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Circular Economy Initiatives in Supply Chain: A Systematic Literature Review and Future Research Directions

Hemakshi Chokshi
Guildhall School of Business and Law,
London Metropolitan University, London, N7 8DB, United Kingdom.
E-mail: h.chokshi@londonmet.ac.uk

Rohit Agrawal
Operations Management and Quantitative Techniques,
Indian Institute of Management Bodhgaya, Bodhgaya, India.
E-mail: rohit.a@iimbg.ac.in

Ashutosh Samadhiya
Jindal Global Business School,
OP Jindal Global University, Sonipat, India.
E-mail: samadhiyashu@gmail.com

Anil Kumar
Guildhall School of Business and Law,
London Metropolitan University, London, N7 8DB, United Kingdom.
Corresponding author: A.Kumar@londonmet.ac.uk

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Abstract
The concept of a circular economy (CE) entails developing a closed-loop system that strives to reduce waste, which adversely impacts the environment, while also minimising the use of resources (both natural and technical). The authors perform a thorough literature assessment of relevant papers using bibliometric and network analysis methodologies to identify the major components involved in a CE and solve the issues associated with implementing CE practices in the supply chain (SC). One of the objectives of this study is to determine current trends in SC based on the CE from 2013 to 2022. 101 articles are selected for in-depth analysis based on a bibliometric and network analysis approach. The review sheds light on the most important success factors of CE practices in SC across a variety of industries, as well as current and upcoming research trends. This review identifies research gaps and highlights additional theoretical approaches to the critical success factors of CE practices in the SC. The findings of this research will enable organisations to better understand the challenges and opportunities associated with CE practices and develop more efficient and sustainable SC strategies.

Keywords- Supply chain management, Closed-loop supply chain, Waste management, Circular economy.

1. Introduction

In today's economy, there are a lot of missed operational opportunities, as more than half of the materials utilised may be disposed of or incinerated, while approximately 15% undergo recycling or reuse (Ellen MacArthur Foundation, 2016). There are many reasons for this, but most have to do with how much more expensive it is to buy new materials than recycled ones (Ruffino et al., 2021). Every year, a value of between 80 and 120 billion USD in plastic packaging materials is lost, and a further 5.7 trillion USD is wasted due to the linear nature of current food production; this uses finite resources, pollutes, and destroys the natural environment (Ellen MacArthur Foundation, 2016). By 2025, it is predicted that the amount of solid waste produced annually by the world's metropolitan population will reach 2.2 billion tonnes (Masi et al., 2017).

This presents a significant challenge for manufacturing organisations in reducing waste generation and mitigating ecological degradation (Braun et al., 2018). To address these issues, a serious commitment is required for a more sustainable means of manufacturing and a better supply chain (SC), embodied by the circular economy (CE) (Homrich et al., 2018).

In the current global market, companies are striving to achieve greater sustainability in their SC across financial, social, and ecological domains to stay competitive (Nosratabadi et al., 2019; Kazançoglu et al., 2022). The conventional manufacturing and consumption structure operates as an invariable economic model of "take-make-consume-dispose" (Goyal et al., 2018). A CE is increasingly recognised as a viable, sustainable development approach that necessitates completely transforming all human actions, including manufacturing and consumption activities across the SC (Sehnem et al., 2019; Berberoglu et al., 2023). This novel CE approach relies on the six guiding principles of 6R: reuse, reduction, recycling, redesign, remanufacturing, and repair; the aim is to optimise by-products, products, and services (Lüdeke-Freund et al., 2019). The CE recognises SCs as essential because they provide the framework and structure required to implement CE principles (Ripanti and Tjahjono, 2019).

The generation of excessive waste over a product's lifecycle has led to significant interest from researchers, practitioners, and policymakers in the concept of a CE. Adopting the principles of the CE into SC management practices is known as "Circular Supply Chain Management" (CSCM) (Lahane et al., 2020). A CE's guiding principles centre on reducing and eliminating waste and pollution, promoting material and product reuse and recycling, and restoring degraded environments (Ellen MacArthur Foundation, 2016). By adopting CSCM, companies can reduce costs, improve efficiency, and enhance their environmental impact by creating closed-loop systems that minimise waste and resource consumption (Kazançoglu et al., 2018). The monetary activity and consumption of limited resources are separated in a CE. It is a robust system that benefits people, businesses, and the environment. Circular economy practices (CEP) can encourage industries to adopt sustainable manufacturing strategies (Centobelli et al., 2020), which aim to create a resilient SC structure and reduce waste. In response to the challenge of scarce natural resources, CEP encourages industries to recycle waste, reuse materials, and minimise resource consumption (Govindan and Hasanagic, 2018). Organisations have shifted their SC practices and business strategies to address resource constraints and urgent sustainability challenges (Perey et al., 2018). Materials flow through multiple stages in a "closed-loop supply chain (CLSC);" implementing CEP within a CLSC provides significant benefits. Financially, CE promotes social and technical progress plus economic development while reducing environmental harm and energy consumption (Marconi et al., 2018).

According to a report from the Ellen MacArthur Foundation (2016), adopting CSCM is projected to result in many economic, social, and environmental benefits. These benefits include a reduction of carbon dioxide emissions by 48% across the built environment, food systems, and mobility sectors. An anticipated annual economic benefit of almost a trillion dollars from saving on materials alone by 2030. This represents an increase of €3,000 in disposable income for EU families, or an increase of 18% above current predictions. However, according to a report by Bysong et al. (2022), achieving circularity in the tech industry presents unique challenges. The SC in tech is often sprawling and span multiple continents, with large carbon footprints and complex, short-lived products. Improving circularity necessitates a comprehensive understanding of the flow of materials before, during, and after the product's useful life, given the diverse origins of the raw materials utilised in high-tech goods.

Although there are many research articles in the field of critical success factors for CEP in SC (Sehnem et al., 2019; Moktadir et al., 2020; Dwivedi et al., 2022), there is no review article detailing a thorough understanding of CE's critical success factors. It is therefore important to systematically analyse the concept

of CE in SC and determine its critical success factors. This review article aims to contribute to the existing research by analysing the critical success factors and challenges associated with using CEP in the SC and offering recommendations to businesses planning to use these strategies. This study's findings can help policymakers, industry practitioners, and SC management experts understand what it takes to successfully deploy CEP and what obstacles they may face along the way. This study was undertaken to address knowledge gaps concerning CEP's critical success elements in SC.

Examining the following research issues, this study aims to deepen our understanding of the critical elements that promote the smooth incorporation of CEP into SC. The results of this study will help businesses improve their understanding of CEP and its prospects, allowing them to create SC strategies that are both effective and sustainable. Moreover, this research will offer novel perspectives on the present trends and predicted future advancements in CEP in SC. The following questions are formulated for this study:

RQ1: *To what extent can SC essential success factors ensure that circular economy practices (CEP) are effectively implemented?*

RQ2: *What are the most cutting-edge directions being taken in the study of CEP in the SC?*

RQ3: *Where might we anticipate seeing new developments in the critical success factors of CEP in the SC regarding academic study and real-world implementation?*

To address these research questions, this study presents a systematic literature review (SLR) and bibliometric analysis of scholarly journals to learn more about using CEP in SC. Many researchers suggest using the Scopus data base due to its extensive collection of scholarly publications and broad usage (El Baz and Iddik, 2021; Fahim and Mahadi, 2022). Therefore, the Scopus database is selected as our main source for locating relevant articles.

This paper aims to draw attention to the many steps of a SLR. The SLR process is broken down into its constituent parts - planning, execution, and reporting. The various methodological frameworks for conducting such reviews are then discussed in detail. In order to analyse the growth of previous research and foretell the trends in CEP research and development in SC for the foreseeable future, the SLR technique is employed to perform the review. The authors also offer a research methodology that may help researchers, industry practitioners, and managers to successfully use CEP in the SC, leading to greater resource conservation and cleaner manufacturing both now and in the future.

2. Systematic Literature Review

The SLR methodology is presented in Figure 1. The review methodology followed in this study is adopted from Sharma et al. (2020). A SLR, as shown in Figure 1, is conducted to explore the CE's critical success factors in a SC. In this process, firstly, a list of keywords is explored in the investigating field and then fed to the Scopus database to identify available research articles. Next, the identified articles are subjected to several inclusion and exclusion criteria and abstract reading. At the end, 101 articles are finalised for SLR. The details of shortlisting are further elaborated below.

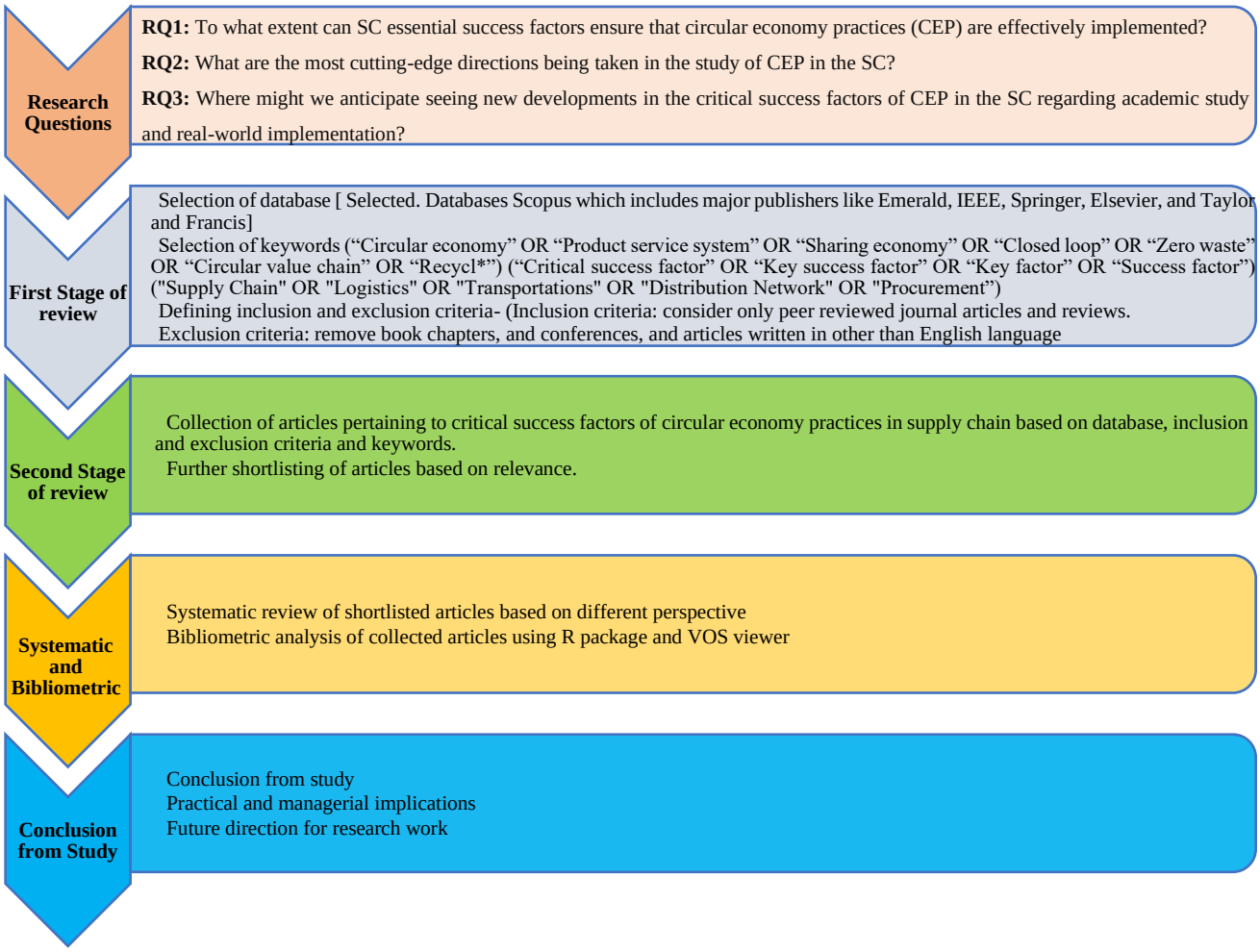

Figure 1. Methodology framework of a systematic literature review.

2.1 Database and Keywords Selection

Selecting databases with relevant papers is the first step in a literature review. When looking for studies on the most important aspects of CEP in SC, the researchers go to the Scopus database. Scopus is a well-known and extensive database with millions of articles from academic journals and publishers, including Elsevier, Emerald, Springer, Taylor and Francis, and IEEE. This analysis only includes articles published between 2013 and 2022.

One of the goals of this research is to look into the progress made in CEP in SC from 2013 to 2022. The keywords selection and phrases to locate relevant articles is given major consideration. The following keywords are used to select and finalise relevant articles for this study: "Circular economy" OR "Product service system" OR "Sharing economy" OR "Closed loop" OR "Zero waste" OR "Circular value chain" OR "Recycl*"AND "Critical success factor" OR "Key success factor" OR "Key factor" OR "Success factor" AND "Supply chain" OR "Logistic" OR "Transportation" OR "Distribution network" OR "Procurement".

2.2 Defining Inclusion and Exclusion Criteria

This study uses approved meeting papers and peer-reviewed journal pieces as guidelines for what to include. This study only looks at English language articles written from 2013 to 2022. Non-refereed journals, book chapters, conference proceedings, and magazine-style articles are some of the reasons to exclude them.

2.3 Final Shortlist of Selected Articles for In-depth Content Analysis

The Scopus database is searched for articles that have inclusion-exclusion criteria in the fields of CEP and SC, considering the critical success factors that affect CEP in SC. A total of 174 articles were discovered through the searches.

Articles are chosen based on how relevant their focus and scope are to narrow the final choice further. Articles with duplicates are removed. In the end, 101 articles were chosen for comprehensive content analyses.

3. Bibliometric Study of the Papers Chosen for this Systematic Literature Review

Numerous articles in various fields are based on bibliometric analyses and utilise a variety of software packages. Bibliometric analysis involves utilising various tools such as HistCite, BibExcel, Gephi, Pajek, R module, and the VOS viewer. Notably, only data from Google Scholar and Academic Research are compatible with Publish or Perish, a significant tool used for this type of analysis. HistCite only uses data from the WOS, and BibExcel takes longer to analyse than others (Sharma et al., 2020). The authors of this article utilise the VOS viewer and the R-package for bibliometric and network analyses. Figure 2 depicts the number of selected articles published between 2013 and 2022. From Figure 2, an increasing trend is observed mainly since 2017, i.e., an average of 40% annual growth (from 8 articles in 2017 to 24 articles in 2022).

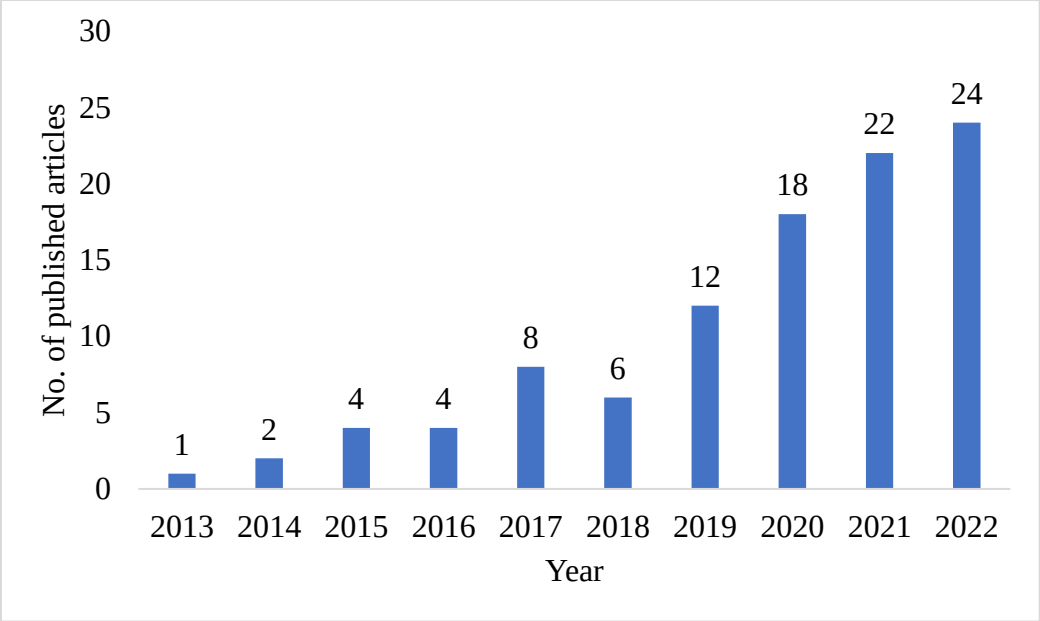

Figure 2. Statistics of published articles.

Table 1. The top journals that publish articles in the field of CE and SC.

Rank	Sources	Articles
1	"Journal of Cleaner Production"	11
2	"Resource Conservation and Recycling"	6
3	"Sustainability (Switzerland)"	5
4	"Sustainable Production and Consumption"	4
5	"Business Strategy and the Environment"	3
6	"Environmental Science and Pollution Research"	3
7	"International Journal of Production Economics"	3
8	"Waste Management"	3
9	"Environment Development and Sustainability"	2
10	"IEEE Transactions on Engineering Management"	2
11	"International Journal of Life Cycle Assessment"	2
12	"International Journal of Logistics Research and Applications"	2
13	"Supply Chain Management"	2

Table 1 shows the most influential academic journals in the field of study. This study found that the "Journal of Cleaner Production" is the leading publisher, followed by "Resource Conversation and Recycling" and "Sustainability (Switzerland)" of relevant articles on CEP in the SC; they have eleven, six and five articles, respectively. A few relevant articles are also published in "Sustainable Production and Consumption", "Business Strategy and the Environment", "Environmental Science and Pollution Research", "International Journal of Production Economics", "Waste Management", "Environment Development and Sustainability", "IEEE Transactions on Engineering Management", "International Journal of Life Cycle Assessment", "International Journal of Logistics Research and Applications", and "Supply Chain Management".

The analysis of country-by-country statistics is based on multiple factors, including the number of published articles, the country of the corresponding author, and the number of article citations. Figure 3 depicts the foremost nations in terms of their contributions to CEP in SC and an analysis of the most critical success factors.

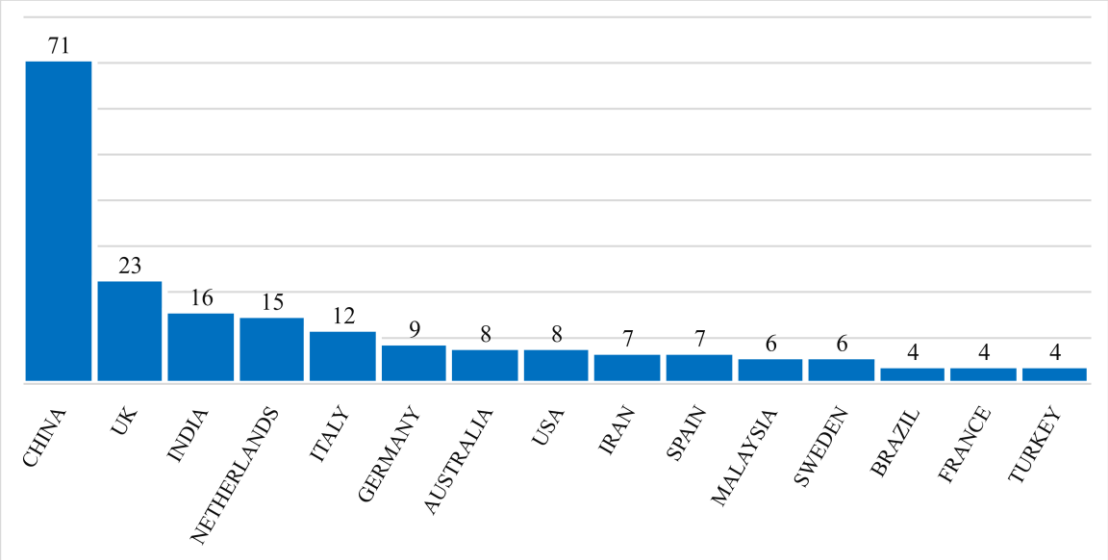

Figure 3. The top 15 contributing nations in the field of CEP in SC and analysis of critical success factors.

Based on the information presented in Figure 3, it can be inferred that China is the most prolific country in terms of publishing articles related to CEP in the SC, with 71 articles. The UK, India, the Netherlands, and Italy are the next highest contributors, with 23, 16, 15, and 12 articles respectively.

From Figure 4, it can be seen that China, Hong Kong, Mexico, Netherlands, and Australia are the leading nations in terms of the number of citations for their published documents in the field of critical success factors of CEP in the SC. As China is a leading contributor, its authors are cited as the highest.

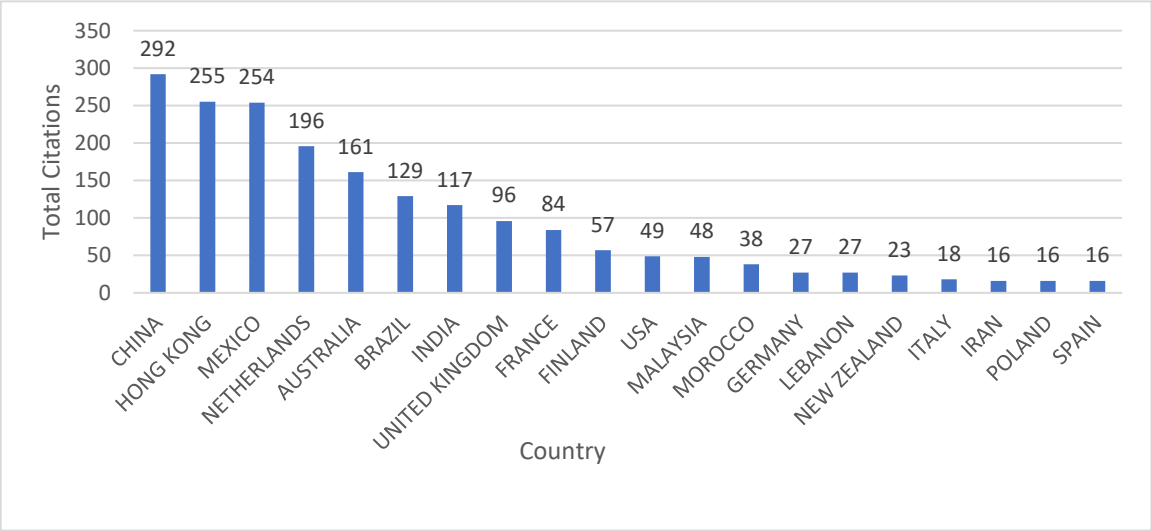

Figure 4. The top 20 countries of authors who receive citations in CEP in SC.

Table 2. Top ten cited documents in the field of critical success factors of CEP in SC.

Paper	Article title	Total citations	Total citations per year
Panda et al. (2017)	"Coordinating a socially responsible closed-loop supply chain with product recycling"	222	37
Ji et al. (2015)	"Developing green purchasing relationships for the manufacturing industry: An evolutionary game theory perspective"	131	16.375
Esa et al. (2017)	"Developing strategies for managing construction and demolition wastes in Malaysia based on the concept of circular economy"	98	16.333
Xu et al. (2020)	"Future material demand for automotive lithium-based batteries"	88	29.333
Lahane et al. (2020)	"Circular supply chain management: A state-of-art review and future opportunities"	87	29
Ajayi et al. (2017)	"Critical management practices influencing on-site waste minimization in construction projects"	83	13.833
Julianelli et al. (2020)	"Interplay between reverse logistics and circular economy: Critical success factors-based taxonomy and framework"	70	23.333
Mak et al. (2019)	"Extended theory of planned behavior for promoting construction waste recycling in Hong Kong"	70	17.5
Moktadir et al. (2020)	"Critical success factors for a circular economy: Implications for business strategy and the environment"	63	21
Sehnem et al. (2019)	"Improving sustainable supply chains performance through operational excellence: circular economy approach"	59	14.75

Table 2 presents the top-cited articles in the field of CEP in the SC. According to the table, Panda et al. (2017) has the highest number of global citations, with 222, followed by Ji et al. (2015) with 131 citations, and Esa et al. (2017) with 98 citations. Panda et al. (2017) focus on maximising profits and being socially responsible by reusing products in a CLSC between a socially responsible manufacturer and retailer. Ji et al. (2015) explores the recycling of various manufacturing material wastes and investigate the cooperative relationship between buyers and suppliers. Esa et al. (2017) identifies ways of reducing waste in the construction sector, including planning, designing, obtaining materials, building, and demolishing.

Keywords statistics are evaluated using the considered databases. Looking at the section on keywords, it is helpful to consider frequently used keywords. Table 3 highlights the most commonly used keywords from the 935 keywords used in the selected articles.

Table 3. Top 20 keywords used in the field of CEP and SC.

Words	Occurrences
Recycling	40
Supply chains	26
Waste management	25
Sustainable development	24
Supply chain management	16
Waste disposal	14
Article	12
China	9
Decision making	9
Closed-loop supply chain	8
Economics	8
Environmental impact	8
Circular economy	7
Construction industry	7
Costs	7
Factor analysis	7
Hong Kong	7
Human	7
Risk assessment	7
Sensitivity analysis	7

The top keywords are distributed into four categories: recycling, supply chains, waste management, and sustainable development. The recycling theme includes decision-making, environmental impact, and CE. The SC theme includes the involvement of SC in the CE; the waste management theme includes waste disposal, China, the construction industry, costs, risk assessment, and sensitivity analysis; the sustainability theme includes sustainable development, sustainability, and environmental impact.

The keywords word cloud used in critical success factors of CEP in the SC is presented in Figure 5. Figure 5 and Table 3 show the terms that are used most frequently in the field of CEP in the SC; these include ‘recycling’ with 40 occurrences; ‘supply chains’ with 26 occurrences; ‘waste management’ with 25 occurrences; ‘sustainable development’ with 24 occurrences.

Figure 5. The word cloud of the top keywords used in the field of CEP and SC.

4. Emerging Research Themes

Clustering analysis is performed to analyse the emerging research themes in the investigated area. The various types of research that are carried out in the field are depicted by cluster analysis. Different article clusters are found through the use of bibliographic coupling analysis. This assists the researcher in locating various collaboration clusters. Six clusters are identified by VOS viewer analyses in this review, as shown in Figure 6. After reviewing the articles in each cluster, a research theme based on these articles is assigned to each cluster. Articles on critical success factors in CSCM can be found in cluster 1 (red); articles in cluster 2 (green) are based on solid waste management; cluster 3 (violet) includes articles on CLSC; the articles in cluster 4 (blue) discuss recycling and reverse logistics in SC; cluster 5 (sky blue) includes articles on circular networks in SC (environment management); and lastly, cluster 6 (yellow), contains the articles on waste management in SC.

The discussion of each cluster and the proposals for future research are presented in sub-sections below.

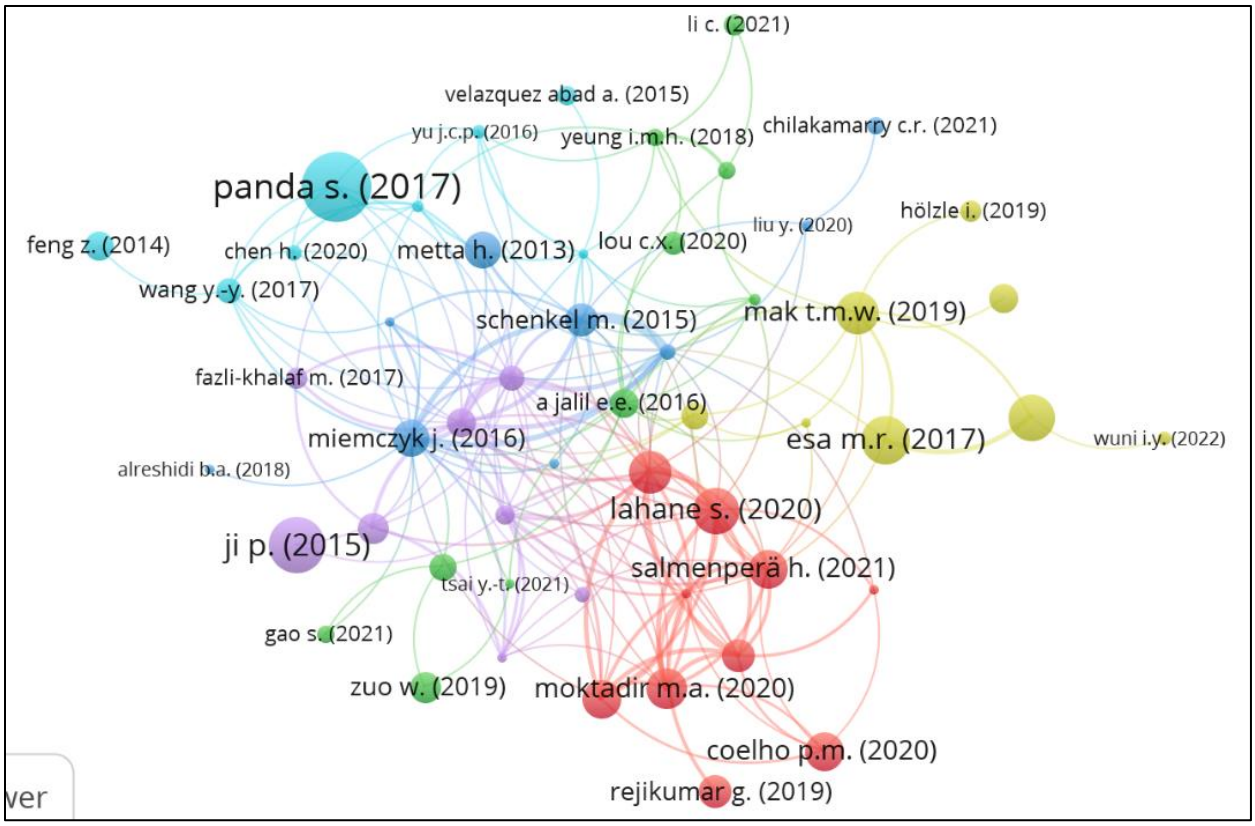

Figure 6. Cluster analysis of articles selected for this study in the field of CEP and SC.

4.1 Cluster 1 (RED): Critical Success Factors in Circular Supply Chain Management

The current model of production and consumption in society is based on the linear "take-make-dispose" flow, where inputs are extracted, converted into consumer goods, and discarded after use (Esposito et al., 2015). In their research, Julianelli et al. (2020) introduce a framework that elucidates the interdependence of critical success factors (CSFs) and reverse logistics within the context of CSCM. The importance of reverse logistics is emphasised across the whole CSCM, from circular inputs to circular products to circular processes to circular flows. The authors draw attention to the crucial role of CSFs linked to promoters and relationships; these have a far-reaching impact on various aspects of the CSCM, including reverse logistics, material planning and management, industrial sustainability, and information and communication technology. To that end, separate research (Moktadir et al., 2020) identifies and evaluates CSFs to establish business strategies in CE practices to lessen environmental contamination in SC of the leather industry. According to their findings, "leadership and top management commitment" are the most significant CSF. Six CSFs are identified as essential for CE practices, including strong legislation, ecological resource scarcity, knowledge of CE practices, government support, and competitor pressure. The findings of this study may be useful for leather industry managers who want to reduce waste by incorporating CE practices into their existing SC. The following recommendations for further study are based on the short overview of numerous studies mentioned above.

***Proposition* 1:** More study is needed to determine the best ways for businesses in the leather sector to use Circular Economy principles throughout their supply chains in order to lessen their negative impacts on the

natural environment. To achieve this, businesses may learn from the successes and failures of others that have previously implemented CE practises by looking at case studies, best practises, and obstacles they had to overcome.

***Proposition* 2:** More study might examine the precise laws and incentives that governments can enact to nudge businesses in the direction of a more circular approach to production and consumption.

Every business aims for its SC to be more environmentally, socially, and economically sustainable in today's competitive environment (Nosratabadi et al., 2019). The traditional manufacturing and consumption system is founded on the so-called "cradle-to-grave" model (Gregson et al., 2015); this may be summarised by the “take-make-consume-dispose” model of the linear economy (Goyal et al., 2018). In a comprehensive evaluation of CSCM based on content analysis techniques by Lahane et al. (2020), a total of 125 CSCM articles were published in journals from 2010 to July 2019. The findings suggest that CSCM practises have much room for development. These can be uncovered with the help of cutting-edge tools like complex algorithms, refined optimisation strategies, streamlined approaches to making decisions based on multiple criteria, and cutting-edge quantitative modelling approaches. Furthermore, CSCM studies need to identify cutting-edge circular business models, frameworks, enablers, drivers, and crucial success factors.

***Proposition* 3:** Longitudinal studies may be done to observe how CSCM methods evolve over time. This can aid in spotting patterns, obstacles, and openings for enhancing supply chain sustainability activities.

According to research conducted by Govindan and Hasanagic (2018) and Ilic et al. (2018), the fundamental aim of CE is to rejuvenate and reshape material cycles by preserving the material value across a product's life cycle, by reducing waste, and ultimately closing the material loop through high-value recycling. The European Commission (2015) and distinct research by Salmenperä et al. (2021) conduct studies to identify the impediments and factors that contribute to waste reduction and recycling in various industries. Barriers farther down the material SC and in multiple barrier types are often identified by intermediaries, but developers tend only to recognise those immediately adjacent to their development operations. The findings show that more communication and cooperation among key stakeholders may encourage waste avoidance and recycling, better data distribution, and more widespread use of CEs. Regulations and their interpretations must also be standardised. The waste management industry must play a crucial role in enforcing a CE by offering services for the manufacturing industry's waste processing requirements. This 2021 study emphasises the concept that understanding the interconnectedness and actions of various barriers is necessary for success.

***Proposition* 4:** The effectiveness of circular economy projects may be measured with the use of improved metrics and performance indicators, which can be the subject of future research. This may aid businesses and sectors in monitoring their recycling and waste reduction efforts and pinpointing places for growth.

4.2 Cluster 2 (GREEN): Solid Waste Management

Local government solid waste management activities are reverse logistics (RL) operations that are vital worldwide. However, the literature on logistics and SC management (SCM) has given the subject little attention. Jalil et al. (2016) study investigates the hypothesis that the reverse logistics discourse contains symbiotic exchanges between household recycling behaviour and waste recycling systems. As a result, in order to investigate this topic in greater depth, we make the following suggestions for future research.

***Proposition* 5:** The efficacy and productivity of reverse logistics operations used by municipal governments to manage solid waste might be the subject of future research. One approach would be to compare various

recycling and garbage removal plans to find the ones with the most room for development.

In recent years, problems with solid waste management have become a pressing issue in Hong Kong. The government of Hong Kong drew up three policies to address these issues: landfill expansion, new incinerator development, and waste charging. The study by Yeung and Chung (2018) uses a large-scale survey to inquire about residents' knowledge of the three policies, daily waste disposal amounts, and inclination to pay. Only 22.7% of residents knew when one of the landfills would be full. According to the findings, more than 50% of residents support the three policies, but 36.1% of Hong Kong residents are unwilling to pay the council for a sustainable development estimate of HK$30 as a minimum waste charge. Spending propensity is shown to be affected by daily trash volume, inhabitants' ages and incomes, their level of support for waste fee policies, and their familiarity with when landfills reach capacity. Low-income residents who cannot pay their bills for waste disposal should be given financial aid.

***Proposition* 6:** It is possible that future research may investigate the interplay between different entities involved in solid waste management, such as public agencies, private waste management firms, and non-profit groups. To do so, it may be helpful to analyse existing models of productive cooperation in order to determine what works best.

A different research project carried out in Thailand (Challcharoenwattana and Pharino, 2018) looks into the factors that led a local community-guided waste recycling program to accomplish a recycling rate that was five to eleven times higher per member than the average rate for community-based recycling programs. The research looks at the effectiveness of various recycling groups to determine the effect of socioeconomic characteristics, attitudes towards correct waste management practises, waste separation approaches, and readiness to pay for better waste management system development. The results suggest that waste bank members, who have diverse socio-economic backgrounds and pro-recycling traits such as a tendency to recycle and a willingness to pay for waste management system improvement, exhibit better recycling performance than those who either do not recycle or directly sell waste.

***Proposition* 7:** The wider social and environmental repercussions of people's recycling habits can be evaluated in future studies. To do so, researchers may examine how recycling programmes affect landfill diversion rates, greenhouse gas emission reductions, and other sustainability metrics.

Recent decades have seen a surge in the waste electrical and electronic equipment (WEEE) business within the framework of the CE (Bressanelli et al., 2020). It is undeniable that WEEE is the fastest-growing worldwide trash stream (Favot and Grassetti, 2017), yet there's a lot of economic and environmental potential in recycling it (Messmann et al., 2019).

***Proposition* 8:** More research may be done to learn what is preventing WEEE from being recycled in a broad and effective manner. Insight into these challenges can help policymakers and businesses devise responses that are more likely to succeed.

4.3 Cluster 3 (VIOLET): Closed Loop Supply Chain

Schenkel et al. (2019) look into vicious cycles in CLSC that prevent value creation. This research contributes to the literature by illuminating the elements influencing CLSC value generation and the interplay between constraints and strategic success factors. By learning how negative cycles may be turned into positive ones, CLSC value production might be enhanced. Schenkel et al. (2015) conducted research on the role that stakeholder relationships and strategic success variables play in the creation of total value for CLSC's stakeholders. More work is needed to fully understand the interplay between stakeholder

relationships and the adoption of strategic success factors, such as the role of incentives in fostering alignment, resolving opposing stakeholder interests, and fostering stakeholder cooperation. The changing nature of these critical success elements over time can be captured through longitudinal research. As a result, to investigate this topic in greater depth, we make the following suggestions for future research.

***Proposition* 9:** It is possible that future research may examine the efficacy of different incentives in encouraging alignment and collaboration among diverse stakeholders in CLSCs. Examining the financial incentives, recognition programmes, and shared benefits of sustainability actions are all possibilities.

There is still a missed opportunity to create value and lessen the environmental impact by recycling apparel waste. McKinsey and Company (2022) say that 740,000 tons of apparel-making materials end up in landfills in California, the size of an area five times bigger than Los Angeles. Through closed-loop recycling, less than 1% resurfaces in subsequent clothing. There are similar opportunities for value in Europe; e.g., a closed-loop recycling system for fast fashion clothing materials could have significant positive economic, environmental, and social benefits of up to $6.5 billion per year.

Paras et al. (2019) develop a framework for companies that sort and recycle used clothing. This paper proposes a simple mechanism for assessing the performance of activities in the clothing industry's reverse value chain performed on the shop floor. Their research focuses on developing economies and specifically investigates clothing manufacturing and SC factors that influence reverse value chain activities. In another study by Liu et al. (2020), one factory's annual production data is gathered from a melange yarn manufacturer in Zhejiang province to see if recycled yarns could replace virgin cotton yarns in investments. However, the results could not be generalised due to a lack of data.

***Proposition* 10:** Consumers' knowledge and attitudes towards clothing recycling may be investigated. One approach would be to investigate factors like customer awareness, knowledge, and openness to recycling programmes. Targeted communication strategies may be developed by gaining insight into customer behaviour.

CLSC development and implementation that are dynamic are examined by Miemczyk et al. (2016). The paper demonstrates how companies in two industries can achieve successful CLSC designs with the assistance of strategic resources. Strategic collaboration in the SC is an important factor in success, but it also comes with several difficulties. The research highlights the role of organisational capabilities in addressing the constant changes in the business environment to renew these strategic resources and discusses the significance of new resources in terms of knowledge, relationships, and technology. The concept of the CE is becoming more popular and accepted, particularly in the public sphere, but it is also being promoted by many SMEs that are establishing themselves through innovative business models and solutions.

***Proposition* 11:** The research may be oriented towards the identification of critical strategic resources that facilitate the attainment of effective CLSC designs by organisations. This may encompass the examination of several variables, such as the optimisation of reverse logistics processes, the use of circular product design principles, and the establishment of collaborative relationships with both suppliers and customers.

4.4 Cluster 4 (BLUE): Recycling and Reverse Logistics in Supply Chains

Electrical and electronic equipment (EEE), such as plug-in and battery-powered gadgets, has seen large demand growth due to more advanced technology and falling manufacturing costs. However, e-waste disposal may significantly affect the environment and human health due to the hazardous components

involved, including mercury, lead, and cadmium. Improper handling and disposal of e-waste can contaminate the air, water, and soil, posing a significant risk (Tsai and Hung, 2009). In a recent SLR, Ni et al. (2021) identified six main research themes related to e-waste management: laws and regulations, obstacles, critical success factors and solutions, design decisions for RL networks, technology-based initiatives, consumer behaviour, and evaluation frameworks. However, due to the highly localised nature of e-waste management with varying economic, social, and regulatory conditions across different regions, there is a need to explore research observations in non-English speaking nations. This specific and comprehensive research agenda presents an opportunity for researchers to contribute to effectively managing e-waste through RL. Longitudinal investigations that capture both the short- and long-term fluctuations of strategic success factors might be used in the future to investigate stakeholder perspectives, including incentive alignment, conflict management, and collaboration among stakeholders. Research publications are always behind the social changes taking place in practical scenarios; hence, current practices and challenges should be investigated further. As a result, in light of this identified theme, we propose the following suggestions for future research.

***Proposition* 12:** The research might be directed towards examining the present condition of e-waste management practises and the associated issues across various geographical areas. This may require the use of various research methods, such as surveys, case studies, and interviews, in order to collect contemporaneous data on current practices.

After recycling through the same channel, post-consumer used materials are recovered in a CLSC to be used as new. The possibility of starting a new business is one advantage of recycling processes. Choi et al. (2013) create a CLSC among retailers, manufacturers, and collectors, demonstrating that the most efficient channel is the one led by retailers. With an eye on both profit maximisation and social responsibility, Panda et al. (2017) analyse channel coordination at a socially conscious manufacturer-retailer. This study investigates a CLSC between producers and distributors of recycled goods made by socially conscious producers. The producer uses a forward channel to sell brand-new items and a reverse channel to collect worn items from consumers, with the latter task falling to retailers in order to facilitate recycling. The paper adheres to the principle established by Vickers (1985), which suggests that recycling can lead to a higher profit margin rather than solely focusing on profit maximisation through extensive CSR practices.

***Proposition* 13:** In order to encourage productive CLSCs, researchers might investigate the design of mechanisms for coordination and rewards. It may be necessary to investigate methods of enticing merchants and other interested parties into more robust participation in recycling and material recovery programmes.

Fuel's effects on the environment and climate change have prompted governments all over the world to give new energy vehicles (NEVs) higher priority. The Global Electric Vehicle (EV) Outlook estimates that there are now more than 3 million electronic vehicles worldwide, a 54% increase from 2016. By 2030, 220 million people worldwide are expected to own electric vehicles. The power battery serves as a crucial component inside the new energy vehicle, playing a pivotal role in propelling the industry of such cars to the forefront. Introducing the groundbreaking concept of Extended Producer Responsibility (EPR), the Government of India has taken a remarkable step towards a greener future (PIB, 2022). Manufacturers, including those that import batteries, will be responsible for collecting used batteries, reconditioning them, and then using the recycled components in the production of new batteries under this ambitious programme (PIB, 2022). As a result of this revolutionary method, sustainability and environmental awareness will flourish like never before in the battery's lifespan (PIB, 2022). As the number of used batteries increases, it is the responsibility of businesses in the sector to properly dispose of them. An intriguing new development has been announced by China's industry ministry: the release of a set of "interim" laws that will transform

China's auto sector (Reuters, 2018). This is a historic step forward in making automakers responsible for recycling the batteries in new-energy vehicles. To aid in the collection, storage, and distribution of used batteries to industry specialists, these laws also call for the development of designated recycling routes and service locations. This groundbreaking venture showcases China's commitment to sustainable practises and ethical manufacturing. (Reuters, 2018). The Chinese government has chosen two strategies for reducing environmental damage: (1) providing subsidies to firms that collect waste and (2) providing subsidies to enterprises that dismantle abandoned items. Ding et al. (2020) study is the first analytical model to investigate the two power battery subsidies, best collecting strategies, and subsidy preferences. Policymakers, manufacturers, and other parties involved can all benefit from these results. In order to assess the efficacy of two power battery subsidies as well as the appropriate collecting methods and preferences for these subsidies, Ding et al. (2020) created an analytical model. The results have major repercussions for government agencies, businesses, and other organisations.

***Proposition* 14:** In future studies, the possibility of applying circular economy concepts to battery life expectancy can be explored. In order to increase battery life and cut down on waste, it may be necessary to investigate their possibilities for refurbishment, recycling, and reuse.

***Proposition* 15:** The wider environmental and social advantages of EV adoption may be studied. To do this, researchers may examine how greater EV use affects emissions, air quality, and wellness.

4.5 Cluster 5 (SKY BLUE): Circular Networks in the Supply Chain (Environment Management)

Environmental management has received increasing attention due to the harmful waste of rare natural resources. Manufacturing companies are forced to adopt CLSC procedures (Jayaraman et al., 2008). According to Li et al. (2018), several factors, including return policies and pressures from competitors, contributed to an increase in the number of products returned over the past few decades in the retail and manufacturing sectors. More than 10% of sold items are returned at Home Depot due to its generous return policies. An empirical investigation conducted into North American manufacturing organisations by Bhatia et al. (2020) identified CLSC CSFs and their connections to anticipated performance outcomes. According to the main findings, "product recovery" harms the natural environment due to the added recovery procedures that businesses need to perform. The CSFs' "demand and inventory management" and "raw material expenditure" in financial performance are found to dominate the causal relationships between CLSC CSFs and performance outcomes. Their research is unable to confirm the effect of "product recovery" on financial performance. As a result, considering this identified theme, the following suggestion for future research is made:

***Proposition* 16:** Methods to improve CLSC product recovery processes can be investigated in future studies. The approaches of process optimisation, technological adoption, and minimising waste could be investigated.

Bhatia et al. (2020) research the critical factors for applying CLSC policies in the Indian automotive industry. The most significant factors are the bureaucratic regulatory environment and support, customer understanding of environmental preservation, and application of information technologies. The paper offers recommendations for environmental management policymakers, managers, and practitioners for implementing CLSC in the sector.

***Proposition* 17:** Future research may examine the impact of the administrative regulatory setting on the implementation of CLSC policies within the automobile sector. This may entail an examination of the

impact of government policies, legislation, and incentives on the promotion of sustainable practices.

The CLSC reverse and forward networks for the walnut industry are investigated by Salehi-Amiri et al. (2021), looking at the total cost of forward and reverse flow between networks. A CLSC network reduces the cost of delivering and collecting the returning crop for recycling, thus creating a cost-effective model (Salehi-Amiri et al., 2021). Given the significance of relationships in the development of a SC, the majority of their research focuses on the operational and technological aspects of the process and takes into account both forward and reverse flows to prepare returned products for a second use. In other research by Alonso-Muoz et al. (2021), the connection between CSCM and customer-supplier relationships is examined.

***Proposition* 18:** CLSC networks in the walnut business could be studied to find out how much they would cost and if they would be financially feasible. This could include looking at cost-benefit studies and return on investment for different CLSC situations.

Sustainability is a crucial factor in modernising traditional SC networks. The sustainable CLSC network includes primary and secondary suppliers, manufacturing, distribution, customer collection and waste centres (Momenitabar et al., 2022). In a recent study by Momenitabar et al. (2022), a model is proposed to maximise social outcomes while minimising the network's overall costs. In addition, this study incorporates the CE concept to lessen its impact on the environment. Primary and secondary suppliers, manufacturing, disposal, distribution and waste centres are some of the centres of the designed Sustainable CLSC Network where disruption can occur due to changes in demand or supply. Since it interrupts the SC for transporting goods, any disruption in any of these can damage the entire network. Arani et al. (2020) suggest a contingency supplier to assist primary suppliers at the first level and a concept of parallel resupply by exchanging products between production centres and distribution centres to prevent shortages while transporting manufactured goods within the network.

***Proposition* 19:** Future research can explore various solutions aimed at mitigating disruptions within sustainable CLSC networks that arise due to fluctuations in demand or supply. This may entail the examination of contingency planning, resilience methods, and risk management methodologies.

4.5 Cluster 6 (YELLOW): Waste Management in Supply Chains

Numerous studies and policies have been conducted in response to the industry's need to reduce waste volume. It is essential to separate recyclable waste from non-recyclable waste to ensure effective waste segregation. Akinade et al. (2015) suggest prefabrication and modular construction techniques to construction site managers since modern construction methods have been shown to reduce construction waste. To reduce construction-related waste, researchers have proposed soft measures that could be adopted in construction site management practices. The study by Ajayi et al. (2017) suggests that following the project drawing strictly with minimal design changes could substantially cut-down waste generation in construction-site management functions.

***Proposition* 20:** Future research can explore the various viewpoints of many stakeholders, such as building employees, freelancers, and project supervisors, about activities aimed at reducing waste. This may encompass an examination of individuals' attitudes, motives, and propensity to embrace sustainable construction practises.

A study by Mak et al. (2019) shows that social values and perceptions of benefits and costs influence the intention of recycling buildings and demolition waste. The most important factors affecting individuals' decision-making processes in waste recycling are compliance with regulations, financial inducement,

endorsement plans, logistics planning, and management motivation. The public, on the other hand, views monetary incentives as the primary impetus for waste recycling, while representatives from organisations that deal with construction waste and government officials alike prioritise regulatory compliance over other factors. Since collection costs, classification, and disposal are highly correlated, charging for disposal to promote recycling is highly advisable. For sustainable resource management, an inclusive government policy is essential to promote recycling of construction and demolition waste (Esa et al., 2017). To create a sustainable future, inclusive regulatory policy implementation is required to lead the players in the construction industry in managing waste in an efficient and sustainable manner.

***Proposition* 21:** Logistics planning may be studied further in the future to learn how to maximise recycling efforts for building debris. One approach would be to investigate how improved logistics and transportation may enhance garbage collection, categorization, and disposal.

It is becoming increasingly challenging for business-to-business (B2B) buyers to assess the actual sustainability of SC partners (Oruezabala and Rico, 2012). However, according to Pierre (2008), 75% of buyers of the OECD's SC report that they will reject potential suppliers that do not meet sustainability criteria. There are no measures to evaluate the sustainability position of enterprises, and there are no agreed-upon operational standards for companies that are very sustainable compared to those that are weak. The study by Kapitan et al. (2019) determines B2B sustainability levels and examines how suppliers' sustainability practices are perceived. The credibility of sustainability, concern for the impact on the environment, careful consideration of stakeholders, resource efficiency, and a holistic philosophy are all important aspects of sustainable B2B positioning. This scale will make it easier for business-to-business marketers to comprehend and make use of their sustainability activities and sustainability-related communications.

***Proposition* 22:** The further investigation might delve into the impression of B2B buyers about the sustainable practises implemented by their suppliers. This research endeavour entails the examination of customer mindsets, demands, and choices pertaining to sustainability, and the subsequent impact of these views on assessments of suppliers.

On the basis of this review, a theoretical model is outlined, describing the propositions shown below in Figure 7. Figure 7 presents the identified clusters of critical success factors of CE practices in a SC on the left side; on the right side, are the proposed research directions in each cluster.

5. Discussion of Findings

Introducing the concept of the CE involves a visionary approach that strives to safeguard the utilisation of resources for an extended period of time. This uncovers the remarkable advantages that CEP can unleash within the realm of SC management. CE can enable a transformative journey where waste is minimised, costs are slashed, and sustainability soars to unprecedented heights. It can produce a paradigm shift that will revolutionise the way you perceive and operate within the SC landscape. The power of CEP can unlock a world of endless possibilities. Boundless rewards await if we fully grasp the pivotal success factors that wield influence over the execution of CEP within SC operations. The identified CSF of CE practices in SC is presented and discussed in Table 4.

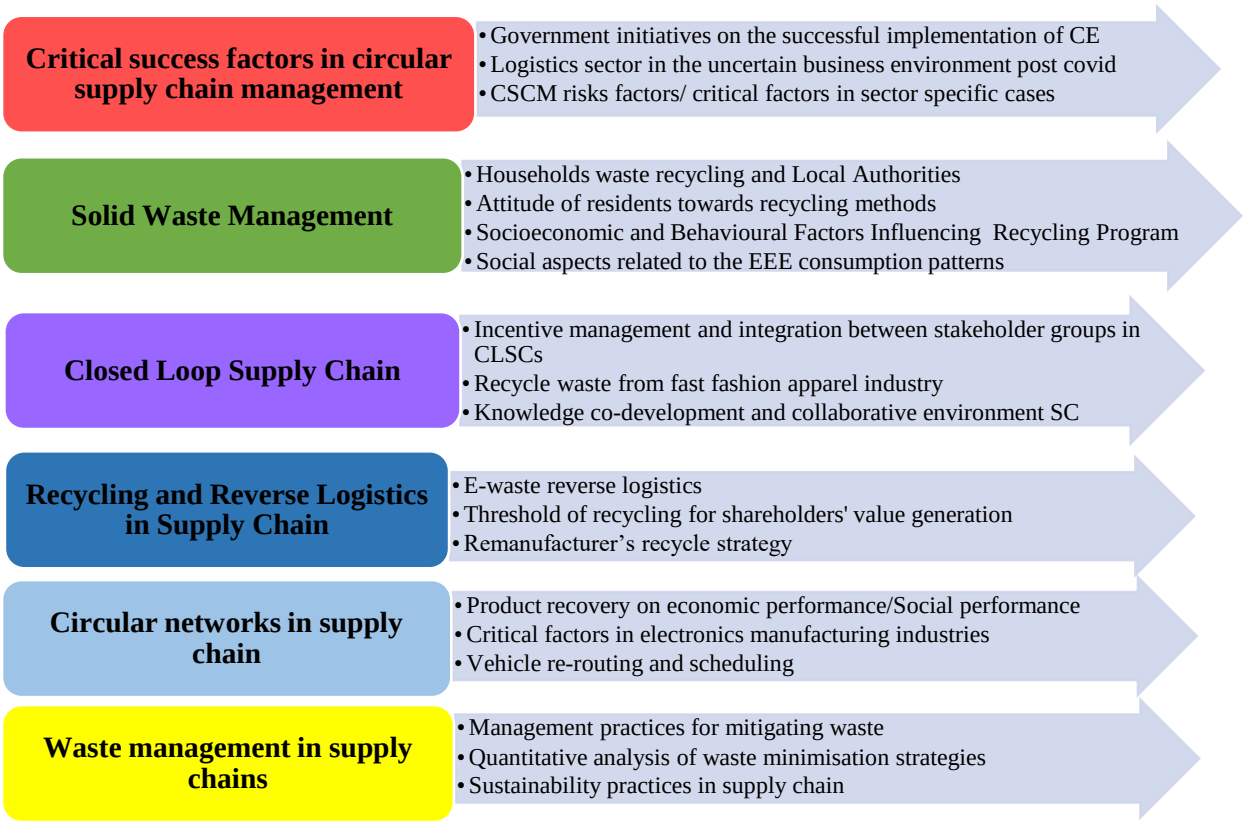

Figure 7. Theoretical model presenting the key propositions in critical success factors of CEP in SC.

Table 4. The important critical success factors of CEP in SC.

S. No.	Critical success factors	Descriptions	References
1.	Collaboration	The achievement of CEP is heavily reliant on collaboration among all SC stakeholders, including suppliers, manufacturers, distributors, and customers. By working together, they can enhance efficiency, minimize waste, and promote the sustainable use of resources.	Aloini et al. (2020), Wuni and Shen (2022)
2.	Innovation	CEP require innovative thinking and approaches to resource use. Companies must be willing to challenge traditional practices and embrace new technologies and ideas that can help to reduce waste and improve efficiency.	Khan et al. (2020), Erol et al. (2022)
3.	Sustainability	CEP should be implemented with a strong commitment to sustainability; this involves adopting a long-term perspective that takes into account both the environmental impact and financial viability.	Julianelli et al. (2020), Moktadir et al. (2020)
4.	Measurement and reporting	It is crucial to measure and report the performance of CEP in the SC to ensure their success. This enables the identification of areas for improvement and ensures that practices are delivering the intended impact.	Gonzalez et al. (2019)
5.	Regulation	Governments play a crucial role in promoting and regulating CEP in SC. By setting standards and creating incentives for companies to adopt CEP, governments can help to drive their widespread adoption.	Aloini et al. (2020), Erol et al. (2022)
6.	Customer engagement	Engaging with customers and educating them about CEP is important to increase awareness and support.	Awan and Sroufe (2022), Tukker (2015)
7.	Supply chain integration	Integrating CEP into the SC can help to reduce waste, increase efficiency, and improve sustainability.	Julianelli et al. (2020), Wuni and Shen (2022)
8.	Data management	Effective data management is crucial for the success of CEP, providing insights into resource use and waste reduction.	Wuni and Shen (2022)

Table 4 continued…

9.	Resource efficiency	Improving resource efficiency is key to CEP, reducing waste and improving sustainability.	Moktadir et al. (2020), Tukker, (2015)
10.	Culture change	Implementing CEP requires a cultural change, with companies embracing new ways of thinking about resource use and waste reduction.	Salmenperä et al. (2021), Sohal and De Vass (2022)
11.	Product design	Designing products for circularity, with the end of life in mind, is a critical factor for the success of CEP.	Aloini et al. (2020), Julianelli et al. (2020)
12.	Closed loop systems	Implementing closed-loop systems, where waste is reused, recycled or repurposed, is an important aspect of CEP.	Julianelli et al. (2020), Moktadir et al. (2020)
13.	Stakeholder engagement	Engaging with stakeholders, such as employees, investors, and local communities, is important for the success of CEP.	Esken et al. (2018), Wuni and Shen (2022)
14.	Circular procurement	Procuring materials and products from circular sources is important for the success of CEP.	Goyal et al. (2022), Wuni and Shen (2022)
15.	Financial viability	Implementing CEP must be financially viable, providing benefits to both the environment and the bottom line.	Julianelli et al. (2020), Sehnem et al. (2019)
16.	Circular business models	Adopting circular business models, such as product-as-a-service, is important for the success of CEP.	Moktadir et al. (2020), Awan and Sroufe (2022)
17.	Infrastructure	Developing the infrastructure needed to support CEP, such as recycling facilities, is crucial for their success.	Sehnem et al. (2019), Goyal et al. (2022)
18.	Continuous improvement	Continuously improving CEP and adapting to new technologies and approaches is essential for their success.	Wuni and Shen (2022)
19.	Education and training	Educating and training employees about CEP is important to ensure their widespread adoption and success.	Erol et al. (2022), Wuni (2023)
20.	Policy and legal framework	The development of a supportive policy and legal framework is important for the success of CEP.	Aloini et al. (2020), Erol et al. (2022)
21.	Scarcity of resources	By adopting CEP, companies can reduce their reliance on virgin materials and minimise the amount of waste generated; this can help to conserve resources and reduce the environmental impact of their operations.	Kayikci et al. (2022), Sohal and De Vass (2022)
22.	Strong legislation mandating CE	A robust regulatory framework mandating the adoption of CEP can provide companies with the necessary incentives and support to make the transition towards a more sustainable and circular model of production and consumption.	Oluleye et al. (2022, 2023)
23.	Competitor pressure for CE	As more and more companies embrace circularity, the pressure on other firms to follow suit increases. This competitive pressure can be a powerful driver of change, as it incentivises companies to adopt CEP in order to remain competitive and relevant in the market.	Dwivedi et al. (2022), Sohal and De Vass (2022)
24.	Reverse logistics practices	By adopting and implementing effective reverse logistics practices, companies can reduce waste and improve resource efficiency while also creating new business opportunities and enhancing their reputation as environmentally responsible and socially sustainable organisations. Moreover, effective reverse logistics practices can help companies comply with regulatory requirements related to waste reduction and environmental protection.	Fernando et al. (2023), Khan et al. (2022a)
25.	Top management commitment	Top management commitment involves setting clear goals and targets for CEP, allocating resources and budgets to support these practices, and actively promoting and championing CE initiatives throughout the organization. This requires a deep understanding of the principles and benefits of CEP, as well as a willingness to take risks and embrace innovation and change.	Wuni and Shen (2022), Yamoah et al. (2022)
26.	Support from government	Government support can come in many forms, such as tax incentives, subsidies, grants, and procurement policies that favour CEP. These measures can provide a financial incentive for businesses to adopt CEP, making it easier and more cost-effective for them to transition to a more sustainable and circular model.	Khan et al. (2022b), Sohal and De Vass (2022)
27.	CE oriented business model	A CE-oriented business model requires a shift in mindset from a linear to a circular approach. This shift requires businesses to adopt new technologies, practices, and business models that are designed to promote the principles of the CE.	Awan and Sroufe (2022), Wuni and Shen (2022)
28.	Consumer awareness	Consumers play a significant role in the CE as they are the end-users of products and services. Hence, their awareness and actions can significantly influence the success of CEP in the SC.	Kayikci et al. (2022), Khan et al. (2022b)

Table 4 continued…

29.	Information sharing	By sharing information about resource use, waste generation, and SC dynamics, stakeholders can identify opportunities to reduce waste and improve resource efficiency. This can lead to the development of new business models and innovative technologies that support CEP.	Kayikci et al. (2022), Wuni and Shen (2022)
	Increased employee participation	When employees are engaged in CEP, they become more aware of the environmental impact of their actions and are more likely to adopt sustainable behaviours both inside and outside the workplace. This can significantly reduce waste and carbon emissions; this benefits both the organisation and the environment.	Agrawal et al. (2022), Singh et al. (2022)

6. Implications of this Study

The answers to these research questions can provide valuable insights into the implementation of CEP in SC and the success factors that are crucial for their effectiveness. Answering RQ1 can help organisations identify the critical success factors for the implementation of CEP in their SC, such as:

- Strong leadership and commitment from top management.
- Adequate resources, such as funding and personnel, to support the implementation of CEP.
- Collaboration and partnerships with suppliers and other stakeholders.
- Effective communication and education of stakeholders.
- Clear and measurable goals and targets for circularity.
- Integration of CEP into business processes and operations.

Answering RQ2 can provide an overview of the current research trends in the field of CEP in SC, such as the increasing focus on the circularity assessment methods, the role of technology and innovation, and the importance of stakeholder engagement and collaboration.

Answering RQ3 can give an idea of the potential new directions in research and applications in the field of CEP in SC, such as:

- Development of more advanced and sophisticated circularity assessment methods.
- Further exploration of the impact of technology and digitalisation on CEP.
- Study of the integration of CEP into various industrial sectors and SC.
- Examination of the barriers and challenges to the implementation of CEP in SC and how they can be overcome.

Overall, understanding the critical success factors, current research trends, and future directions in the field of CEP in SC can help organisations effectively implement and adopt CEP in their operations, resulting in a more sustainable and resilient SC.

6.1 Implications for Industry Practitioners and Managers

This study presents a CE-based management framework that focuses on critical success factors (CSFs) for practitioners seeking a competitive edge through reverse logistics. The industrial sustainability provided by CSF gives guidance and a mechanism for the production system, emphasising the zero-waste strategy and the use of regenerative natural resources. To put transformative strategies like industrial symbiosis and increased resource use intensity into action, mutually beneficial transactions and more efficient processes can strengthen sustainability in both industrial and urban settings.

Institutions and managers participating in CLSC processes can benefit from many of the managerial suggestions outlined in our study. Our research suggests that businesses that wish to ease restrictions on

CLSC are constrained by the involvement of many stakeholders, each of whom has their own set of objectives and strategic success factors. In practice, businesses can devise a strategy for proactive cycle management. Our research suggests that managers who are able to economically scrutinise green and eco-friendly values will succeed. The difficulty lies in achieving the same result for social, information, and customer value.

6.2 Implications for Researchers

This article can make an academic contribution to the exploration of new research studies on reverse logistics within the context of the CE and the potential implications for society as the CE becomes more viable and widely adopted. In addition, it can direct and establish emerging research on the social ramifications of material circularity.

7. Conclusion, Recommendations and Limitations of this Review

To find an adequate market for recycling products and an ample supply of end-of-life products, systems must be moderately closed-loop. Social enterprises and charitable organisations have been involved in reselling furniture, books, clothes, and computers for some time. Employment gaps can be filled in new CLSC practices of CE, and this could also open up new collaborative opportunities. This might be a sign of how product stewardship helps ensure long-term sustainable development. A life cycle approach would be required if the sorting process were to be outsourced to developing nations, but advancements in the social life cycle approach could assist in making informed decisions.

In conclusion, extending these CLSCs to community levels is troublesome due to a large number of organisations having inadequate capacity and engagement. As a result, a solution would be to make these resources easily accessible to everyone (through a subsidy from the government) and improve the organisation of supply and demand for recyclable or recycled goods while minimising legislative changes. This would ensure stability of the business environment.

We prioritise the essential success factors in this study using inputs from 2013 to 2022. An empirical study with a larger sample size can be conducted to further validate the findings. Critical success factors might be different in different regions of the world. As a result, the study's findings can be compared with those of other developed and developing nations. Recent interruptions and the cancellation of Covid-19 have left SC performance measurement as a mostly uncharted field. In light of the current unstable economic climate, academics may thus suggest a performance framework for the logistics industry.

The present study is limited to studies published in only the English language; this may result in the exclusion of valuable literature from other languages. This could introduce bias and limit the generalizability of the findings. The study's findings are based on the literature available up until the time of the review. Newer research or emerging trends may not have been included, potentially limiting the study's comprehensiveness and relevance.

7.1 Special Contributions of this Review Paper to the Field

Importantly, the research contributes by undertaking a thorough literature analysis and bibliometric analyses of papers on the important success aspects of CEP in SC. The research team behind this study sets out to learn all they could about the connections between CEP and SC in different businesses. The SLR indicates that waste can be viewed as a design flaw, and in a CE, materials must be returned to the economy after their use. This transforms the traditional linear take-make-waste framework into a circular process. The circular design flow can preserve, share, reuse, repair, refurbish, remanufacture, and recycle many products. The soil can also be regenerated with food and other organic materials that can be safely returned

to nature, promoting new food and materials production. This review helps in determining the essential success factors of CSCM practices in a variety of industries, including construction, electronic waste management, and other waste management, among others.

Conflict of Interest

The authors have no potential conflict of interest.

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