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CIRCULAR SUPPLY CHAIN MANAGEMENT: CONTENT ANALYSIS WITH SPECIFIC DRIVERS AND BARRIERS

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The entire process of producing, distributing, and delivering goods and services to consumers in the supply chain has a significant impact on the environment. The transition towards Circular Supply Chain Management (CSCM) is imperative for addressing contemporary sustainability challenges. This study attempts a systematic exploration of the key barriers and drivers influencing the adoption of circular practices within supply chains by using content analysis and a systematic literature review. This paper highlighted the importance of CSCM adoption. The outcome of the study is relevant as it gives a framework of barriers and drivers for the CSCM implementation by a force field analysis. Various critical factors are assumed to define hypotheses as the basis of further research. This review has great significance for CSCM practitioners, academicians, managers, and policymakers. By recognizing the barriers and the drivers, organizations can embark on a transformative journey toward circular practices in their supply chains.

Keywords: Circular Economy; Supply Chain; Circular Supply Chain Management; Drivers; Barriers.

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1. INTRODUCTION

The supply chain plays a crucial role in the development of any country. It involves sourcing, producing, distributing, and delivering products or services to the end users. The increased technological advancement and global interconnectivity have a profound impact on supply chain processes, providing a dynamic trade environment. But in the present scenario of increased pollution, pandemic outbreaks, war conditions between countries like Ukraine-Russia, Israel-Palestine, and other international tensions tend to disrupt the overall supply chain management. The global economy is being affected by such issues. Environmental concerns associated with supply chain operations are at a peak as ozone depletion, greenhouse gas emissions, and increased landfills are adversely affecting our environment, economy, and society. To incorporate these environmental, economic, and social issues, a nation should be self-reliant in its sourcing, production, and consumption cycle. Hence, this is the time to consider revising the traditional supply chain operations by adopting the circular economy (CE) model.

CE is increasingly recognized as a better alternative to the dominant linear (take, make, and dispose) economic model. Linear philosophy leads to scarcities of raw supplies, high outlays, and unpredictability of consumption and demand (Patwa *et al*., 2021). Conversion of the linear economy to CE is important to save humankind (Ghisellini *et al*., 2016). Linear economies tussle with unmanageable supply chains and serious matters such as changes in climate, leftover generation, dumping, and environmental deprivation (Nandi *et al.*, 2021). The technique of sourcing, producing, delivering, using, reclaiming, and regenerating the products should be revised to have a sustainable and healthy future for the planet (Hazen *et al*., 2017; Kordsachia *et al*., 2022). Circular Supply Chain Management (CSCM) offers a compelling perspective on the supply chain sustainability domain by integrating the principles of the CE into supply chain management (SCM) practices (Farooque *et al*., 2019). CSCM is a vibrant, highly associated system where all supply chain partners are associated internally and dependent on each other; the interchange of knowledge and alliance occurs to achieve a mutual objective (Wieland, 2021). It is a relatively new concept that has been gaining popularity in recent years. In CSCM, organizations cooperate inside and cross-sectional sectors to maximize the worth of materials (Chauhan *et al*., 2021).

The available literature shows the different perspectives of researchers and academicians on this emerging topic. The CSCM is now a new emerging field of research and various researchers unfolded this phenomenon by using different terminologies. Table 1 shows the perspective of various researchers on definitions of CSCM and the evolution of the concept with time.

Table 1. Definitions of CSCM

S.No.	Author(s)	Definition	Evolution of Concept
1.	Govindan *et al.* (2018)	The design and management of supply chains that are environmentally and socially responsible, economically viable, and sustainable by optimizing the life cycles of products and materials through collaboration and innovation.	Introduced as a concept that focuses on optimizing the life cycles of products and materials while also considering environmental and social responsibility. Collaboration and innovation are highlighted as key concept elements.
2	Mangla *et al*. (2018)	Upstream and downstream organizations work together to recycle, reprocess, and remanufacture goods to re-enter the product lifecycle.	This aspect involves the organizational view of CSCM and provides the significance of collaboration among supply chain partners.
3.	Farooque *et al.* (2018)	Restoration of technical materials and regeneration of biological materials towards zero-waste by system-wide innovation in supply chain functions and business models.	This approach highlights the restoration and regeneration concept of technical and biological waste generated in the entire supply chain by innovation in businesses.
4.	Wang *et al*. (2018)	CSCM involves the coordination and integration of activities across the supply chain to achieve CE goals, including waste reduction, resource efficiency, and the extension of product life cycles through strategies such as recycling, remanufacturing, and reverse logistics.	The concept highlights the importance of collaborative activities in SCM to achieve CE goals. Waste reduction, resource efficiency, and product lifecycle extension through strategies like recycling, remanufacturing, and reverse logistics are emphasized as key objectives within CSCM.
5.	Luthra *et al*. (2020)	The operational and strategic decisions by organizations towards the adoption of CE ensure waste reduction, resource conservation, and the value creation through the closed-loop management of services and goods.	The concept broadens its scope to include the strategic and operational decisions made by organizations to foster CE. Resource conservation, waste minimization, and value creation through closed-loop management of products, materials, and services are highlighted as key objectives within CSCM.
6.	Barros *et al.* (2021)	CSCM generates economic opportunities for businesses through job creation, innovative approaches, and new circular business models. It enables businesses to focus on the expansion of sustainable services and goods.	The concept shifts focus towards the economic opportunities created by the CSCM. The emphasis is on creating new business models and stimulating innovation with the development of new jobs. The adoption of circular strategies is highlighted as a key aspect.

It is evident from these definitions that the researchers have described the CSCM on different notions of sustainability. This concept is in the evolutionary stage and brings a revolution for the entire planet. So, based on the above perspectives from various authors (Table 1), an attempt is made to define CSCM as,

"The crucial combination of circular economy and supply chain operations in such a way that the flow of goods and services provides the best value with zero waste by moving back in circles and ultimately to origins post consumption by adopting circular strategies of regeneration and reformation."

CSCM attempts to improve value from what was usually known as "wastage". Few researchers studied the CE execution approaches in SCM but did not extensively shed light on the critical implementation factors (Farooque *et al*., 2018; Batista *et al*., 2018). It is evident that this field is utterly new and offers new vistas of research by integrating CE and SCM. Global scenario, focus shift from global to local, and environmental issues have created compelling situations where SCM has to be revisited in the light of CE. However, the implementation of CSCM can be challenging. So, the research questions that arise here are:

RQ1: How is the CSCM phenomenon different from other types of SCM?

RQ2: What are the barriers to CSCM implementation?

RQ3: What are the drivers for the implementation of CSCM?

These research questions seek to identify the critical factors of CSCM implementation. Hence, the review study is conducted to achieve the following objectives:

O1: To study the concepts of CSCM given by different researchers.

O2: To investigate the various drivers that are imperative for implementing the CSCM in the current business environment.

O3: To investigate the various barriers that are posing a threat to implementing the CSCM.

O4: To categorize the drivers and barriers based on various factors for their better understanding.

O5: To investigate the criticality of these identified drivers and barriers.

Hence, considering the CSCM's need, a literature review is framed in this emergent field to broaden the development of CSCM that delivers a new aspect for researchers to study sustainability in SCM while proposing noteworthy implications in managerial strategy, the well-being of humans, and the ecosystem. The study pursues developing a theoretical framework of CSCM to provide a background and research outline along with its specific drivers and barriers.

2. THEORETICAL BACKGROUND

The evolution of a CE has been progressively acknowledged as the best substitute, observing leftovers as a raw supply as contrary to the linear economic model (Yu *et al*., 2021). The CE exhibits influences on several applications, containing supply chains that need a prototype change while shifting from a traditional to a sustainable supply chain (Ferasso *et al*., 2020). Therefore, it is obligatory to explore the operation conceptions of the CE contained by the supply chain perception where additional studies are narrow.

2.1 Circular Economy

The evolution to gain sustainability is already taking place, and one of its leading outlooks is the idea of a CE. The philosophy of CE is developing into a dominant dynamic force behind sustainability in literature and practice equally (Hobson, 2016; Stewart and Niero, 2018), and it has started to be acknowledged as a great perspective for helping organizations achieve a revolution in sustainable performance. According to the Ellen MacArthur Foundation (EMF), CE targets keeping products, instruments, and resources at their uppermost usefulness and value entirely in both biological and technical cycles. This exhibits returning biological components to the biosphere and technical components for retrieval (reproduction, renovation, and reprocessing) with zero waste vision (EMF 2015). The fundamental of CE is the closed movement of resources and the usage of raw materials and energy via several stages (Franklin *et al*., 2016; Ferasso *et al*., 2020). Hence, the advantages of CE are:

- Restorative and regenerative by design (EMF, 2015; Farooque *et al.*, 2018).
- Circular business models build natural, social, and economic capital. (EMF, 2015; Barros *et al*., 2021).
- Lessens greenhouse gas emissions and ozone depletion and safeguards the ecosystem (Zhang *et al*., 2021).
- Lessen or diminish leftovers (Zhang *et al*., 2021; González-Sánchez *et al.*, 2020; Pan *et al*., 2015).
- Upsurge in the life span of products (Ilić and Nikolić, 2016; Rubio-Andrés *et al*., 2022).
- Works for societal welfare (DeAngelis *et al*., 2018; Genovese *et al*., 2017; Upadhyay and Shukla, 2023).
- Resources are used more efficiently, waste and emissions are minimized, and the value of products and materials are maintained as long as possible (Gualandris *et al*., 2022; Genovese *et al*., 2017).
- Use of reprocessed or recycled resources in the place of virgin materials (Rubio-Andrés *et al*., 2022).
- Design for zero waste to minimize negative impact (De Angelis *et al*., 2018; Genovese *et al*., 2017).
- Shift towards renewable and sustainable energy suppliers (Kazancoglu *et al*., 2020; Hobson, 2016).
- Decrease the usage of perilous matters (Upadhyay and Shukla, 2023; Nasir *et al*., 2017; Zils *et al*., 2023).
- Product as service business model contributes to overall development (Ferasso *et al*., 2020; Jain *et al*., 2018).
- Shrinks the use of natural properties (González-Sánchez *et al.*, 2020; Ferasso *et al*., 2020).
- Intensify value conception in every linkage of the system (Rubio-Andrés *et al*., 2022; Zhang *et al*., 2021).

Geissdoerfer *et al*., 2017 highlight the business models part in the transition to a CE and discuss various archetypes of business models for CE adoption. The CE seeks to restore and regenerate natural resources and ecosystems. This involves adopting sustainable practices in agriculture, forestry, construction, and other industries to ensure the long-term health and availability of natural resources (Morseletto, 2020; Ossio *et al.*, 2023). The transition of CE is important to achieve sustainable development and socio-economic challenges (Ghazanfari, 2023). Partnership for sustainability and engagement of stakeholders is crucial for CE development (Eiselein *et al*., 2023).

2.2 Circular Supply Chain

Incorporating CE into SCM will possibly deliver sustainability benefits (Genovese *et al*., 2017; Nasir *et al*., 2017). Thus, keenness and emergent interests are observed in the union of SCM with CE from many researchers. The term CSCM has been used in some research for linking CE with SCM (Nasir *et al*., 2017; DeAngelis *et al*., 2018; Genovese *et al*., 2017; Mishra *et al*., 2018). Numerous studies have claimed that the efficacy of SCM unswervingly impacts the performance of organizations irrespective of the implementation (Upadhyay and Shukla, 2019). Along with this, CE incorporation turns out to be one of the dynamic tactics in the supply chain revolution (DeAngelis *et al*., 2018; Ripanti and Tjahjono, 2019). Some specific studies have reinvestigated the relationship between the CE and SCM. Preferably, a CSCM would produce zero leftovers as it is considered for restoring and regenerating resources systematically in the industrial and natural environment where it is implanted (Zils *et al*., 2023). CSCM consists of forward flow and reverse circular flow. The forward flow is recognized as the progressive linear flow of products in the supply chains. The circular flows characterize the reverse flow of goods at different echelons of the supply chain for value creation by circular strategies like reprocessing, recollecting, reusing, refurbishing, reproducing, renovating, recuperating, etc.

According to the World Economic Forum (2014), supply chains are a vital part of action related to CE execution and achievement and would be the basis for dynamic desirable changes. For the foundation of the world economy, supply chain procedures should be considered with utmost priority (Ripanti and Tjahjono, 2019; Govindan and Hasanagic, 2018; Min *et al*., 2019).

2.3 SCM transition to CSCM:

A linear supply chain obtains materials from the natural environment and disposes of End of Life items, wrapping supplies, and trash from various stages of the supply chain (Jain *et al.*, 2018). The unsolicited stuff is frequently dumped in the dumping ground. According to Kao *et al*. (2021), the supply chain should be designed in such a way that it supports the effectiveness and efficiency of firms by minimizing the use of energy. Moula *et al*. (2017) stated that the degree of value reclamation in a closed-loop supply chain is repeatedly restricted because the endeavors are controlled within the source supply chain (supply chain related to manufacturer) and do not contain subordinate supply chains and do not include new supplementary network participants. While, CSCM executes further by recuperating value from left-over by pooling resources with other organizations with the same industrial sector or with cross-industry sectors in an open loop (Weetman, 2017).

Figure 1 is drawn to explain the interplay between CE, SCM, and sustainability. This Figure shows the forward flow of materials from supplier to consumer in the middle section. In contrast, various loops show the potential for retrieval of material and value at various echelons. The left block shows the role of CE, where other third parties are involved with the expertise to retrieve and facilitate the management of by-products, wastes, and sales purchase collaboration.

CSCM is intended to produce nil left-over because it is planned for restoring and regenerating resources thoroughly in the manufacturing and natural ecology where it is implanted (EMF 2015; Farroque *et al*., 2018).

CSCM considerably augments sustainable supply chain management (SSCM) and Green supply chain management (GSCM) through a reformative aspect. Ahi and Searcy (2013) conducted a comparative study to frame some exclusive definitions of SSCM and GSCM with the help of various research studies. They came to know that most of the definitions of SSCM overtly explained all three extents of the Triple bottom line. None of the available definitions of Green-SCM overtly talk about social matters.

Genovese *et al*. (2017) suggested that incorporating CE in SCM will extend the boundary of GSCM and SSCM by decreasing the requirement for fresh supplies, which can intensify the movement of resources inside the supply chain systems. It spreads principles of sustainability by smearing CE's principles in all phases of the supply chain and performs thoroughly. CSCM is pertinent to industrial products along with service products (Ferasso *et al*., 2020; Jain *et al*., 2018). Table 2 shows the paradigm shift in SCM definitions over time.

In CSCM, organizations pool resources with others inside and outside of the sector to maximize the usefulness of merchandise/supplies (Kayikci *et al*., 2022). It presents an encouraging visualization for guiding supply chain superiors to attain an outstanding performance in resource proficiency and, subsequently, cost-effectiveness. Instantaneously, it reduces the adverse impact on the environment, society, and economy.

In recent times, researchers have paid a lot of attention to CSCM, and the number of research articles published in noted journals and business magazines is an indicator of growing interest in this field. However, the published literature encompasses several research gaps, which are as follows:

RG1: There is limited literature available on CE and supply chain.

RG2: The terminologies of different types of supply chains are not yet cleared.

RG3: The CSCM implementation drivers and barriers are not extensively discussed in the available literature.

RG4: The criticality of drivers and barriers of CSCM are not figured out yet.

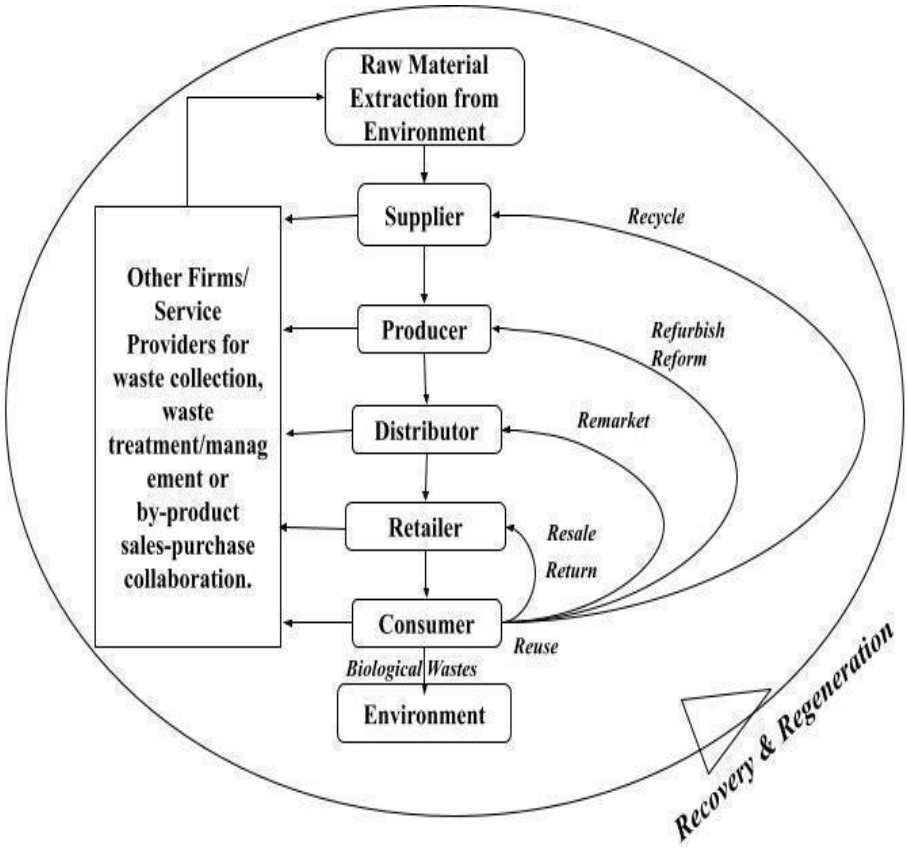

Figure 1. Circular supply chain management

Table 2. SCM Transition with different terminologies

S.No.	Terminology	Theme	References	Remarks
1.	Linear Supply Chain Management	Management of the movement of goods and services from the point of origin to the point of consumption.	Ellram (1991); Taschner *et al.* (2020)	● Focus on supply-side operations. ● Product and information flow in a linear direction within the supply chain. ● The traditional approach of SCM
2.	Green Supply Chain Management	Integration of environmental aspects into supply chain operations.	Chakraborty (2010); Malviya and Ravi (2015)	● Environmental value in the entire operations of SCM. ● It primarily emphasizes reducing the environmental impact of supply chain operations. ● It involves measures like sustainable sourcing, eco-friendly packaging, and transportation to reduce ecological harm. ● More narrowly focuses on environmental aspects.
3.	Sustainable Supply Chain Management	The management of material, information, and capital flows, as well as cooperation among companies along the supply chain, while taking goals from all three dimensions of sustainable development.	Seuring and Müller (2008); Genovese *et al.* (2017)	● Vision of restoration. ● Holistic approach to sustainability. ● Integrates economic, social, and environmental considerations in SCM. ● Ensures not only eco-friendly SCM operations but also economically viable and socially responsible.

S.No.	Terminology	Theme	References	Remarks
4.	Closed-Loop Supply Chain Management	Process of collecting, reprocessing, and redistributing used products to eliminate waste and maximize value while promoting environmental sustainability.	Souza (2013); Govindan *et al*. (2015)	● Post-consumption strategy for the environmental sake. ● A closed-loop supply chain aims at creating a continuous recovery cycle by efficient resource use and minimization of waste. ● Optimize the entire life cycle of the product.
5.	Circular Supply Chain Management	SCM that adheres to the concepts of the CE is known as CSCM.	Nasir *et al*. (2017); Farooque *et al*. (2019); Zhang *et al*. (2021)	● Zero waste vision. ● Reformative and regenerative. ● CSCM has a broader scope. ● Holistic approach to sustainability. ● Cradle-to-cradle management of supply chain operations. ● Eco-design and extended life of the product.

3. METHODOLOGY

Since literature reviews perform a decisive role in journal publications, their potential for creating knowledge and affecting strategies and practices is even better (Kraus *et al*., 2020). Content analysis could be described as a research method for constructing copy-able and binding interpretations from texts (or other significant stuff) to the frameworks of their usage (Krippendorff, 2004; Batista *et al*., 2018). Content analysis is a valuable research method that can be applied to systematic literature reviews (SLR) to analyze and synthesize existing literature on a particular topic (Govindan *et al*., 2018). The SLR is used for gaining a comprehensive understanding of existing knowledge on a specific topic (Sauer and Securing, 2023). This requires careful planning, systematic search, critical analysis, and clear reporting (Kraus *et al*., 2022). This analysis aids researchers in understanding the consistency of the outcomes under several situations and stages. This helps in in-depth knowledge of present scenarios about this particular domain. Content analysis of conceptual type with a structured review of literature is used to perform this study. This paper depicts the research process through which data is extracted, refined, selected, segregated, and analyzed. Figure 2 shows the methodology adopted in the form of a flow chart.

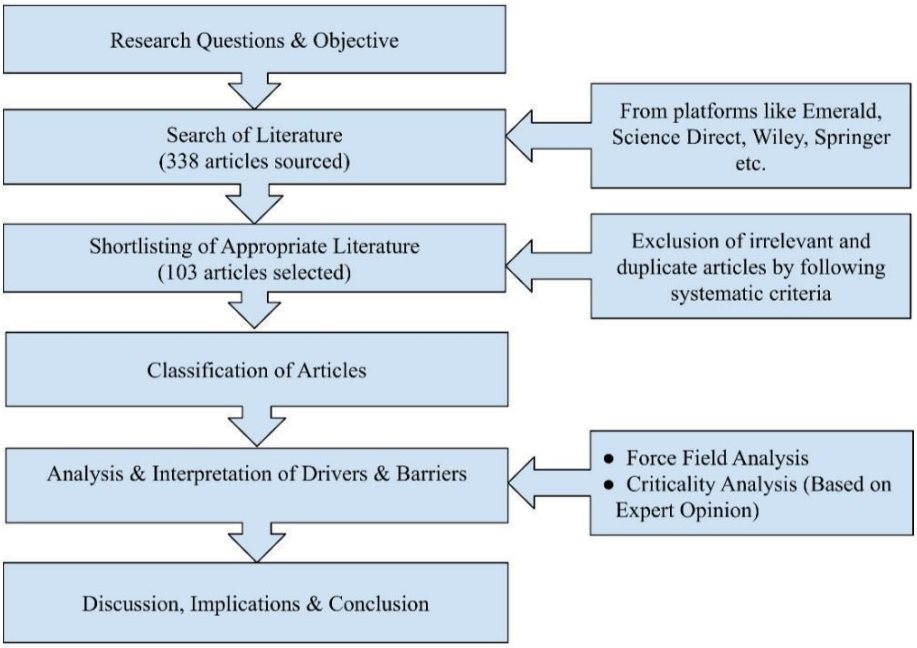

Figure 2. Research Methodology

3.1 Search of Literature

After setting up clear objectives of this review, literature was sourced from various databases like ScienceDirect, Emerald, Springer, Wiley, etc. Around 338 research studies have been collected by using specific keywords or combinations of keywords. The number of papers extracted along with specific keywords or the combination of keywords are tabulated in Table 3.

Table 3. Keywords for literature search

S.No.	Keywords	Number of Papers
1.	Circular economy and supply chain	121
2.	Circular supply chain management	36
3.	Circular supply chain enablers	12
4.	Circular supply chain drivers	14
5.	Circular economy and supply chain drivers	22
6.	Circular supply chain critical factors	9
7.	Circular supply chain motivation	3
8.	Circular supply chain obstacles/impediments/roadblocks	10
9.	Circular economy and supply chain hurdles	7
10.	Circular economy and supply chain barriers	23
11.	Circular supply chain barriers	16
12.	Circular economy and supply chain sustainability	65

3.2 Shortlisting of Appropriate Literature

The papers were assessed to ensure their suitability for the study. Extracted articles were refined by removing duplicates and irrelevant with the area of study omitted. A total of 103 relevant literature were chosen for accomplishing the study by setting proper inclusion and exclusion criteria. The inclusion and exclusion criteria strictly adhere to the requirement of the study, which consists of,

a. Duplicates: The first step of shortlisting is the removal of duplicate papers. A total of 89 papers were found to be in double copies and hence removed from the study.
b. Language: Papers that are not in English language were excluded from this review. A total of 7 articles were excluded according to this criteria.
c. Publication Type: This study consists of journal research papers. Conference papers are excluded from the study. This stage left us with 182 papers.
d. Quality: This study includes peer-reviewed publications only. Hence, 16 non-peer-reviewed publications are excluded.
e. Title and Content of Paper: Off-topic research and papers with methodological flaws are excluded. This shortlisting was accomplished by the removal of 63 articles.

3.3 Classification of Articles

The selected sample of 103 papers was classified based on various dimensions like journals, country, year of publication, publisher, industry type, and methodology adopted to get a better understanding of the spread of the subject.

3.3.1 Distribution of Papers by Year of Publication

The distribution of all 103 papers is shown in Figure 3. This shows an upsurge in publications when we move ahead. Circular supply chain and CE gained popularity after the UN Agenda 2030 and EMF's awareness campaign. So, the articles and studies found on CSCM are mostly after 2016. Figure 3 shows upward concern in the CE and its implementation in supply chains when we distributed the papers according to year of publication.

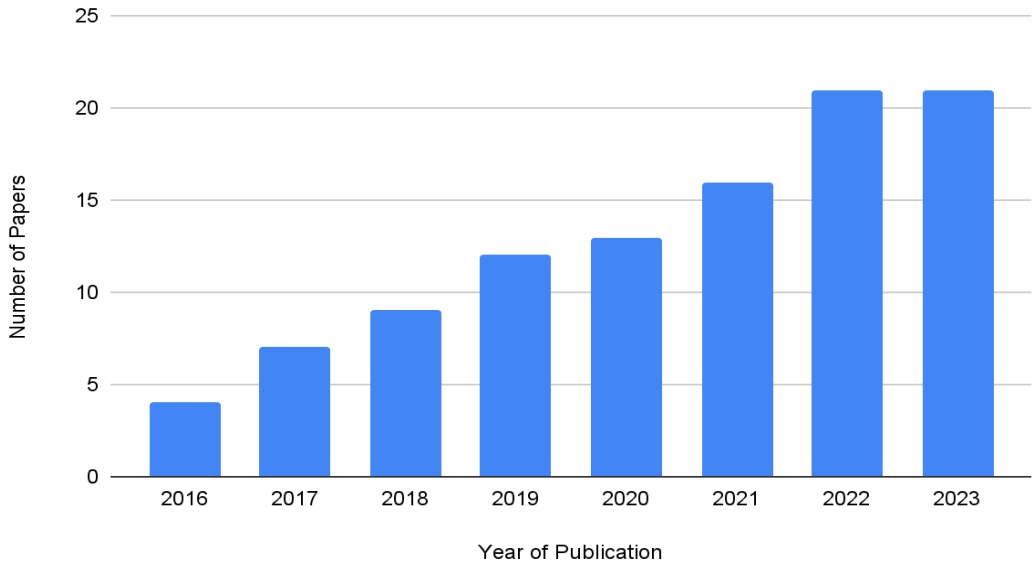

Figure 3. Distribution of articles based on publication year

3.3.2 Distribution of Papers Based on Research Methodology

Maximum studies available on CE and SCM comprise literature reviews, reports, case studies, and theoretical and conceptual papers. The spectrum of the articles based on methodology is depicted in Figure 4.

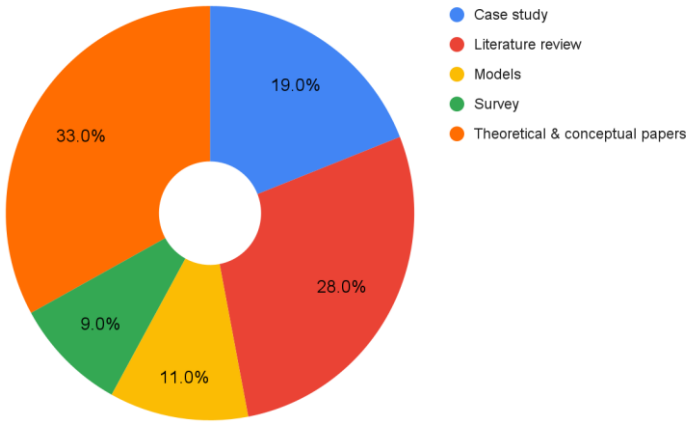

Figure 4. Distribution based on research methodology

3.3.3 Distribution of Papers Based on Industries

CSCM's significance is very broad. The fashion industry, manufacturing industries, leather, iron and steel, electronics, biochemical, food industries, and even the service sectors are working on the implementation of circular practices in their supply chain operations. Researchers are continuously expanding new paradigms of circularity in various industries. The review attempted to categorize literature on various industry setups targeted for the CSCM study (Figure 5).

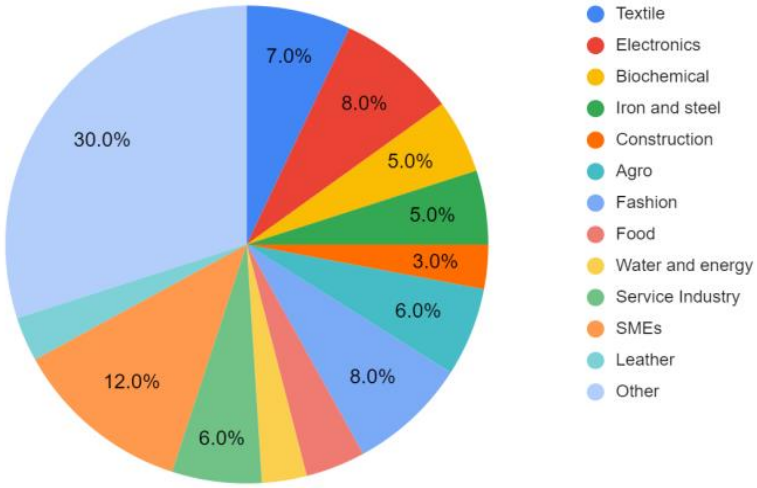

Figure 5. Spectrum of Industry Classification

3.3.4 Distribution of Papers Based on Geographical Background

CSCM implementation is an emerging topic, and researchers from different countries are finding ways to explore this phenomenon through their publications. The analysis indicates that Asian countries were the heads in researching the CE and supply chain, but European countries have enlarged their concern considerably. The geographical distribution of papers is shown in Figure 6.

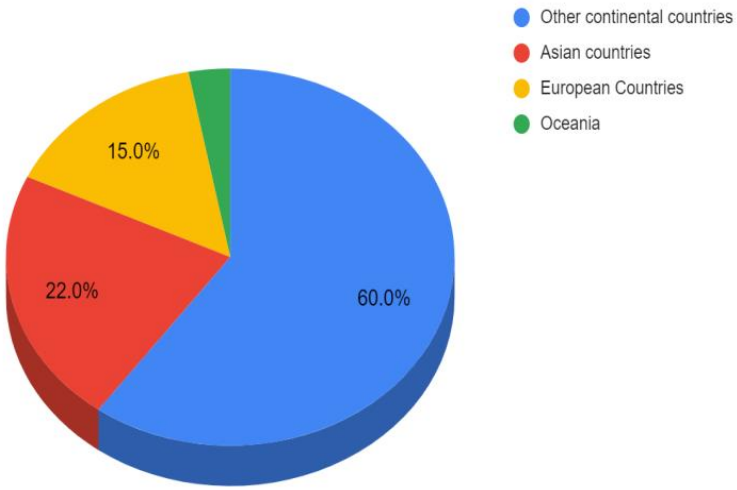

Figure 6. Classification based on geography

4. ANALYSIS AND INTERPRETATION OF DRIVERS AND BARRIERS

This study intended to identify various critical factors for the effective implementation of CSCM. These are the drivers and barriers that affect the adoption of CSCM practices. The CSCM drivers are the fundamental factors that motivate the adoption of CE strategies in the supply chain and its implementation. The drivers are the influences that are pushing organizations and industries to implement CSCM practices, encouraging a more resilient, eco-conscious, and socially responsible approach to resource management and supply chain operations. On the other hand, barriers are the obstacles that hinder the execution and adoption of circular practices in supply chain operations. These specific drivers and barriers have been distributed into internal

and external environments. In internal environments, manufacturers are stimulated to implement CE practices in their production tactics precisely from the primary proposal.

Conversely, in the external environment, the producers get affected by others outside the firm for their actions (Zhong *et al*., 2022; Govindan and Hasanagic, 2018). The internal environment detects what practices have to be adopted within the industry, and the external environment is related to outside practices and they are associated with one or more supply chain participants called stakeholders (Govindan and Hasanagic, 2018). Stakeholders are affected parties or beneficiaries such as government, society, controlling authorities, business organizations, society, manufacturers, suppliers, customers, warehousing companies, logistics providers, third-party service providers, financial institutes, recyclers, and salvage collection centers. The interplay of these stakeholders, marked by cooperation, communication, and collaboration, is essential to ensure the smooth and efficient flow of goods and services, meeting the demands of a dynamic and interconnected marketplace. The identified drivers were further distributed and clubbed under groups such as political (P), economic (E), social (S), technological (T), legal (L), environmental (E), and infrastructural-organizational (IO). This analysis can be abbreviated as PESTLEIO analysis, an extended version of PESTLE analysis to emphasize the role of infrastructure and organizations in CSCM.

4.1 Drivers of CSCM

This review identified various drivers for the implementation of CSCM. These drivers help in identifying and understanding the inducing aspect of CSCM practice. Table 3 shows the exhaustive list of drivers. A total of 33 drivers are identified for the CSCM. The drivers are categorized into internal and external drivers, and each one is associated with one or more stakeholders. Table 4 shows various drivers for CSCM with their domain and remarks.

Table 4. Various Drivers of CSCM

Factors	Drivers		References	Stakeholders	Domain	Remarks
Political	D1	Political support for the development of regulations and policies for waste management and sustainable practices.	Luthra *et al*. (2018); Nag *et al*. (2021)	Government, controlling authorities	External	Government policies and regulatio can significantly impact the adopti of CSCM. EPR laws, incentives fo circular strategies, International agreements, and SDG 2030 can se global sustainability targets and encourage CSCM.
	D2	International Agreements such as the UN SDG 2030.	Proposed	Government	External	
	D3	Tariffs and trade agreements impact the flow of secondary raw materials and recyclable goods.	Proposed	Government	External	
	D4	Policies for Extended Producer Responsibility (EPR) drive circular supply chain practices.	Kayikci *et al*. (2022); Levering and Vos (2019)	Produce, Supplier, Government	External	
	D5	Incentives for recycling, regeneration, and reformation.	Govindan and Hasanagic (2018)	Producer, Supplier	External	
Economic	D6	Consumer demand for eco-friendly products drives firms to adopt circular supply chain practices.	Kayikci *et al*. (2022)	Consumers'	External	Economic factors play a crucial role in CSCM implementation as it prompt resource conservation along with great market demand and job creation.
	D7	Cost saving through reduced resource consumption and waste disposal expenses.	Nag *et al*. (2021); Govindan and Hasanagic (2018)	Producer	Internal	

Factors	Drivers		References	Stakeholders	Domain	Remarks
	D8	Job opportunities in recycling, remanufacturing, and repair industries contribute to economic growth.	Govindan and Hasanagic (2018); Khan *et al*. (2020)	Society	External	
	D9	Export demand for circular products drives the firms to adopt CSCM.	Kayikci*et al*. (2022); Govindan and Hasanagic (2018)	Producer, Society	External	
	D10	Potential economic benefits by the implementation of CSCM in firms.	Nag *et al*. (2021); Upadhyay and Shukla (2023)	Producer, supplier, logistic providers	Internal	
Social	D11	Health concerns for stakeholders.	Nag *et al*. (2021); Govindan and Hasanagic (2018),	Society	Internal	Behavioral change in consumption for the environment's sake, health and safety concerns and increased awareness about circular products encourage CSCM.
	D12	Safety and health consciousness from sudden pandemic outbreaks like COVID-19.	Proposed	Society	External	
	D13	Consumers' Awareness for circular products.	Nag *et al*. (2021); Govindan and Hasanagic (2018); Hazen (2017)	Consumers	External	
	D14	Change in consumption pattern with acceptance for reused, recycled and refurbished products.	Proposed	Society	External	
Technological	D15	Technology compatibility with renewable energy sources.	Proposed	Producer	Internal	Technology upgradation, availability of plenty of renewable energy sources and increased use of ICT tools drive CSCM implementation.
	D16	Biofuels and electric vehicles availability.	Proposed	Producer, Supplier	Internal	
	D17	Increase in the use of AI and ICT tools.	Proposed	Producer	Internal	
	D18	Use of technology in tracing and tracking of products.	Upadhyay and Shukla (2023); Malik *et al*. (2022)	Producer, Supplier	Internal	
Legal	D19	Legislations for waste management in the firm.	Geissdoerfer *et al*. (2018)	Producer	External	Legal rules and regulations for raw material extraction, processing, transportation and, selling and post-treatment encourage CSCM and lets the firms adhere to eco-safe operations.
	D20	End-of-life treatment legislative rules.	Levering and Vos (2019)	Government	External	
	D21	Environmental certifications to run the firm.	Proposed	Government	External	
	D22	Legislative actions on ecological harm by organization.	Proposed	Government, Producer	External	

Factors	Drivers		References	Stakeholders	Domain	Remarks
	D23	Export countries' legislative environmental regulations.	Malik *et al*. (2022); Govindan and Hasanagic (2018)	Government	External	
	D24	Carbon Credits.	Proposed	Government	Internal	
Environmental	D25	Concern about ozone depletion.	Proposed	Society, Producer	Internal	Environment concerns play a significant role in CSCM implementation as resources are degrading exponentially and our planet is paying the cost of human actions.
	D26	Concern about environmental pollution.	Geissdoerfer *et al*. (2018); Luthra *et al.* (2018); Mehmood *et al*. (2021)	Government, Producer, Society	Internal	
	D27	Concern for climate change.	Khan *et al*. (2020); Rathi *et al*. (2022)	Government, Producer	Internal	
	D28	Concerns associated with resource scarcity.	Malik *et al*. (2022); Govindan and Hasanagic (2018)	Government, Producer	External	
	D29	Collaboration and coordination of supply chain partners for circular practices.	Rathi *et al*. (2022); Mehmood *et al*. (2021)	Producer	Internal	
	D30	Global warming issues drive CSCM practices.	Luthra *et al*. (2018)	All	External	
Infrastructural and Organizational	D31	The organization's mission and vision support CSCM practices.	Proposed	Producer	Internal	The ability of firms to provide environmentally dedicated products and services drives CSCM transition easily.
	D32	Product segments can be easily modified for circularity.	Proposed	Producer	Internal	
	D33	Availability of resources that support circular practices.	Levering and Vos (2019); Nag *et al*. (2021)	Producer, Suppliers, Distributor	Internal	

Amongst the 33 drivers, 18 are associated with the external environment, and the remaining 15 are linked to the internal environment. The identified drivers are further categorized based on their relationship with supply chain participants or stakeholders. Supply chain participants mentioned in this research are consumers, society, producers, distributors, suppliers, and the government, which are safeguarded by the stakeholders concept. The word "proposed" in the reference column shows the author's contribution to the recognition of new drivers. A total of 13 new drivers are acknowledged.

4.2 Barriers to CSCM

Several researchers have explored and proposed the barriers that relate to the execution of the CSCM. Similar to drivers, barriers were also categorized based on PESTLEIO analysis. The barriers are also classified according to their domain in either internal or external environments or their association with one or more stakeholders comprising consumers, society, producers, suppliers, distributors, retailers, policymakers, and government (Govindan and Hasanagic, 2018). These barriers are presented in Table 5.

Table 5. Various Barriers to CSCM

Factors	Barriers		References	Stakeholders	Domain	Remarks
Political	B1	Inadequate supportive policies for CSCM implementation.	Mangla *et al*. (2018)	Government, Producer	External	Political barriers to the adoption of a circular supply chain can hinder the transition to more sustainable and resource-efficient business practices. These barriers can result from conflicting interests, regulatory challenges, or a lack of political will.
	B2	Difficult and unclear regulations for waste management.	Govindan and Hasanagic (2018); Mangla *et al*. (2018)	Government, Producer	External	
	B3	Inadequate incentives hinder CSCM implementation.	Govindan and Hasanagic (2018); Mangla *et al*. (2018)	Producer	External	
	B4	Frequent changes in government disrupt long-term CSCM initiatives.	Proposed	Government, Producer	External	
	B5	Less tax benefits in terms of subsidies and insurance.	Mangla *et al*. (2018); Kazankoglu *et al*. (2020)	Producer, Supplier, Distributor, Retailor	External	
Economic	B6	High upfront investment (Technology and Infrastructure).	Kazancoglu *et al*. (2020); Mangla *et al*. (2018)	Producer	Internal	High investment is associated with CSCM practices. Waste management is also a costly process and needs a strategic and risky shift from the traditional way. This results in financial hurdles.
	B7	Costly skilled manpower for CSCM-supported activities.	Khandelwal and Barua (2020); Govindan and Hasangic (2018)	Producer	Internal	
	B8	Recycling and remanufacturing is costly.	Ayati *et al*. (2022); Khandelwal and Barua (2020)	Producer, Supplier	Internal	
	B9	Decrease in the firm's market share and overall profit.	Govindan and Hasanagic (2018); Lahane and Kant (2021)	Producer	Internal	
	B10	High production costs hinder CSCM practices.	Kazancoglu *et al*. (2022); Mangla *et al*. (2018)	Producer, Supplier	Internal	
	B11	Short-term profitability wins over sustainable and circular initiatives.	Proposed	Producer	Internal	
Social	B12	Bad societal image of reused products.	Lahane and Kant (2021); Govindan and Hasanagic (2018)	Society	External	Society has a different view for reused, refurbished and recycled products. Consumers are reluctant to use cheap products rather than pay high costs for circular ones.

Factors	Barriers		References	Stakeholders	Domain	Remarks
	B13	Lack of awareness about end-of-life treatment and collection policies of waste.	Govindan and Hasanagic (2018); Upadhyay and Shukla (2023)	Society	External	Greenwashing creates bad brand images. Social barriers also include health hazards associated with waste sorting.
	B14	Greenwashing and misleading claims of eco-friendly products and services.	Proposed	Producer, Consumers	External	
	B15	Hazardous waste sorting methods and cause severe health issues.	Govindan and Hasanagic (2018); Upadhyay and Shukla (2023)	Society, Producer, Supplier	External	
	B16	Planned adolescence pushes consumers to change things with time.	Upadhyay and Shukla (2023)	Consumers, Producer	External	
	B17	Unwillingness to pay high cost for eco-safe products.	Luthra *et al*. (2022); Farooque *et al*. (2019); Govindan and Hasangic (2018)	Consumers	External	
Technological	B18	Quality concerns in the production of goods from recycled and reused materials.	Govindan and Hasangic (2018); Liu *et al*. (2018)	Producer, Supplier	Internal	Reluctance to change from traditional technology and the viability of new technology for CSCM practices hinders the way to its implementation.
	B19	Reluctancy of management and employees to shift from the traditional method.	Luthra *et al*. (2022); Farooque *et al*. (2019); Govindan and Hasangic (2018)	Producer, Supplier	Internal	
	B20	Technically complicated end-of-life treatment of products.	Dutta *et al*. (2021); Mangla *et al*. (2018); Govindan and Hasangic (2018)	Producer, Supplier	Internal	
	B21	The viability of compatible technology hinders CSCM practices.	Shang *et al*. (2022)	Producer	Internal	
	B22	Tracing and tracking issues with waste products.	Shang *et al*. (2022); Patidar *et al*. (2023)	Producer	Internal	

Factors	Barriers		References	Stakeholders	Domain	Remarks
Legal	B23	Inconsistent EPR laws create difficulty in the management of the entire lifecycle of products.	Proposed	Producer, Government	External	Legal barriers to the adoption and implementation of a CSCM can vary by region and jurisdiction. These barriers can arise from existing laws and regulations that may not align with circular principles or from the absence of supportive legal frameworks.
	B24	Export and import restrictive regulations for the flow of secondary material.	Govindan and Hasangic (2018)	Policymakers, Government	External	
	B25	The poor taxation system for recycled resources.	Proposed	Policymakers, Government	External	
	B26	The burdensome and complex permitting process for circular practices like remanufacturing and recycling.	Proposed	Policymakers, Government	External	
Environmental	B27	Resource scarcity impacts the feasibility of CSCM practices.	Luthra *et al*. (2022); Farooque *et al*. (2019); Govindan and Hasangic (2018)	Producer and supplier	Internal	Resources are now limited on our planet, and their continuous extraction can not make sense for CSCM implementation. The recycling and remanufacturing practices also harm ecology.
	B28	Recycling and remanufacturing involve more carbon footprints and greenhouse gas (GHG) emissions.	Luthra *et al*. (2022); Mangla *et al*. (2018); Govindan and Hasangic (2018)	All	Internal	
	B29	Changes in environmental conditions and weather issues disrupt CSCM.	Proposed	All	External	
	B30	Natural disasters disrupt CSCM.	Proposed	All	External	
Infrastructural and Organizational	B31	Unavailability of local suppliers for eco-safe resources.	Luthra *et al*. (2022); Kazankoglu *et al*. (2019)	Producer	External	Basic infrastructural and organizational hurdles affect CSCM practices. It requires a dedicated network and collaboration among supply chain partners for zero waste.
	B32	Logistics providers are reluctant to change traditional and old transportation modes.	Luthra *et al*. (2022); Govindan and Hasangic (2018)	Producer, Supplier	External	

Factors	Barriers		References	Stakeholders	Domain	Remarks
	B33	Difficulty in taking back used and waste products.	Luthra *et al*. (2022); Levering and Vos (2019); Govindan and Hasangic (2018)	Producer, Supplier	Internal	
	B34	Collaborative issues with supply chain partners.	Luthra *et al*. (2022); Mangla *et al*. (2021)	Producer	Internal	
	B35	The product segment does not support CSCM practices.	Proposed	Producer	Internal	
	B36	Difficulty in establishing market penetration with eco-safe products.	Proposed	Producer	Internal	

According to Table 5, amongst 36 acknowledged barriers, 19 are linked to the external environment, and the remaining 17 are linked to the internal environment. This review contributed to the identification of 10 new barriers proposed from an understanding of the phenomenon.

4.3 Force Field Analysis of Drivers and Barriers

The features acknowledged in this study are the drivers and barriers that could influence the execution of the CE in a supply chain. Further, an attempt is made to provide a force field analysis of identified critical factors. Force field analysis is a tool that shows the restraining forces mean barriers and propelling forces mean drivers by an effective presentation. This analysis helps in a comprehensive understanding of the interplay between forces, gives an outlook on the complexities, and helps in strategic planning and interventions for the achievement of goals with better clarity. Table 6 presents a force field analysis for the CSCM implementation on PESTLEIO analysis for the CSCM implementation.

Table 6. Force field analysis for CSCM implementation

--------- Drivers----------->	**CSCM Implementation**	**<—---------Barriers—-----**
D1- Political support for the development of regulations and policies of waste management and sustainable practices. **D2**- International Agreements such as the UN SDG 2030. **D3**- Tariffs and trade agreements impact the flow of secondary raw materials and recyclable goods. **D4**- Policies for extended producer responsibility (EPR) drives circular supply chain practices. **D5**- Incentives for recycling, regeneration, and reformation.	<---------> **Political** <---------->	**B1**- Inadequate supportive policies for CSCM implementation. **B2**- Difficult and unclear regulations for waste management. **B3**- Inadequate incentives hinder CSCM implementation. **B4**- Frequent changes in government disrupt long-term CSCM initiatives. **B5**- Less tax benefits in terms of subsidies and insurance.
D6- Consumer demand for eco-friendly products drives firms to adopt circular supply chain practices. **D7**- Cost saving through reduced resource consumption and waste disposal expenses. **D8**- Job opportunities in recycling, remanufacturing, and repair industries, contributing to economic growth.	<----------> **Economical** <---------->	**B6**- High upfront investment (Technology and Infrastructure). **B7**- Costly skilled manpower for CSCM-supported activities. **B8**- Recycling and remanufacturing are costly. **B9**- Decrease in the firm's market share and overall profit.

--------- **Drivers**---------->	**CSCM Implementation**	<—---------**Barriers**—-----
D9- Export demand for circular products drives the firms to adopt CSCM. **D10**- Potential economic benefits of the implementation of CSCM in firms		**B10**- High production costs hinder CSCM practices. **B11**- Short-term profitability wins over sustainable and circular initiatives.
D11- Health concerns for stakeholders. **D12**- Safety and health consciousness from sudden pandemic outbreaks like COVID-19. **D13**- Consumers' awareness of circular products. **D14**- Change in consumption pattern with acceptance of reused, recycled, and refurbished products.	<----------> **Social** <---------->	**B12**- Bad societal image of reused products. **B13**- Lack of awareness about end-of-life treatment and collection policies of wastes. **B14**- Greenwashing and misleading claims of eco-friendly products and services. **B15**- Hazardous waste sorting methods cause severe health issues. **B16**- Planned adolescence pushes consumers to change things with time. **B17**- Unwillingness to pay high cost for eco-safe products.
D15- Technology compatibility with renewable energy sources. **D16**- Biofuels and electric vehicles availability. **D17**- Increase in the use of AI and ICT tools. **D18**- Use of technology in tracing and tracking of products.	<----------> **Technological** <---------->	**B18**- Tracing and tracking issues with waste products. **B19**- Quality concerns in the production of goods from recycled and reused materials. **B20**- Reluctancy of management and employees to shift from the traditional method **B21**- Technically complicated end-of-life treatment of products **B22**- Viability of compatible technology hinders CSCM practices
D19- Legislations for waste management in the firm. **D20**- End of Life treatment legislative rules. **D21**- Environmental certifications. **D22**- Legislative actions on ecological harm. **D23**- Export countries' legislative environmental regulations. **D24**- Carbon Credits.	<----------> **Legal** <---------->	**B23**- Inconsistent EPR laws create difficulty in the management of the entire lifecycle of products **B24**- Export and import restrictive regulations for the flow of secondary material. **B25**- Poor taxation system for recycled resources. **B26**- Burdensome and complex permitting process for circular practices like remanufacturing and recycling.
D25- Concern about ozone depletion. **D26**- Concern about environmental pollution. **D27**- Concern for climate change. **D28**- Concerns associated with resource scarcity. **D29**- Collaboration and coordination of supply chain partners for circular practices. **D30**- Global warming issues drive CSCM practices.	<----------> **Environmental** <---------->	**B27**- Resource scarcity impacts the feasibility of CSCM practices. **B28**- Recycling and remanufacturing involve more carbon footprints and greenhouse gas (GHG) emissions. **B29**- Changes in environmental conditions and weather issues disrupt CSCM. **B30**- Natural disasters disrupt CSCM.
D31- The Organization's mission and vision support CSCM practices. **D32**- Product segments can be easily modified for circularity. **D33**- Availability of resources that support circular practices.	<----------> **Infrastructural & Organizational** <---------->	**B31**- Unavailability of local supplier for eco-safe resources **B32**- Logistics providers are reluctant to change traditional and old transportation modes. **B33**-Difficulty in taking back used and waste products. **B34**- Collaborative issues with supply chain partners. **B35**- The product segment does not support CSCM practices **B36**- Difficulty in establishing market penetration with eco-safe products.

The drivers are the push forces to attain CSCM implementation goals, while barriers are the obstacles that push back the implementation of circular practices in the supply chain. CSCM implementation often involves a combination of these identified drivers to tackle the barriers and create a regenerative and sustainable economic system.

4.4 Criticality Analysis

For a better understanding of these critical factors of CSCM, a categorization consisting of the most critical, critical, and less critical drivers and barriers is done with the help of experts' opinions on the achievement of sustainable development and their significance in the CSCM implementation goal. The spectrum of experts who take part in the discussion round is shown in Figure 7 in the form of pie charts along with respective numbers and percentages.

A Total of 23 experts from different backgrounds were consulted and asked to categorize identified factors. In three iterations of categorization, the final categorization of these critical factors has been made. The categorization is shown in Table 7.

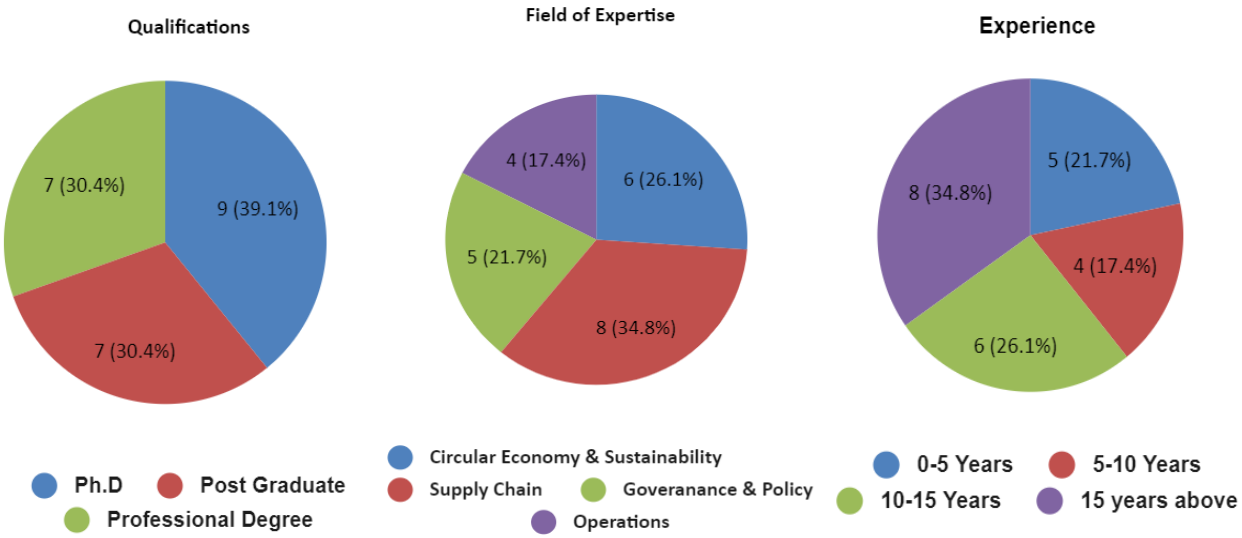

Figure 7. Classification of Experts

Table 7. Categorization of drivers and barriers for CSCM implementation

Categorization	Drivers	Barriers
Most Critical	● Incentives for recycling, regeneration, and reformation. ● Policies for Extended Producer Responsibility (EPR) ● Consumer demand for eco-friendly products ● Increase in the use of AI and ICT tools. ● Environmental certifications ● Concern for climate change and environmental issues. ● Collaboration and coordination of supply chain partners for circular practices ● The Organization's mission and vision support CSCM practices. ● Availability of resources that support circular practices.	● Inadequate supportive policies for CSCM implementation ● High upfront investment (Technology and Infrastructure) ● Hazardous waste sorting methods and cause severe health issues. ● Tracing and tracking issues with waste products. ● Lack of awareness about end-of-life treatment and collection policies of waste. ● Resource scarcity impacts the feasibility of CSCM practices. ● Collaborative issues with supply chain partners. ● The product segment does not support CSCM practices.
Critical	● Tariffs and trade agreements impact the flow of secondary raw materials and recyclable goods.	● Inadequate incentives hinder CSCM implementation

Categorization	Drivers	Barriers
	● Political support for the development of regulations and policies for waste management and sustainable practices. ● International Agreements such as the UN SDG 2030. ● Export demand for circular products drives the firms to adopt CSCM. ● Cost saving through reduced resource consumption and waste disposal expenses. ● Health concerns for stakeholders ● Safety and health consciousness from sudden pandemic outbreaks like COVID-19. ● Technology compatibility with renewable energy sources ● Use of technology in tracing and tracking of products ● Legislation for waste management in the firm ● Legislative actions on ecological harm ● End of Life treatment legislative rules ● Concerns associated with resource scarcity ● Concern about environmental pollution ● Product segments can be easily modified for circularity. ● Availability of resources that support circular practices. ● Consumers' Awareness of circular products	● Difficult and unclear regulations for waste management ● Frequent changes in government disrupt long-term CSCM initiatives. ● Less tax benefits in terms of subsidies and insurance ● Lack of awareness about end-of-life treatment and collection policies of waste. ● Decrease in the firm's market share and overall profit. ● Recycling and remanufacturing is costly ● Unwillingness to pay high cost for eco-safe products. ● Bad societal image of reused products ● Greenwashing and misleading claims of eco-friendly products and services ● The viability of compatible technology hinders CSCM practices ● Reluctancy of management and employees to shift from the traditional method ● Quality concerns in the production of goods from recycled and reused materials. ● Export and import restrictive regulations for the flow of secondary material. ● Inconsistent EPR laws create difficulty in the management of the entire lifecycle of products. ● Recycling and remanufacturing involve more carbon footprints and greenhouse gas (GHG) emissions. ● Changes in environmental conditions and weather issues disrupt CSCM. ● Difficulty in establishing market penetration with eco-safe products. ● Unavailability of local suppliers for eco-safe resources ● Difficulty in taking back used and waste products.
Less Critical	● Job opportunities in recycling, remanufacturing, and repair industries. ● Potential economic benefits of implementation of CSCM in firms. ● Change in consumption pattern with acceptance for reused, recycled, and refurbished products ● Biofuels and electric vehicles availability ● Carbon Credits ● Export countries' legislative environmental regulations ● Concern about ozone depletion	● Costly skilled manpower for CSCM-supported activities. ● The poor taxation system for recycled resources. ● Short-term profitability wins over sustainable and circular initiatives ● Planned adolescence pushes consumers to change things with time. ● Technically complicated end-of-life treatment of products ● The burdensome and complex permitting process for circular practices like remanufacturing and recycling. ● Logistics providers are reluctant to change traditional and old transportation modes. ● Natural disasters disrupt CSCM.

This categorization brings a different view of CSCM implementation and helps the researchers and practitioners to proceed with the significant ones. This may differ with particular industry types or with other internal-external factors. This may differ in scope with industry, geography, and organizational context. Market forces and disciplines can also affect the categorization of these critical factors.

5. DISCUSSION

This study identified various drivers and barriers of CSCM along with force field analysis and criticality analysis that help in its adoption and implementation by recognizing conditions from multiple perspectives of PESTLEIO analysis. The aspects of PESTLEIO were investigated for the external environment and internal environment. This review contributed rigorously to the literature by adding 13 new drivers and 10 new barriers along with their relationship with stakeholders, and internal and external domains. Force field analysis and criticality analysis provide a holistic view of these critical factors. The insights provided by this study have numerous implications, and the overall phenomenon will serve well to the concept building and requirement of this dynamic phenomenon. The implications of this study, according to various stakeholders' perspectives, are discussed below:

5.1 Political and Governmental Perspective

This study identified several barriers and drivers influenced by political factors in both the internal and external environment. Study reveals incentives for reformation and regeneration, EPR policies, environmental certifications, and legal actions on ecological harm are the most critical drivers towards the adoption of CSCM, while inadequate and unclear supportive policies, inconsistent laws for eco-friendly production-consumption by government authorities, trade and tax issues restrain the CSCM implementation.

Government support is key to entering into circular practices for any firm. The whole production-consumption pattern requires a change to achieve the circularity goal, and for this, the clear supportive regulations for the CSCM implementation are important. The administration of supportive laws, policies for CSCM, incentivization of CSCM practices, and punitive actions on unsustainable practices are crucial for its implementation. Awareness programs and training programs by the government will be pivotal for this transition. Even this may be a drastic step for any leader to initiate such things despite opposition from other parties and big industries' reluctant behavior. Depending on the nation, the region, and the particular political ideology in place, the political view of the CSCM implementation drivers and hurdles might differ significantly. Sometimes, for firms, it will become difficult to execute things locally and hence require global coordination that can only be possible by the intervention of the government and their zeal to support circular practices.

5.2 Economic Perspective

This study highlighted various barriers to mitigate and drivers to thrust upon for the implementation of CSCM. The recent diverse scenario of the world where we learned to live in shutdown and disruption in export-import because of conflicts between countries pushes this phenomenon to get economic advantages.

The economic perception of CSCM is generally positive due to their potential for resource efficiency, cost savings, innovation, global demand for green products, and job opportunities in end-of-life management of products. However, there are challenges also related to upfront investments, consumer buying behavior, new hiring, costly workforce for their CSCM-supported skills and activities, high production and regeneration cost, and market dynamics that need to be addressed to fully realize the economic benefits of a CE. Policymakers, businesses, and consumers all play roles in shaping the economic transition toward circular practices.

5.3 Social Perspective

With the increasing population, it is essential to keep the resources in use and decrease the generation of waste (Zhong *et al*., 2022). This can be paced up by social awareness and their consumption pattern. Consumer behavior and purchase perception are always considered the main factors for any organization (Upadhyay and Shukla, 2019). This study reveals various social roadblocks and drivers in the effective implementation of CSCM practices.

Effective adoption of CSCM should aim to maximize societal benefits while minimizing negative impacts. Consumer awareness for eco-safe products, health and safety issues associated with waste products, and responsible disposal practices of products with extended life cycles drive CSCM implementation. Job creation in waste management contributes to socio-economic development.

On the other hand, this study reveals that the societal adoption of reused and reprocessed goods is still limited. People prefer to buy new products rather than refurbished or reused products. Planned obsolescence also pushes consumers to change as it will become difficult to live with old products in this technology-driven era. The paying capacity of consumers, the standard of living, and the lack of awareness about waste collection policies and environment-safe operations hinder customers from opting for circular products. Misleading claims and greenwashing by companies are like a threat to society in the adoption of circular products. The waste sorting process can be life-threatening as it involves the risk of severe health

issues and allergies because of chemicals and poisonous substances. Hence, it is important to address this issue with care in CSCM implementation practices.

5.4 Managerial Perspective

These context-specific studies identified barriers that can be tackled by leveraging the drivers with a proper strategy for CSCM implementation. PESTLEIO analysis, force field analysis, and criticality analysis will have significant managerial perspectives and help in making a strategy accordingly. Organizations' sustainable growth and also their long run in the market reside in circular production-consumption only. The study highlighted that resource availability for circular operations, firm vision and mission, SCM partners collaboration and coordination, and CSCM-supported product segment will help in its implementation.

Restoration from waste might be difficult for several sectors and have multiple quality issues as well. Recycling practices also contribute to GHG emissions and more carbon footprints. The unavailability of environment-conscious supply chain partners, market dynamics, and product incompatibility for CSCM practices stumbles the way to its implementation.

Zeroing waste within the supply chain is the main motive for CSCM implementation. Hence, managers and practitioners have to take risks with limited resources to get a change for their long run in the market. Supply chain collaboration, advanced technology, upgraded resources, and local supply chain partners lead to competitive advantage in the development of circular business models and effective CSCM practices.

The organization should focus on its corporate social responsibility (CSR) initiatives, as it is a complementary concept that emphasizes sustainable practices in the firm (Kotzian, 2022). CSR consists of ethical considerations, reputation enhancement, regulations compliance, and commitment to conducting business ethically and responsibly while also contributing to the well-being of society, the environment, and its stakeholders beyond just maximizing profits (Zhong *et al*., 2022). This CSR activity helps managers implement CSCM productively by finding a better intersection. This is the right time to shift from the traditional method of manufacturing and providing goods and services to end users.

6. CONCLUSION

This review paper offers a comprehensive analysis of the critical factors that influence the adoption and implementation of CSCM practices within organizations. The increasing population exerts stress on natural wealth (Kordsachia *et al*., 2022). This unregulated rise makes it vital to shift from the conservational linear model (take-make-dispose) to a circular one. Furthermore, it is also significant that the regulations framed by the government are executed in an appropriate mode; other regulations make it problematic for companies to develop circular practices in their supply chain. The study demonstrates the critical drivers and barriers in the execution of CSCM. Economic progress and increasing demand for renewable resources can help companies to switch from their traditional method. With the increase in awareness about circular practices, the research in this domain is also increasing at a very high pace. Environment safety is a global issue, and the topic is also emerging globally. This review adopted SLR and content analysis which helps in enhancing the reliability and validity of outcomes. Table 8 concluded our study with outcomes along with objectives.

Table 8. Outcomes of Review

S.No.	Objectives	Outcome
O1.	To study the concepts of CSCM given by different researchers	Table 1 depicts the concept of CSCM by giving various definitions from researchers, and Table 2 shows its evolution from linear supply chain management to CSCM.
O2.	To investigate the various drivers that are imperative for implementing the CSCM in the current business environment.	The review investigated various drivers discussed in Table 4.
O3.	To investigate the various barriers that are posing a threat to implementing the CSCM	The study investigated various barriers discussed in Table 5, along with new contributions.
O4.	To categorize the drivers and barriers based on various factors for their better understanding.	These critical factors are categorized based on PESTLEIO analysis. Table 6 shows them well with force field analysis.
O5.	To investigate the criticality of these identified drivers and barriers.	The criticality level of barriers and drivers are identified for general practitioners and depicted in Table 7.

The supply chain is the backbone of any country’s economy and in the era of CE, CSCM implementation is an essential strategy that helps businesses to address environmental concerns, meet consumer demands, and remain competitive in a

resource-constrained world. The success of CSCM will ultimately depend on the collective efforts of organizations, governments, policymakers, society, and users in driving change and fostering a more sustainable future for our planet.

7. FUTURE SCOPE OF THE STUDY

The future of CSCM research lies in addressing these evolving challenges and opportunities, with a focus on creating sustainable, resilient, and environmentally responsible supply chain systems. The force field analysis can help practitioners, academicians, managers, and policymakers to narrow down the restrictive force of barriers from the way of CSCM practices. These drivers found in the study are vital to contemplate because they define the reasons for companies to execute a CE in their supply chains. The strugglers can use this study as a base for circular practices in their firm. Researchers and academicians can test the hypothesis for a particular industry type or in general practice. The relevance of hypotheses can vary according to the situation of the firm and its product segment, so that the critical factors may change accordingly. This review acknowledged extra drivers and barriers for CSCM practices and implementation, along with reviewed ones, that help in developing a new business model to support CSCM. Further research can explore the contribution of technology intervention, smart manufacturing, blockchain technology, industry 5.0, etc, in the effective implementation of circular practices in supply chain operations. More research can be conducted by investigating various matters and observing the CSCM practices in diverse segments.

When examining the drivers and barriers to the implementation of a CE, One can formulate these hypotheses to test the significant relationships or effects. Here are several hypotheses related to CE drivers and barriers proposed to be examined in the future.

H1(0): There is no significant correlation between the government's environmental regulation and the adoption of circular practices in the supply chain.

H1: There is a significant correlation between the government's environmental regulation and the adoption of circular practices in the supply chain.

H2(0): There is no significant correlation between the awareness of CE principles and the adoption of circular practices in the supply chain.

H2: There is a significant correlation between the awareness of CE principles and the adoption of circular practices in the supply chain.

H3(0): The level of technological innovation (use of AI, ICT, etc) in a company's operations does not influence the motivation to adopt CSCM practices.

H3: The level of technological innovation (use of AI, ICT, etc) in a company's operations influences the motivation to adopt CSCM practices.

H4(0): Collaboration with suppliers and partners does not significantly contribute to overcoming barriers to CSCM.

H4: Collaboration with suppliers and partners significantly contributes to overcoming barriers to CSCM.

H5(0): There is no significant correlation between the consumer demand for eco-safe products and the adoption of CSCM practices.

H5: There is a significant correlation between the consumer demand for eco-safe products and the adoption of CSCM practices.

H6(0): There is no significant correlation between the organization's vision and mission to support circular practices and CSCM implementation.

H6: There is a significant correlation between the organization's vision and mission to support circular practices and CSCM implementation.

H7(0): There is no significant correlation between hazards associated with the waste sorting method and waste collection for CSCM.

H7: There is a significant correlation between hazards associated with waste sorting methods and waste collection for CSCM.

H8(0): There is no significant correlation between resource scarcity and circular practices in the firm.

H8: There is a significant correlation between resource scarcity and circular practices in the firm.

H9(0): There is no significant correlation between financial investment and CSCM implementation

H9: There is a significant correlation between financial investment and CSCM implementation

These hypotheses can serve as the basis for quantitative research to test whether certain factors have a statistically significant impact on the drivers and barriers to CSCM adoption. Researchers would collect data and use appropriate statistical tests to either accept or reject these null hypotheses, providing insights into the relationships and effects within the context of CSCM practices.

8. LIMITATIONS

This study consists of several limitations as any other research. The scope of the study covers organizations in general. The specific conditions, industry type, and region constraints may affect the critical factors. The sector-wise challenges may vary with time and conditions.

This study is based on the literature from several databases, and most of our emphasis was on journal publications. Conference papers and articles are excluded from this review. For future research, a meta-analysis can be attempted on this review data.

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