A., Giama, E., 2007. Environmental performance evaluation of thermal insulation materials and its impact on the building. Building and Environment, 42(5), 2178-2187.

Paulraj, A., 2009. Environmental motivations: a classification scheme and its impact on environmental strategies and practices. Business Strategy and the Environment, 18(7), 453-468.

Pochampally, K.K., Gupta, S.M., Govindan, K., 2009. Metrics for performance measurement of a reverse/closed-loop supply chain. International Journal of Business Performance and Supply Chain Modelling, 1(1), 8-32.

Pourjavad, E., Shahin, A., 2018. The Application of Mamdani Fuzzy Inference System in Evaluating Green Supply Chain Management Performance. International Journal of Fuzzy Systems, 20(3), 901-912.

Purba, R., 2002. Greening the Supply Chain: A New Initiative in South East Asia, International Journal Operations and Production Management, 22(6), 632-655.

Rao, P., 2002. Greening the supply chain: a new initiative in South East Asia. International Journal of Operations and Production Management, 22(6), 632-655.

Rao, P., 2004. Greening production: A South- East Asian experience. International Journal of Operations and Production Management, 24(3), 289-320.

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

Roehrich, J.K., Hoejmose, S.U., Overland, V., 2017. Driving green supply chain management performance through supplier selection and value internalisation: A self-determination theory perspective. International Journal of Operations and Production Management, 37(4), 489-509.

Rostamzadeh, R., Govindan, K., Esmaeili, A., Sabaghi, M., 2015. Application of fuzzy VIKOR for evaluation of green supply chain management practices. Ecological Indicators, 49, 188-203.

Sagnak, M., Kazancoglu, Y., 2016. Integration of green lean approach with six sigma: an application for flue gas emissions. Journal of Cleaner Production, 127, 112-118.

Sarkis, J., 2003. A strategic decision framework for green supply chain management. Journal of Cleaner Production, 11, 397-409.

Sarkis, J. 1998. Evaluating environmentally conscious business practices. European journal of operational research, 107(1), 159-174.

Sarkis, J. (Ed.). 2001. Greener manufacturing and operations: From design to delivery and back. Greenleaf Publishing.

Sarkis, J. (Ed.). 2006. Greening the supply chain (pp. 407-pp). Berlin: Springer.

Sarkis, J., Zhu, Q., and Lai, K.H., 2011. An organizational theoretic review of green supply chain management literature. International Journal of Production Economics, 130, 1-15.

Sauvé, S., Bernard, S., Sloan, P. 2016. Environmental sciences, sustainable development and circular economy: Alternative concepts for trans-disciplinary research. Environmental Development, 17, 48-56.

Schoenherr, T., 2012. The role of environmental management in sustainable business development: a multi-country investigation. International Journal of Production Economics, 140(1), 116-128.

Shafique, M. N., Asghar, M. S., Rahman, H., 2017. The Impact of Green Supply Chain Management Practices on Performance: Moderating Role of Institutional Pressure with Mediating Effect of Green Innovation. Business, Management and Education, 15(1), 91-108.

Shang, K.C., Lu, C.S., Li, S., 2010. A taxonomy of green supply chain management capability among electronics-related manufacturing firms in Taiwan. Journal of Environmental Management, 91(5), 1218-1226.

Sharma, V. K., Chandna, P., Bhardwaj, A., 2017. Green supply chain management related performance indicators in agro industry: A review. Journal of Cleaner Production, 141, 1194-1208.

Shahryari, A.N., Olfat, L., Esmaeili, A., Rostamzadeh, R., Antucheviciene, J., 2016. Using fuzzy Choquet Integral operator for supplier selection with environmental considerations. Journal of Business Economics and Management, 17, 503-526.

Shen, L., Olfat, L., Govindan K., Khodaverdi R., Diabat, A., 2013. A fuzzy multi criteria approach for evaluating green supplier's performance in green supply chain with linguistic preferences. Resources, Conservation and Recycling, 74, 170-179.

Shi, V.G., Koh, S.C.L., Baldwin, J., Cucchiella, F., 2012. Natural resource based green supply chain management. Supply Chain Management: An International Journal, 17(1), 54-67.

Shrivastava, P., 1995. Environmental Technologies and competitive advantage. Strategic Management Journal, 16, 137-200.

Shu, Q., Zhang, L., 2004. Green purchasing in coal-burning power plants. Energy Conservation and Environmental Protection, 13(2), 18-20.

Simpson, D., Power, D., Samson, D., 2007. Greening the automotive supply chain: a relationship perspective. International Journal of Operations and Production Management, 27(1), 28-48.

Srivastava, S.K., Srivastava, R.K., 2006. Managing product returns for reverse logistics. International Journal of Physical Distribution and Logistics Management (Special Issue on 3PL, 4PL and Reverse Logistics), 36, 524-546.

Srivastava, S.K., 2007. Green supply-chain management: A state-of the- art literature review. International Journal of Management Reviews, 9(1), 53-80.

Stefanelli, N.O., Jabbour, C.J.C., Jabbour, A.B.L., 2014 Green supply chain management and environmental performance of firms in the bioenergy sector in Brazil: An exploratory survey. Energy Policy, 75, 312-315.

Stevic, Ž., Pamučar, D., Vasiljević, M., Stojić, G., Korica, S., 2017. Novel Integrated Multi-Criteria Model for Supplier Selection: Case Study Construction Company. Symmetry, 9(11), 279.

Thanki, S., Thakkar, J., 2018. A quantitative framework for lean and green assessment of supply chain performance. International Journal of Productivity and Performance Management, 67(2), 366-400.

Theyel, G., 2001. Customer and supplier relations for environmental performance. Greener Management International, 35, 61-69.

Tseng, M.L., Chiu, A.S., 2013. Evaluating firm's green supply chain management in linguistic preferences. Journal of Cleaner Production, 40, 22-31.

Tsoulfas, G.T., Pappis, C.P., 2006. Environmental principles applicable to supply chains design and operation. Journal of Cleaner Production, 14(18), 1593-1602.

Tsui, C.W., Tzeng, G.H., Wen, U.P., 2015. A hybrid MCDM approach for improving the performance of green suppliers in the TFT-LCD industry. International Journal of Production Research, 53(21), 6436-6454.

Tyagi, M., Kumar, P., Kumar, D., 2015. Parametric selection of alternatives to improve performance of green supply chain management system. Procedia - Social and Behavioral Sciences, 189, 449-457.

United Nations (UN), 2010. Supply Chain Sustainability. A Practical Guide for Continuous Improvement. UN Global Compact Office and Business for Social Responsibility, 5.

Urbinati, A., Chiaroni, D., Chiesa, V., 2017. Towards a new taxonomy of circular economy business models. Journal of Cleaner Production, 168, 487-498.

Uygun, O., Dede, A., 2016. Performance evaluation of green supply chain management using integrated fuzzy multi-criteria decision making techniques. Computers and Industrial Engineering, 102, 502-511.

Vachon, S., Klassen, R.D., 2007. Supply chain management and environmental technologies: the role of integration. International Journal of Production Research, 45(2), 401-423.

Vachon, S., Klassen, R.D., 2008. Environmental Management and Manufacturing Performance: The Role of Collaboration in the Supply Chain. International Journal of Production Economics, 111(2), 299-315.

Vanalle, R.M., Ganga, G.M.D., Godinho Filho, M., Lucato, W.C., 2017. Green supply chain management: An investigation of pressures, practices, and performance within the Brazilian automotive supply chain. Journal of Cleaner Production, 151, 250-259.

Vijayvargy, L., Thakkar, J., Agarwal, G., 2017. Green supply chain management practices and performance: The role of firm-size for emerging economies. Journal of Manufacturing Technology Management, 28(3), 299-323.

Wagner, M., Schaltegger, S., Wehrmeyer, W. 2001. The relationship between the environmental and economic performance of firms: what does theory propose and what does empirical evidence tell us?. Greener Management International, 95-109.

Wagner, M., Schaltegger, S., 2004. The effect of corporate environmental strategy choice and environmental performance on competitiveness and economic performance: an empirical analysis of EU manufacturing. European Management Journal, 22(5), 557-572.

Walker, H., Di Sisto, L., McBain, D., 2008. Drivers and barriers to environmental supply chain management practices: lessons from the public and private sectors. Journal of Purchasing and Supply Management, 14(1), 69-85.

Walton, S.V., Handfield, R.B., Melnyk, S.A., 1998. The green supply chain: integrating suppliers into environmental management processes. Journal of Supply Chain Management, 34(1), 2-11.

Wang, S.W., Zhang, L., Liu, Z.F., Liu, G.F, Hong, C.Z., 2005. Study on the performance assessment of green supply chain. In: 2005 IEEE International Conference on Systems, Management and Cybernetics (IEEE), 942-947.

Wang, X., Chan, H.K., 2013. A hierarchical fuzzy TOPSIS approach to assess improvement areas when implementing green supply chain initiatives. International Journal of Production Research, 51(10), 3117-3130.

Wee, H. M., Lee, M. C., Jonas, C. P., Wang, C. E. 2011. Optimal replenishment policy for a deteriorating green product: Life cycle costing analysis. International Journal of Production Economics, 133(2), 603-611.

Wei, F., Liu, S.F., Yin, L.J., Li, W.Z., Yu, Z.Y., 2014. Research on performance evaluation system for Green supply chain management based on the context of recycled economy-taking Guangxi's manufacturing industry as example. Journal of Grey System, 26(2), 177-187.

Woo, C., Kim, M.G., Chung, Y., Rho, J.J., 2016. Suppliers' communication capability and external green integration for green and financial performance in Korean construction industry. Journal of Cleaner Production, 112, 483-493.

Wu, G.C., Cheng, Y.H., Huang, S.Y., 2010. The study of knowledge transfer and green management performance in green supply chain management. African Journal of Business Management, 4(1), 44-48.

Wu, K.J., Liao, C.J., Tseng, M.L., Chiu, A.S., 2015. Exploring decisive factors in green supply chain practices under uncertainty. International Journal of Production Economics, 159, 147-157.

Xiaoping, X., Chen, L., 2008. The Supply Chain Performance Evaluations Indicator System Based on Benchmark Balanced Scorecard. Proceedings of 4th International Conference on Wireless Communications, Networking and Mobile Computing, 12-14 October, Dalian, China, 1-4.

Yang, C.S., Lu, C.S., Haider, J.J., Marlow, P.B., 2013. The effect of green supply chain management on green performance and firm competitiveness in the context of container shipping in Taiwan. Transportation Research Part E: Logistics and Transportation Review, 55, 55-73.

Yang, H., 2011. Research on the construction and management of green supply chain based on circular economy. In Business Management and Electronic Information (BMEI), 2011 International Conference, 3, 171-174).

Yazdani, M., Hashemkhani Zolfani, S., Zavadskas, E.K., 2016. New integration of MCDM methods and QFD in the selection of green suppliers. Journal of Business Economics and Management, 17(6), 1097-1113.

Yeung, A.C., 2008. Strategic supply management, quality initiatives, and organizational performance. Journal of Operations Management, 26(4), 490-502.

Ying, J., Li-Jun, Z., 2012. Study on green supply chain management based on circular economy. Physics Procedia, 25, 1682-1688.

Younis, H., Sundarakani, B., Vel, P., 2016. The impact of implementing green supply chain management practices on corporate performance. Competitiveness Review, 26(3), 216-245.

Yu, F., Han, F., Cui, Z., 2015. Evolution of industrial symbiosis in an eco-industrial park in China. Journal of Cleaner Production, 87, 339-347.

Yu, W., Chavez, R., Feng, M., 2017. Green supply management and performance: a resource-based view. Production Planning and Control, 28(6-8), 659-670.

Zampese, E.R.S., Moori, R.G., Caldeira, A., 2016. Green marketing as a mediator between supply chain management and organizational performance. Revista de Administração Mackenzie, 17(3), 183-211.

Zeng, H., Chen, X., Xiao, X., Zhou, Z., 2017. Institutional pressures, sustainable supply chain management, and circular economy capability: Empirical evidence from Chinese eco-industrial park firms. Journal of Cleaner Production, 155, 54-65.

Zhang, H., Yang, F., 2016. On the drivers and performance outcomes of green practices adoption: an empirical study in China. Industrial Management and Data Systems, 116(9), 2011-2034.

Zhao, H., Zhao, H., Guo, S., 2017. Evaluating the comprehensive benefit of eco-industrial parks by employing multi-criteria decision making approach for circular economy. Journal of Cleaner Production, 142, 2262-2276.

Zhu, Q., Geng, Y. 2001. Integrating environmental issues into supplier selection and management; a study of large and medium-sized state-owned enterprises in China. Greener Management International, 27-41.

Zhu, Q., Sarkis, J., 2004. Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing practices. Journal of Operations Management, 22(3), 265-289.

Zhu, Q., Cote R.P., 2004. Integrating green supply chain management into an embryonic eco-industrial development: a case study of the Guitang Group. Journal of Cleaner Production 12, 1025-1035.

Zhu, Q., Sarkis, J., Geng Y., 2005. Green supply chain management in China: pressures, practices and performance. International Journal of Operations and Production Management, 25(5), 449-468.

Zhu, Q., Sarkis, J., 2006. An inter-sectoral comparison of green supply chain management in China: drivers and practices. Journal of Cleaner Production, 14(5), 472-486.

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, 1041-1052.

Zhu, Q., Sarkis J., Lai, K.H., 2008. Confirmation of a measurement model for green supply chain management practices implementation. International Journal of Production Economics, 111, 261-273.

Zhu, Q., Geng, Y., Lai, K.H., 2010. Circular economy practices among Chinese manufacturers varying in environmental-oriented supply chain cooperation and the performance implications. Journal of Environmental Management, 91(6), 1324-1331.

Zhu, Q., Sarkis, J., Lai K.H., 2013. Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. Journal of Purchasing and Supply Management, 19(2), 106-117.

Zhu, Q., Feng, Y., Choi, S. B., 2017. The role of customer relational governance in environmental and economic performance improvement through green supply chain management. Journal of Cleaner Production, 155, 46-53.

Zsidisin, G.A., Siferd, S.P., 2001. Environmental purchasing: a framework for theory development. European Journal of Purchasing and Supply Management, 7(1), 61-73.

Highlights

- Proposed a framework for GSCM performance based on a circular economy.
- Holistic GSCM performance model included criteria, sub-criteria and measures.
- Revealed the different dimensions of GSCM.
- Proposed a systematic framework in order to assess GSCM performance.
- The inclusion of the marketing criterion in GSCM performance.