Green Supply Chain Management (GSCM) and Circular Economy (CE): A Rapid Review of their Conceptual Relationships

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Abstract

There is an increasing interest among scholars and practitioners of Green Supply Chain Management (GSCM) and Circular Economy (CE) as these concepts are interrelated in business operations to foster economic growth with environmental sustainability. Both GSCM and CE aim to safeguard the environment, by reducing the utilization of resources and decreasing environmental depletion by managing supply chains using green production systems. However, the relationship between these concepts is not available in the literature. This article aims to fill up the gap in the literature by adopting a rapid review method, reviewing literature from reliable sources indexed in PubMed, Google Scholar, and other Web of Science, published during the year 2011-2022, with aims to provide definitions of GSCM, CE and their significance; relationships of GSCM and CE. The article discusses that both concepts are closely related in their aims, characteristics, benefits, and ways of implementation, as they need an integrated green framework in all aspects, including management, resource usage, marketing, distribution, reverse logistics, etc. The article concludes that both concepts are concerned with environmental and economic sustainability, as enforcement of GSCM and CE benefits the economy, the environment, and society.

Keywords: GSCM, CE, Conceptual relationship, Environmental sustainability, Environmental management

Introduction

There is an increasing awareness and concern among business organizations about climate change and environmental changes due to increasing industrial activities in the name of economic development, thus leading to an intense debate and discussion among industries on the restoration of the natural environment with the improvement of ecological and economic impact (Del Giudice et al., 2021). This growing concern has motivated companies to protect environment by switching to a green or circular economy for environmental sustainability. GSCM and CE are emerging closely related concepts for a green sustainable world (Genovese et al., 2017; Zhu et al., 2011) as both concepts are concerned with environmental and economic sustainability in increasing productivity, by increasing the lifespan without wastage of resources and environmental depletion. However, these concepts have some differences in their approaches. For example, GSCM focuses primarily on improving of environmental conditions. On the other hand, CE is the economic development in a circular usage of resources, less wastage, and increasing the product life cycle (Geng et al., 2017). Several recent studies have been published on GSCM and CE practices (Liu et al., 2018; Ghisellini et al., 2016; Su et al., 2013). In these studies, some components of their relationship have been introduced. For instance, GSCM is considered a component to help in the working process of CE, in which a firm can adopt GSCM practices to get more competitive advantages and profits (Yan, 2011). Both concepts' working processes are integrated as the operation of eco-friendly SC and CE have contributed positive outcomes in terms of environmental performance and profitability (Khan and Qianli, 2017). However, the working process of CE helps to proceed with a firm's supply chain, which is environmentally sustainable (Kirchherr et al., 2017). The approach of CE aims at economic development by improving the efficiency of materials and energy use to minimize the environmental impact (Su et al., 2013). Even though GSCM and CE are important emerging concepts for a Green world, a conceptual relationship analysis is not available in the existing literature. Knowledge of their conceptual relationships analysis is essential to help policymakers, business people, and researchers use these concepts. To fill the gap in the available literature, this article aims to find these conceptual relations for application in future works. From the review, the article presents some insights which may be relevant for future research.

Method and objectives

Many kinds of review studies exist, such as systematic review, critical review, meta-analysis, etc., for the GSCM and CE (Merli et al., 2018; McCarthy et al., 2018; Liu et al., 2018). Due to time constraints the article used a rapid reviewing method, state-of-the-art reviewing. The article has reviewed available literature from reliable sources and electronic databases indexed in PubMed, Google Scholar, Web of Science, etc. published during the year 2011-2022, to search a summary of the various research that has been done related to GSCM and CE, and classified the literature based on content analysis. Keywords including 'Green supply chain management', 'sustainable supply chain', 'GSCM'. 'circular economy'and 'CE' were typed for searching. All articles published to date related to the review's objectives were

searched by typing these two concepts. This article comprises five sections with the following headlines: Introduction; GSCM and its significance; CE and its significance; Relationships of GSCM and CE; and Conclusion. This article has the following objectives:

1. Definitions and significance of GSCM
2. Definitions and significance of CE
3. Relationships between GSCM and CE

Green Supply Chain Management (GSCM) and its significance

Green supply chain management (GSCM) is a modern management method that integrates environmental consideration in supply chain management (SCM), targeting to reducing costs, energy, resources, wastage, and environmental challenges (Malviya and Kant, 2015; Zhu et al., 2011). In recent decades, there has been an increasing awareness of the benefits of GSCM application parallel with the increasing demand for environmental protection and sustainability in business activities (Aroonsrimorakot et al., 2022; Vanalle et al., 2017). This has instigated firms to take steps to promote GSCM with pressures to implement stricter regulations in GSCM practices with aims to improve both the environment and economy (Diabat et al., 2013) for sustainable development (Sarkis et al., 2011; Green et al., 2012). Due to these reasons, many firms consider GSCM as a viable choice for reducing pollution and other impacts of industrial activities on the environment, as GSCM practices improve the supply chain's performance in terms of business supplier, customer, and logistics activities. There are five essential practices of GSCM (Liu et al., 2018) as follows: 1. Integrated environmental management (IEM) that aims at intra-organizational environmental performance improvement, including top manager's dedication, environmental standard certification, cleaner production, awareness promotion, and organizational knowledge sharing activities; 2. Eco-design (ECO) that integrates ecological consideration in the production process to achieve eco-efficiency; 3. Green purchasing (GP), including material selection, monitoring, environmental auditing, eco-labeling, etc.; 4. Customer cooperation (CC), including collaboration and cooperation with customers for product recycling, green consumption, marketing, logistics, etc. to improve environmental performance; 5. Investment recovery (IR), including activities in the SC following the 3Rs principles, such as recycling system, reverse logistics, and sale of unused materials.

Making the supply chain green involves two categories: 1. Improving coordination with suppliers to help expand greener and environmentally friendly commodities; 2. Rewarding ISO 14000 standards to suppliers who passed the eco-friendly performance evaluation test. The significance of following GSCM practices is many, such as improving a firm's rating in the market, improving the market situation in terms of the competition at a lesser cost, and minimizing resource consumption. These factors motivate sustainable consumption and solve environmental degradation (Shahriarpour and Tabriz, 2017). With increasing environmental awareness, firms are implementing GSCM practices to solve environmental problems to increase sustainability and competitive advantage (Khan and Qianli, 2017). Various scholars have defined GSCM in different ways (Ahi and Searcy, 2013) as given in Table 1. The

operational definition of GSCM can be defined as integrating environmental concerns into the organizational practices of SCM (Islam et al., 2017).

Table 1 Definitions of GSCM

Author (**s**)	**Definitions of GSCM**
Rosyidah et al**. (***2022	It is a new strategy for SC management, necessary for business firms to achieve financial and environmental benefits while minimizing the negative impact on the environment.
Assumpcao et al**. (**2021**)**	GSCM practices include innovations in the acquisition, production, distribution, and logistics processes, therefore, to successfully implement supply chain greening, companies need to leverage significant efforts to change or adapt their products, processes, and management, often with the adoption of new business models.
Tseng et al**. (**2019**)**	A management system that integrates environmental consideration into the supply chain process including collaboration with customers, suppliers, and logistics service providers to share information and knowledge for improving environmental performance.
Silva et al**. (**2019**)**	Business innovation strategy for managing SC to protect the environment and minimize environmentally degrading impacts.
Dube and Gwande **(**2016**)**	It is a modern management approach where the supply chain is a combination of economy and ecology. It aims at reducing the waste of energy and material, hence helping to conserve energy and prevent pollution.
McKinnon et al**. (**2015**)**	It is defined in terms of the collaboration of environmental management within supply chain management, having environmental responsibilities in terms of design, procurement, production, purchasing, reverse logistics, re-utilization, and disposal.
Dawei et al**. (**2015**)**	Management process aimed at reducing costs and resource consumption, decreasing environmental pollution through green production, improving market share, stronger brand image, and increasing economic performance by improving environmental and social performance.
Diabat et al**. (**2013**)**	Management process to minimize life cycle impacts of a product, integrating green design, resource usage, and allocation, and decreasing the use and production of

Author (s)	Definitions of GSCM
	environmentally harmful material through recycling and reuse concepts.
Ying and Li-Jun (2012)	Management that focuses on environmental protection and resource conservation with integrated information, logistics, and energy flow in the entire supply chain.
Sarkis et al. (2011)	Defined as integrating environmental concerns into the inter-organizational practices of SCM including reverse logistics.

Circular Economy (CE) and its significance

There has been a growing popularity of the concept of CE in recent decades; its significance and implementation expanded at the global scale as it is a modern regenerative approach for global sustainability with aims at optimizing the performance of both the economy and the environment with a reduction of resource usage, minimizing waste by extending product's life cycle and performance (Merli et al., 2018; Geng et al., 2017). CE not only aims to reduce the impact of production activities on the environment but also saves resources by repairing, recycling, and reusing the product repeatedly (Govindan and Hasanagic, 2018; Genovese et al., 2017; Ghisellini et al., 2016; Murray et al., 2017). Due to this reason, CE is considered an essential practice for economic growth and a sustainable environment (Ma et al., 2014). As a result, there is a growing significance of the application of CE practices during these few decades, evidenced by the growing number of research articles available in various academic journals worldwide (Lieder and Rashid, 2016). Organizations have started to adopt CE as an alternative sustainable and green approach to solving environmental problems and economic development (Manavalan and Jayakrishna, 2019). CE originates to minimize industrial impact on human ecology and the environment. Therefore, it is closely related to environmental science concepts by adopting minimal resource consumption and wastage strategies. It extends products' life cycle through reuse, repair, and recycling, leading to sustainable economic development with less impact on the environment (European Commission, 2021). So, implementation of CE practices is essential in the current world to solve the challenges due to climate change. The CE initiative has been successfully implemented in many countries (Ghisellini et al., 2016).

CE is different from the traditional linear economy (LE) as the working processes of CE adopt strategies of minimal resource consumption, reducing waste, reusing and recycling for environmental protection, unlike the traditional linear supply chain that favors using readily available natural resources without environmental consideration (Vanalle et al., 2017; Zhu et al., 2010). However, the transformation of LE into CE is challenging as it requires a major transformation from the current pattern of production and consumption. It is, therefore, important for researchers, business industries, and practitioners to study and understand the working process of the concept, its process, and its effects on other green practices including GSCM. A literature review has led to various definitions of CE from various scholars, as shown in Table 2. However, when integrated, all these definitions expressed a common aim: to

increase resource and production efficiency, and lower resource extraction without reducing economic activity (Mccarthy et al., 2018). In other words, CE integrates policies and strategies for efficient energy, materials, and water consumption, minimizing waste that degenerates the environment.

Table 2 Definitions of CE

Author (s)	Definitions of CE
Tang et al**. (**2022**)**	Practices that increase production efficiency, leading to improved economic and environmental performance.
Ellen MacArthur Foundation **(**2021**)**	System solution framework to solve pollution and other global climate change challenges.
Awan et al**. (**2020**)**	A process to reduce material used both in production and consumption to bring maximum benefits to the ecology.
Kristensen and Mosgaard **(**2020**)**	Promotes system innovations to reduce waste, increase resource efficiency, and achieve a better balance between the economy, environment, and society.
Korhonen et al**. (**2018**)**	A sustainable development initiative to reduce the societal production-consumption systems' linear material and energy flow by applying materials cycles, the renewable and cascade-type energy flow to the linear system.
Kirchherr et al**. (**2017**)**	An industrial system that employs principles such as reuse, recycling, remanufacturing, reducing, repair, and redesign to replace the end-of-life of manufactured products and materials advantage of value creations and propositions philosophy.
Murray et al **(**2017**)**	An economic model with design in resourcing, purchasing, production, and reprocessing to consider environmental performance and human well-being.
Leider and Rashid**(**2016**)**	A model of production and consumption that involves extending the life cycle of a product by reusing, refurbishing, and recycling existing materials and therefore is increasingly treated as a solution to a series of challenges such as waste generation, resource scarcity, and sustainable economic benefits.
Wu et al**. (**2014**)**	A process to achieve optimum production by minimizing natural resource utilization and pollution emission simultaneously, minimum wastage by reusing the wastes from production, and minimum pollution by recycling and restoring the technically useless wastes.

Author (s)	Definitions of CE
Ying and Li-Jun **(**2012**)**	An ecological economy, which requires human economic activities in line with the 3R principle, Reduce, Reuse, and Recycle in such processes as production, circulation, and consumption of resources to protect the environment.
Zhu et al**. (**2011**)**	An environmental management concept that can be implemented at three levels, namely, regional, industrial zone, and individual enterprise, to boost economic development while lessening environmental and resource challenges.

The article used a rapid reviewing method, a state- of- the- art literature review in reviewing relevant articles for a decade related to the objectives during the years 2011 and 2022. Table 3 provides a brief description of the literature review.

Table 3 Literature Reviews of Green Supply Chain Management (GSCM) and Circular Economy (CE)

#	Author(s)	Method/Objectives/Results
1.	Sangpech and Ueasangkomsate (2022)	Investigated the relationship between CE and GSCM by reviewing the literature. Identified future trends of 3 industries: manufacturing, natural resources, and services moving in line to reduce resource, waste, and environmental impact.
2.	Khan et al. (2022)	Literature review of 91 articles on different aspects of CE research. The result suggested the incorporation of CE with digital technologies for better performance.
3.	Lahane et al. (2021)	Explored CE, its trends, and current status by using a systematic review of literature and content analysis methods. The result provided valuable insights into CE research
4.	Centobelli et al. (2021)	Data were obtained from 212 SMEs. Found that the working model of GSCM and CE are closely related in terms of environmental responsibility, green design, cost saving, etc.
5.	Del Giudice et al. (2021)	An online survey of 378 Italian firms' managers. This resulted in three categories of CE practices impacting performance as design, SC relationship management, and HRM.

#	Author(s)	Method/Objectives/Results
6.	Manavalan and Jayakrishna (2019)	Case analysis on CE and SC in an industry in South India. The result found a combination of CE with SCM as drivers for social, economic, and environmental improvement.
7.	Korhonen et al. (2018)	Analyzed the concept of CE through a literature review. Suggested to develop a CE research model framework consisting of categorization, classification, and organization.
8.	Govindan and Hasanagic (2018)	Systematic literature review to analyze drivers, barriers, and practices that influence the implementation of CE in supply chain management.
9.	Kazancoglu et al. (2018)	Reviewed literature to propose an integrated conceptual framework of CE and GSCM concepts to maximize environmental, economic, logistics, organizational, and marketing performance indicators.
10.	Liu et al. (2018)	Analyzed the relationship between GSCM and CE concepts through a systematic literature review. The result identified the foundation for theories of GSCM and CE's studies.
11.	Genovese et al. (2017)	Case study research that examined the impact of CE and SCM practices integration on environmental performance. Obtained positive results for a sustainable environment.
12.	Blomsma and Brennan (2017)	Literature review on the CE concept that provided in-depth insight and the need for research for the theoretical development of the concept of CE and its applications for bringing a sustainable environment with economic development.
13.	Murray et al. (2017)	Literature review that investigated the origin and conceptualization of CE. The result stressed the application of an improved CE concept for green business development.
14.	Geng et al. (2017)	Systematically reviewed 50 articles (1996-2015) on GSCM in Asia. Found four aspects (economic, environmental, operational, and social performance) to develop the GSCM performance conceptual framework.

#	Author(s)	Method/Objectives/Results
15.	Huang et al. (2017)	Collected data through mailed questionnaires on internal and external factors influencing firms to adopt GSCM from 380 electrical and electronics manufacturers in Taiwan. Found four integrated factors (institutional pressures, management, GSC initiatives, and view of performance) to create an inclusive GSCM research model.
16.	Kirchherr et al. (2017)	Collected 114 CE definitions from the literature. Concluded with a summarized concept of CE, including integrated activities of reduction, reuse, and recycling with economic prosperity as its main aim, followed by environmental quality.
17.	Vanalle et al.(2017)	Collected data on GSCM pressures, practices, and performance from 41 suppliers of Brazilian automotive SC by using closed-ended e-mail questionnaires. Found that the adoption of GSCM practices enhanced economic and environmental performance.
18.	Lieder and Rashid (2016)	Systematic literature review of research articles on the beneficial aspects of CE concerning environment and resources. The result offered practical benefits and strategies for implementing a regenerative economy and sustainable environment.
19	Ghisellini et al. (2016)	Literature review to investigate CE's main features, perspectives, origins, advantages, disadvantages, modeling, and worldwide implementation. CE was found rooted in ecological, environmental economics, and industrial ecology, while implementation of CE's strategies needs the involvement of all actors of the society through collaboration and sharing.
20.	Ma et al. (2014)	Studied private steel enterprises in China. The result provided a historical perspective of CE, leading to significant reductions in energy consumption and pollutant emissions.
21.	Ahi and Searcy (2013)	An extensive literature review that identified and analyzed definitions of GSCM. The result indicated that the integration of sustainability into SCM practices began by including green considerations.

#	Author(s)	Method/Objectives/Results
22.	Su et al. (2013)	Reviewed literature on CE's concept, current practices, and performance. Results identified barriers to the implementation of CE such as inadequate information, technological gap, lack of economic stimulus, motivation, management, leadership quality, lack of public awareness, and environmental quality assessment.
23.	Diabat et al.(2013)	Explored GSCM's practices and performances based on the literature review. The result offered guidelines to managers for implementing GSCM practices.
24.	Laosirihongthong et al. (2013)	Collected data from 190 environmentally certified manufacturing companies in Thailand to investigate priority drivers in GSCM's implementation and impact on environmental and economic performance. The result found legislation and regulation as a top priority driver of environmental and economic performance.
25.	Green et al. (2012)	Empirically assessed 159 manufacturing managers for GSCM practices. The result provided a comprehensive GSCM practice for optimum environmental and economic performance.
26.	Zhu et al. (2011)	Collected data from 396 Chinese manufacturers. Results suggested that GSCM within the CE needs the application of the 3R principles to improve SC's performance.
27.	Eltayeb et al.(2011)	Used a structured mailed questionnaire to collect data from 569 ISO 14001- certified companies in Malaysia to examine the environmental, economic, and intangibility output following GSCM practices which found eco-design to be significant.

Relationship of GSCM and CE

On reviewing literature from published works, it has been found that GSCM and CE are closely related concepts, as the working and management process of both concepts aim to achieve an ideal equilibrium of economy, society, and environment (Zeng et al., 2017; Kazancoglu et al., 2018). The working processes of CE and GSCM are integrated to solve issues of environment and consumption (Vanalle et al., 2017). Integration of GSCM and CE increases the stability and capability of business management in terms of indicators including environment, economy, logistics, and marketing (Ying and Li-Jun, 2012), leading to a sustainable environment (Genovese et al., 2017) with efficient resource usage (Manavalan and

Jayakrishna, 2019). GSCM and CE concepts use 3R principles as reuse, recycling, and remanufacturing (Blomsma and Brennan, 2017). Even though GSCM and CE are emerging closely related concepts for sustainable development, their approaches have some differences. The main goal of GSCM is to improve environmental performance. However, CE focuses on economic development by increasing resource and production efficiency, integrating policies and strategies for efficient energy, materials, and water consumption, and minimizing waste that harms the environment (Mccarthy et al., 2018).

Most CE research has focused on practice and analysis, with limited theory development and expansion (Su et al., 2013; Ghisellini et al., 2016; Murray et al., 2017). CE has three levels of analysis and application: Micro, Meso, and Macro (Merli et al., 2018; Kirchherr et al., 2017). In most research studies, as obtained from the literature review, both concepts are interdependent. GSCM has been regarded as a working component to support CE practices. Similarly, GSCM can achieve environmental benefits by integrating principles of CE into its operational process. (Genovese et al., 2017). This suggests that both are interrelated concepts with different approaches or perspectives. Table 4 shows a summarized conceptual relationship.

Table 4 Relationships of Circular Economy (CE) and Green Supply Chain Management (GSCM)

Theme	Relationships
Definition	Both concepts of GSCM and CE are related to having environmental concerns in all activities of material production, distribution, and consumption by extending the product's life cycle, innovating green design that can save resources and reduce waste, thus lessening consumption and production of pollutants (Blomsma and Brennan, 2017; Diabat et al., 2013). GSCM is an approach that deals with the integration of green into the SCM to reduce strain on the environment through information exchange and cooperation of both customers and suppliers (Tseng et al., 2019). CE enhances resource and material efficiency while reducing waste. CE is defined as a restorative economic model, designed to maintain products, parts, and materials at their highest utility and value, at all times to reduce costs, and improve environmental performance and human well-being (Webster, 2015).
Aims	Both aim at reducing costs, resources, and energy consumption, decreasing environmental pollution through green design, green production, repairing, reusing, and recycling. In this way, both aim at economic growth without damaging the environment in the production and distribution system (Merli et al., 2018; Dawei et al., 2015; Ying and Li-Jun, 2012).

Theme	Relationships
Origin	The concept of GSCM originates from the concept of green purchasing proposed in 1994 and developed in 1996 (Shan and Wang, 2018) while CE was initiated in Germany in 1976, in the USA in 1980, in the UK in 1990, and in Japan in 1991 (Ghisellini et al., 2016).
Characteristics	Both GSCM and CE use green strategy, procurement, production, processing, logistics, and recycling, and perform human economic activities following the 3R (reduce, reuse, recycle) principle, which aims to strengthen resource conservation, promote ecological economy and environmental performance (Ying and Li-Jun, 2012). The CE process has three key elements: 1) circularity by design; 2) close relationships between materials cycle, money, and finance systems; 3) connection to a worldview framework (Webster, 2021).
Importance	Both GSCM and CE are important academic disciplines and branches of sustainability (Tseng et al., 2019; Murray et al., 2017), that help to improve environmental quality through efficient resource management, minimizing waste, and reducing cost but increasing economic growth. Both are interdependent in their role and importance as incorporating GSCM is a requisite for the successful implementation of CE (Liu et al., 2018). Similarly, CE promotes the implementation of the GSCM strategy (Ying and Li-Jun, 2012). However, GSCM is a recent management approach in the supply chain and its importance lies in the improvement of the economy and ecology (Dube and Gawande, 2016), while CE is viewed as a process of business operation for promoting sustainable development (Ghisellini et al., 2016).
Classification	Classified the performance of GSCM into environmental, economic, operational, and competitiveness (Huang et al., 2017) while that of the CE into macro (social and economic changes), micro (nature of firms, production design, and ways of consumption), and meso levels (industrial cooperation and collaboration experiences) (Merli et al., 2018; Kirchherr et al., 2017).
Implementation	GSCM needs an integrated framework for implementation in all aspects, including green product design, material management, marketing and distribution, and reverse logistics (Ghobakhloo et al., 2013), along with organizational involvement, and following management standards such as ISO 14000/14001 guidelines (Mumtaz et al., 2018) while CE needs three levels for effective implementation : (1) micro- level comprising of ways of production design, consumption, and product life cycle; (2) meso-level that focuses on developing eco-industrial parks; (3) macro-level comprising of materials and energy (Su et al., 2013).

Theme	Relationships
Benefits	Both GSCM and CE are beneficial to society, the environment, the economy, and the business organization in terms of saving resources, less cost in production, and increasing the lifespan of a product with less wastage (Su et al., 2013; Eltayeb et al., 2011).
Barriers	Both GSCM and CE have barriers including costs, lack of communication, inefficient management and regulation, competitive market, lack of financial support for investment, economic uncertainty, and inadequate training for the staff. In addition, as CE aims to extend the life cycle of a product, there are challenges in finding and designing durable products (Tseng et al., 2019).
Research gap	Both GSCM and CE need further insights in future studies in terms of developed definitions, process and working principles, performance, environmental practices, and impacts (Merli et al., 2018; Korhonen et al., 2018; Vanalle et al., 2017).

Conclusions

GSCM and CE are closely related concepts because both concepts operate for effective business process management that optimizes resource usage according to the 3R strategy, that is, by reducing waste, recycling, and reusing, and therefore help to solve environmental crises. GSCM and CE have gained increasing significance because both are important academic disciplines for environmental sustainability. The definitions of both concepts highlight a new business model that works in line with green business management as they focus on integrating the economy and environment for social well-being by leading to a sustainable world. The study also contributes to a better understanding of the conceptual relationship of GSCM and CE for sustainability performance. Both concepts are closely related in their aims, characteristics, benefits, and ways of implementation, as they need an integrated framework in all aspects, including designing green products, managing raw material usage, marketing, distribution, and logistics. However, for better performance and integration of GSCM and CE, both concepts must adopt strategies to ensure their successful implementations, such as SC coordination, collaboration with customers, eco-design, green innovation, green marketing, etc. This article is important as it contributes to the literature by analyzing and providing insights into the conceptual relations of the two terms, GSCM and CE, which are important approaches in business management, society, and the environment. In the end, the article concludes that both concepts are concerned with environmental and economic sustainability as enforcement of GSCM and CE brings benefits to the economy, the environment, and society.

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Abbreviations

CE	Circular economy
CESCM	Circular economy supply chain management
CESC	Circular economy supply chain
CEHR	Circular economy human resource
CSF	Critical success factor
GSCM	Green supply chain management
HRM	Human resource management
ISM	Interpretive structural modeling
3Rs	Reduce, reuse, recycle
SC	Supply chain
SCM	Supply chain management
SEM	Structural equation modeling
SME	Small and medium enterprises
SSCM	Sustainable supply chain management
SSM	Sustainable supply management