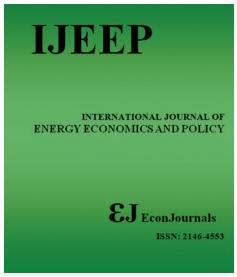

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Circular Economy: A Bibliometric Review of Research in Emerging Economies (2010-2024)

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ABSTRACT

The study "Circular Economy: A Bibliometric Review of Research in Emerging Economies" examines the growing literature on circular economy practices, particularly within environmental science, business, management, and engineering. Utilizing a bibliometric tool and quantitative approach, the research analyzed patterns and trends in publications on circular economy research in emerging economies from 2010 to 2024. The study observed a notable increase in publications since 2019, reflecting a global shift towards sustainable development and heightened awareness of circular economy principles in emerging economies. Key themes identified include sustainability, waste management, and innovative business models, highlighting efforts to address implementation challenges. The significant contributions from countries like India, the UK, and China, along with strong collaborative networks, underscore the importance of international partnerships. The study suggests that future research should strengthen interdisciplinary collaboration and incorporate regional and local contexts to develop tailored strategies. Furthermore, it emphasizes the need for expanded global cooperation.

Keywords: Circular Economy, Sustainability, Resource Depletion, Innovative Business, Waste Management, Environmental Impact
JEL Classifications: Q01, Q56, Q57, Q58

1. INTRODUCTION

In today's competitive, technologically advanced, and constantly evolving business landscape, it is imperative to consider the various obstacles competitors must overcome to survive. Concerns over waste pollution and resource depletion driven by the international scope of business operations have brought the circular economy concept to worldwide attention. As the population grows, urbanisation and modernization take precedence with increased energy consumption, subsequently increasing greenhouse gas emissions that alter the Earth's climate (Uwuigbe et al., 2018). However, the significant challenges posed by resource depletion, low-cost manufacturing and excessive consumption in today's global economies have created a virtual avalanche which recent policymaking has said can be solved with Green Production. The current way of production is recognized as one of the major global risks to the earth's biocapacity (Wackernagel and Beyers, 2021). Wackernagel and Beyers (2021) suggest that the current production poses a major risk to the Earth's biocapacity. Urbanization and modernisation of the global population pose a trend projected to translate into an incremental growth in energy demand, translating into growing GHG emissions that lead to climate change (Geissdoerfer et al., 2017; Henckens et al., 2016; Korhonen et al., 2018).

The prevalent linear economic model has heightened global awareness of resource scarcity, environmental degradation, and the mounting strain on ecosystems and natural resources. This model, characterized by extracting raw materials, manufacturing, consumption, and disposal, generates substantial waste and pollution (Wackernagel and Beyers, 2019). Concurrently, technological advancements, progressive business policies,

and industrial activities have spurred the circular economy movement. As a result, governments, businesses, and civil society organizations worldwide increasingly acknowledge the financial, ecological, and social benefits of adopting a circular economy approach. The need to align global industrial systems with natural balances has garnered attention due to the negative environmental impacts of current economic practices. Similarly, businesses are increasingly cognizant of the circular economy and its ecological implications (Borrello et al., 2020). They recognize that adopting circular economy principles can provide a competitive advantage by addressing sustainable development challenges, enhancing the sustainability of operations, and increasing efficiency while adding customer value. Consequently, circularity is a crucial solution to long-term environmental sustainability issues.

The concept of circular economy (CE) is gaining traction among scholars in academia, industry representatives, policymakers and practitioners who have described it as an alternative model to minimise resource depletion, waste, and emissions (Su, 2013; Geissdoerfer et al., 2020). Similarly, Haupt et al. (2017), described the concept as a sustainable development approach that focuses on reducing waste and maximising resources. It involves rethinking product design, promoting reuse, repair, remanufacturing, and recycling, creating a closed-loop system that minimises resource input and waste generation, unlike the traditional linear economy model. Ma et al. (2014) described it as a mode of economic development whose purpose is to protect the environment and prevent pollution, thus facilitating sustainable economic development. Singh and Ordonez (2016) and Cagno et al. (2021) further describes it as an economic strategy to promote innovative ways to transform the current linear consumption system into a circular one, through material savings. The European Commission (2014), refer to it as an important approach to achieving sustainable economic and environmental development. According to Blomsma and Brennan (2017) and Naustdalslid (2017), the current economic model, which is based on a linear resource flow, is no longer viable (Wackernagel and Beyers, 2019). Consequently, there is a growing shortage of resources and environmental degradation because of the search for virgin materials combined with inadequate waste management techniques. This presents a strong substitute, promoting a closed-loop system where resources are utilised for an extended period. It is a concept that suggests a paradigm shift towards a sustainable economic model that aims to break the link between resource consumption and environmental degradation, promoting a more resilient, regenerative, and sustainable future by reevaluating how businesses and countries produce, use, and dispose of goods and services.

Therefore, the long-run macroeconomic and environmental benefits associated with the circular economy concept can never be overstated, especially given its innovative framework and structure for sustainable operations that will add value for end users (Reike et al., 2018). This aligns with the growing business awareness of the circular economy concept worldwide as a tool for addressing challenges related to sustainable development and gaining a competitive edge. Thus, from a micro and macro perspective, countries and organisations (multinational corporations) worldwide are attempting to adjust to the dynamic processes of the circular economy to react to changes that will transpire in their internal and external environments (Lewandowski, 2016). As a result of the detrimental effects of ignoring climate and environmental issues, organisations have realised in recent years that they can no longer be ignored. Likewise, expanding governmental regulations and raising public awareness of environmental preservation have become increasingly important for businesses to thrive in the global marketplace. Hence, incorporating an environmental, economic, and social efficiency framework to achieve improved sustainability becomes necessary. Similarly, there is a paucity of research on the circular economy concept (Ghisellini et al., 2016). This dearth of related literature that exclusively looked at the emerging circularity concepts, clusters and authors from a global perspective creates the need for this study. It is against the backdrop that this study undertook a bibliographic review of the circular economy from the period 2012-2024.

The remaining part of this article has been segmented into various sections covering the theoretical underpinning, literature review, methodology, discussion of findings, conclusion, and implications of the study. The study ends with an outline of its limitations.

2. THEORETICAL AND EMPIRICAL REVIEW OF RELATED LITERATURE

2.1. Historical Development and Theoretical Foundations

The circular economy (CE) concept originates in various theoretical frameworks and ideas. Over the past several decades, this notion has evolved by incorporating diverse theories and practices to improve environmental sustainability and resource efficiency (Yuan, 2006; Chauhan et al., 2022). The development of CE can be traced through various significant milestones and intellectual movements, reflecting its ongoing refinement and adaptation Blomsma and Brennan (2017). Kenneth Boulding established one of the earliest theoretical foundations for CE in 1966 with his influential essay "The Economics of the Coming Spaceship Earth." In this work, Boulding emphasised the finite nature of Earth's resources, contrasting the traditional open economy, which presumed endless resources, with a closed system that necessitates sustainable consumption habits. His "spaceship Earth" metaphor highlighted the critical need for managing resources sustainably and reducing waste, advocating for an economy within the planet's natural limits (Boulding, 1966). This concept set the stage for the subsequent development of CE, guiding future theories and activities in environmental sustainability and resource efficiency.

Also, another earliest root of CE that emerged is the Industrial Ecology Movement of the 1970s and 1980s (Rosenboom et al., 2022). This period saw the introduction of the term "industrial ecology," which highlighted the importance of designing industrial systems to emulate natural ecosystems, where waste from one process serves as input for another (Frosch and Gallopoulos, 1989). This notion of closed-loop systems marked a pivotal shift towards more sustainable industrial practices. Industrial ecology emerged, focusing on material and energy fluxes across industrial systems (Rosenboom et al., 2022). It advocates for closed-loop

processes like natural ecosystems, where waste is used as input for another. Denmark's Kalundborg Symbiosis, for example, demonstrates this approach, where local businesses collaborate to manage resources, reduce waste, and improve efficiency. These symbiotic and resource optimisation ideas form the basis for the circular economy (Frosch and Gallopoulos, 1989).

In the 1980s and 1990s, the circular economy concept gained significant momentum and clarity, largely due to the influential work of Walter Stahel and Genevieve Reday-Mulvey. Their 1976 report to the European Commission introduced the "loop economy," focusing on extending product lifespan, reuse, and recycling to foster a more sustainable economic model (Stahel and Reday-Mulvey, 1981). This era also witnessed the rise of the "Cradle to Cradle" design philosophy by William McDonough and Michael Braungart, as presented in their 2002 book "Cradle to Cradle: Remaking the Way We Make Things." They advocated for designing products with consideration for their entire lifecycle, encouraging the use of materials that could be safely reintegrated into the environment or continuously reused in industrial processes (McDonough and Braungart, 2002). The Philosophy of the Cradle to Cradle" design philosophy was centered around considering the entire life cycle of products (Corvellec et al., 2022). Their concept promoted creating products that could either biodegrade safely or be fully recycled into new products, mirroring nature's regenerative cycles. The concept is further known for creating products that could either biodegrade safely or be fully recycled into new products, mirroring nature's regenerative cycles. This book and its principles were pivotal in shaping the circular economy, urging a departure from the traditional linear production and consumption model towards a circular approach that prioritises sustainability, resource efficiency, and waste reduction (Frosch and Gallopoulos, 1989).

The establishment of the Ellen MacArthur Foundation in 2010 further accelerated the CE movement, playing a crucial role in promoting CE principles, conducting extensive research, and fostering collaboration with businesses and governments worldwide to facilitate the transition to a circular economy (Ellen MacArthur Foundation, 2017).

2.2. Theoretical Foundations of the Circular Economy

The circular economy (CE) shifts from traditional linear economic models to a sustainable approach that prioritises resource efficiency and minimisation (Bakshi et al., 2018). To promote a closed-loop system where materials are reused, remanufactured, and recycled, challenging traditional accounting techniques and requiring new methods for measuring and reporting economic activities (Geissdoerfer et al., 2017). CE's theoretical foundations are rooted in systems thinking, industrial ecology, and sustainable development, advocating for a regenerative approach to production and consumption (Ellen MacArthur Foundation, 2013; Rizos et al., 2016). The circular economy (CE) has called into question standard accounting techniques based on a linear "take-make-dispose" approach (Geissdoerfer et al., 2017). New accounting theories are emerging to meet the special requirements of a closed-loop system that prioritises resource efficiency and material cycling. Accounting theories are crucial in implementing circular economy ideas in organisational activities. Some of the related theories that explain this concept are discussed in this section.

2.2.1. Cradle-to-cradle design approach

One fundamental theory is the cradle-to-cradle design strategy, proposed by Braungart and William McDonough in 2002 (Ellen MacArthur Foundation, 2017). This approach emphasises using materials that can be safely returned to nature or recycled into new products, resulting in a closed-loop system that reduces waste and environmental impact. This regenerative and sustainable approach to production and consumption aims to create a regenerative economy. However, the implementation of this theory is limited by several challenges, including economic viability, the need for advanced material science and technology, the lack of robust infrastructure for recycling and upcycling, and regulatory and standardisation issues (Ghisellini et al., 2016; Blomsma and Brennan, 2017). These challenges can hinder widespread adoption and require comprehensive policy reforms to align with the principles of C2C, ensuring the successful implementation of this sustainable approach.

2.2.2. Restorative economy approach

Another theory that has contributed to shaping the concept of circular economy is the restorative economy approach (Blomsma and Brennan, 2017). This complements the circular economy's concepts by emphasising the restoration and regeneration of natural capital and ecosystem services. This approach emphasises the need of protecting and improving natural resources, biodiversity, and ecosystems while also encouraging economic activities that contribute to environmental restoration and sustainability. The theory aims to balance economic activity and environmental health by creating systems that repair, rejuvenate, and regenerate resources (Stahel, 2016). By incorporating restorative economy goals into circular economy practices, businesses and policymakers can work to create a more resilient and harmonious relationship between economic development and environmental stewardship, fostering long-term sustainability and well-being for both people and the planet. However, this theory faces challenges in implementing restorative practices, infrastructure, and legislation, especially in underdeveloped countries (Blomsma and Brennan, 2017). Additionally, detecting and verifying regeneration impacts is challenging due to complex ecological processes and limited evaluation methods (Korhonen et al., 2018).

2.2.3. Natural capital accounting

Natural capital accounting is a theory that integrates the value of natural resources and ecosystem services into financial statements. This helps businesses understand their environmental impact and make informed decisions about resource use. It can include costs of raw material depletion and waste generation, potentially leading to strategies for product life extension or material recovery. In the circular economy, Natural Capital Accounting (NCA) integrates natural resources and ecosystem services into economic decision-making. However, its limitations include reliance on market mechanisms, potential ineffectiveness due to market failures, externalities, and inadequate regulatory frameworks, and potential incentives for short-term gains, leading to resource exploitation and challenges in measuring regenerative impacts

(Kosoy and Corbera, 2010; Spash, 2020; O'Neill et al., 2021). This bibliometric research adopts the Natural Capital Accounting approach. The choice for this theory is grounded in the fact that it reveals the true cost of resource depletion through the valuation of natural assets and ecosystem services (James et al., 2018). This data empowers businesses to make informed decisions that minimise environmental impact and incentivises them to adopt circular practices like product life extension and material recovery, ultimately promoting resource efficiency and a more sustainable future (Bakshi et al., 2018).

2.3. Empirical Review of Related Literature on Circular Economy

The circular economy (CE) is a sustainable development model that aims to reduce waste and increase resource utilisation. It emerged as a response to environmental issues caused by the old "take-make-dispose" economic paradigm (Neumann et al., 2022). CE focuses on closed-loop systems that promote reusing, repairing, remanufacturing, and recycling goods, materials, and resources (Kirchherr et al., 2018). This movement represents a cultural production and consumption shift, aiming to solve critical environmental and economic issues.

Business development impacts regional economic systems and the environment, sparking global discussions on balancing interests with sustainability to ensure business and societal sustainability (Bocken et al., 2016). The debate over the balance between economic, social, and environmental goals has been ongoing for 40 years but has shifted towards integrating all aspects (Murray, 2017; Genovese, 2017). This study section reviews literature related to circular economy (CE) in emerging economics using bibliometric data from other public works. In the global conversation on sustainable development, the idea of a circular economy and its effects on emerging economies are becoming increasingly relevant. Prior studies document that the primary objective of CE is to reduce waste and resource consumption by planning out waste and pollution, reusing materials and products, and restoring natural systems (Zink and Geyer, 2017).

Bibliometric data is a crucial tool for understanding the impact of published evaluation literature on theoretical perspectives (Lim and Kumar, 2024). It includes physical units of publications, bibliographic citations, peer-reviewed journal articles, letters to the editor, book reviews, and other documents. For example, Kirchherr et al. (2017) examined 114 Community Engagement (CE) papers and found that many articles portrayed CE as a mix of recycling, reducing, remanufacturing, and reusing environmental resources. The authors emphasised CE's importance in ensuring economic prosperity and maintaining environmental sanity.

Masi et al. (2017) and Saidani et al. (2019) identified 55 circularity indicators impacting CE performance at various systemic levels. They divided these indicators into ten scopes: Implementation levels (macro, micro), CE loops (maintain, reuse, remanufacture, recycle), performance criteria (intrinsic, effects), and circularity perspective (actual, potential). Both studies highlight significant variations in CE definitions. Prior CE studies also contend that it is more suitable for cleaner production, regenerative design, greener production, and environmental economics. More importantly, these prior studies concentrated primarily on the theoretical and conceptual understanding of CE, particularly its structural dimensions (Merli et al., 2018), strategic orientation (Kalmykova et al., 2018), consumption methods (Camacho-Otero et al., 2018), economic and environmental costs (Ghisellini et al., 2018), and modes of implementation (Ghisellini et al., 2016). Equally, literature review articles have been sorted and reviewed specifically to address areas like evaluating the existing corpus of CE metrics and their assessment viewpoints (Parchomenko et al., 2019; Sassanelli et al., 2019); adopting CE at the national or local level (Aranda-Usón et al., 2020); the contribution of digital technologies to the adoption of CE (Nobre and Tavares, 2017) and switching from a linear to a circular approach (Tukker, 2015). Using the multiple correspondence analysis technique, Parchomenko et al. (2019) reviewed the available CE indicators and divided them into three primary resource efficiency-related clusters.

Upadhyay et al. (2021b) and Murray (2017) suggest that circular economy (CE) can enhance social inclusion by enabling informal waste workers and marginalised communities to participate in the formal economy. Integrating informal recycling sectors into formal waste management systems can improve livelihoods and reduce poverty. Emerging economies grappling with environmental consequences of industrialisation and urbanisation can mitigate degradation, reduce greenhouse gas emissions, and conserve natural resources, leading to a more sustainable and resilient economy (Hammer and Pivo, 2017).

Similarly, Rosa et al. (2020), conducted a thorough systematic literature study to evaluate the relationship between Industry 4.0 and CE, regarded as the two most significant industrial paradigms guiding business and academia in the twenty-first century. This refers to advanced digital technologies such as the Internet of Things (IoT), augmented and virtual reality, cloud technologies, blockchain, big data and analytics, cybersecurity, etc., as the main drivers for industrial transformation and competitiveness in the 21st century. At the same time, CE focuses on the design of restorative or regenerative industrial systems. Industry 4.0 drives the circular economy, according to Rosa et al. (2020), who based their analysis on 158 publications all geared toward innovation and development of emerging economics.

It must be noted that bibliometric analyses are not very common in CE literature. More importantly, the few that exist do not provide a comprehensive overview of CE publications or conduct quantitative analysis using bibliometric metrics based on the publication dates of these works. More recently, 26 publications published in the WoS database between 2011 and 2019 were used by Navarrete-Oyarce et al. (2021), while Lopes and Penela (2021) combined data from WoS and Scopus. Likewise, Di Vaio et al. (2020) used 60 English-language publications from 1990 to 2019 to achieve the respective objective.

Kirchherr et al. (2017) thoroughly reviewed 114 circular economy definitions (CE) definitions, demonstrating the wide range of interpretations and applications of CE principles. Their research

highlighted that while the fundamental concept of reducing, reusing, and recycling resources is widely accepted, the practical implementation of CE varies significantly across different industries and regions. This variation indicates the necessity for customised strategies that consider local economic, environmental, and social conditions to apply CE practices effectively. Empirical research has also delved into the practical benefits and challenges of implementing CE models. For example, Ghisellini et al. (2016) analysed CE practices within the European Union and found that countries with strong policy frameworks and regulatory support, such as Germany and the Netherlands, have made substantial progress in adopting CE principles, leading to improved resource efficiency and reduced environmental impact. However, the study identified significant obstacles, such as technological constraints, market resistance, and the need for increased consumer awareness and participation. In the same vein, Lieder and Rashid (2016) explored the role of digital technologies in supporting the transition to a circular economy. They found that innovations such as the Internet of Things (IoT), big data analytics, and artificial intelligence are essential for optimising resource use and monitoring environmental impacts, thereby facilitating the practical implementation of CE and enabling new sustainable business models.

The breadth of the various bibliometric studies on CE conducted in the past is constrained and highly subjected to various limitations that must be addressed. Thus, comprehensive and total coverage of bibliometrics analysis from multiple angles is completely missing in CE literature. This study will address comparable papers that employ bibliometric analysis to achieve its purpose. Every publication has some restrictions, including those related to coverage, breadth, sources, and research procedures. To close these gaps, this study sheds light on the most current advancements in CE research. In addition to the academic approaches, there is a noticeable trend in government policy to promote the circular economy. In Europe, the European Union's "Close the Circle" strategy, supported by Spain's "Spain Circular 2030," aims to promote the circular economy and address EU institutions' concerns. Turner and Pearce's "Sustainable Economic Development" study introduced the concept of a circular economy, aiming to challenge the conventional economic paradigm based on the useful benefit-cost ratio (Turner and Pearce, 1990).

To the best of the researchers' knowledge, there is a dearth in the literature that exclusively looked at the emerging circularity concepts, clusters and authors from the African continent using a bibliometric analysis approach. Hence, this study adopts a bibliometric approach in analysing the circular economy construction of Africa to respond to the following research questions.

2.4. Research Question

Guided by the dearth of literature, the following research questions will be considered in this study.

RQ1: Which country is the most productive in terms of publication on green financing and renewable energy?

RQ2. Which institution (University) is the most productive in terms of publication on green financing and renewable energy?

RQ3. What are the most frequently occurring concepts (keywords) shaping the current drive for green financing and renewable energy?

RQ4: Who are the most active authors on green financing and renewable energy?

RQ5: Who are the most cited authors on green financing and renewable energy?

This paper explores the connection between circular economy and supply chain concepts through a bibliometric analysis of articles published up to 2024 in Web of Science (WoS) and Scopus. The analysis focuses on the top 10 journals by the number of articles with the keywords "circular economy" and "supply chain" and the citation count. The study also compares WoS and Scopus indexing to assess their impact on the literature. A keyword map was created using VOSviewer (version 1.6.17) to explore the topic further.

3. METHODOLOGY

3.1. Research Design

To achieve the objective of this study, this research adopted a bibliometric tool utilising a quantitative approach to analyse patterns and trends in publications on circular economy research in emerging economies from 2010 to 2024. The application of a bibliometric tool in this research is based on the fact it helps in analysing the expansive and multi-disciplinary nature of circular economy (CE) research. Also, it provides a robust methodological approach to quantitatively assess and map the development and trends of scholarly publications within a given field over time. In addition, it allows for examining the structure and dynamics of scholarly communication using statistical and visualisation techniques (Pritchard, 1969; Zupic and Čater, 2014). More so, this methodology has been extensively used in related domains like sustainability science (Xie et al., 2021), climate change research (Haunschild and Bornmann, 2022) and waste management (Fu et al., 2021). By applying bibliometric indicators to topic-specific literature retrieved from bibliographic databases, insights can be generated into research productivity and collaboration, influence of publications, conceptual connections and the evolution of a field over time (Ellegaard and Wallin, 2015).

3.2. Data Collection

Publications were retrieved from the Scopus database, one of the largest abstract and citation databases of peer-reviewed scientific publications across disciplines (Chadegani et al., 2013). Scopus was chosen over other databases like Web of Science, IEEE Xplore and PubMed due to its multidisciplinary nature and broad coverage of over 21,500 active titles from 5000 international publishers (Harzing and Alakangas, 2016; Mongeon and Paul-Hus, 2016). The following search query string was used: TITLE-ABS-KEY ("circular economy") AND TITLE-ABS-KEY ("emerging econom*") OR TITLE-ABS-KEY ("developing econom*") AND PUBYEAR > 2009 AND PUBYEAR < 2025 AND (LIMIT-TO [LANGUAGE, "English"]) This search strategy focused on "circular economy" and related terms in combination with phrases denoting developing countries and emerging economies in the title, abstract and author keywords across documents published between 2010 and 2024 written in the English language. Journal

articles, conference papers, reviews and short surveys were included, while editorials, letters, books, book chapters and errata were excluded through filters available in Scopus. This resulted in 352 articles, which, after being limited to countries classified as emerging economies by the OECD and World Economic Forum and removing duplications, yielded a final dataset of 264 documents for analysis.

The search results were exported from the Scopus interface into CSV format to import data into various bibliometric software tools. The Scopus data was cross-verified with Web of Science using a similar search strategy, and no additional unique records were found. Still, Scopus indexing policies related to selective journal coverage can result in missing certain publications (Mongeon and Paul-Hus, 2016), a limitation inherent in using any single database. Comparing results across multiple databases provides a more comprehensive coverage as noted by reviews on data collection methods in bibliometric studies (Aria and Cuccurullo, 2017).

The bibliometric analysis was performed with VOSviewer software (Van Eck and Waltman, 2010), which constructs and visualises bibliometric networks by taking information from the title, abstract and keywords of publications. VOSviewer allows the mapping of co-citation networks (Marx et al., 2014), co-authorship linkages (Waltman and van Eck, 2021), and produces overlay visualisation representing statistical indicators on network structures (Van Eck and Waltman, 2022). It extracts and analyses text data alongside linkages to display conceptual closeness and clustering (Van Eck et al., 2010). These functionalities distinguish VOSviewer from other freely available software tools like CiteSpace, used for co-citation analysis (Chen, 2004); Bibexcel, which offers citation parsing and matrix generation (Persson et al., 2009); and SciMAT, employed for science mapping techniques (Cobo et al., 2012).

While CiteSpace excels at temporal visualisations showing the evolution of networks (Chen, 2006), VOSviewer provides additional text mining and overlay mapping techniques within an intuitive and user-friendly interface. Compared to VOSviewer, Bibexcel and SciMAT have very basic visualisation capabilities. A few proprietary software like HistCite offer more advanced information metric analyses but were not chosen due to accessibility reasons for the wider research community. Among freely available bibliometric software, VOSviewer provides a balance between analysis depth and ease of use (Van Eck and Waltman, 2021). Based on these technical capabilities aligned with the analytical objectives of this study, VOSviewer was selected.

The VOSviewer analysis encompassed network visualisations showing collaboration patterns between countries, organisations and authors. Overlay depictions mapped statistical indicators like citation counts and timelines of publications on these networks to identify key contributors. Co-occurrence analysis extracted keyword frequencies from text data to reveal the conceptual structure and knowledge clusters around circular economy research in emerging countries. Descriptive statistical techniques available in VOSviewer provided summary information on trends, leading sources promoting publications, most productive institutions and countries, and highly cited papers. This combination of computational text mining, visualisation of bibliometric networks, density maps and statistical analyses provided multi-layered insights into the research advancements and collaborations around this topic.

3.3. Qualitative Analysis

To enrich insights from the computational techniques, qualitative analysis was conducted manually on a sample of 222 cited articles to gauge evidence on - key theories drawn upon, specific geographic focus, tools and methods utilised, implications for policy and practice, stated limitations and identified research gaps. This evaluation of knowledge provenance, contextual dispersion and scientific impact provides a multilayered view of influential literature contributing to the circular economy discourse in developing countries (Haunschild and Bornmann, 2022; Su and Lee, 2021).

4. RESULTS

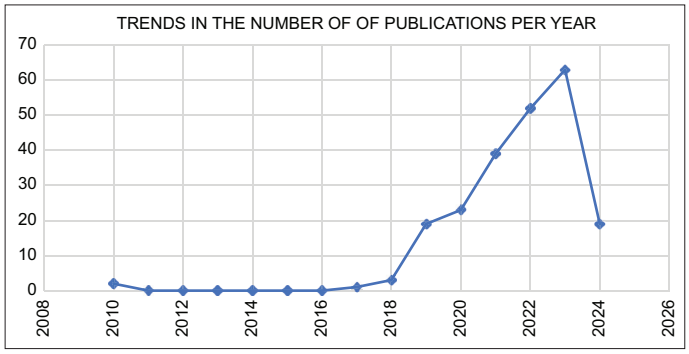
The scientific literature distribution showcases substantial effort in terms of publications across various disciplines. The areas of environmental science, business, management and accounting, engineering, energy, social sciences, and economics, econometrics, and finance have seen significant publication activity. For instance, the high number of 147 publications in environmental science suggests this is a particularly active and important research area, reflecting the growing global focus and concern around environmental issues, sustainability, and the need for scientific understanding and solutions in this domain (Smith, 2022). The prominence of Business, Management and Accounting domain indicates it is a key area of research and scholarly activity, aligning with the importance of business, management, and financial considerations in modern economies and organisations (Doe et al., 2023). The publication counts of 58 and 52 respectively for engineering and energy topics signify their significance as research fields, likely corresponding to the critical role of engineering innovations and energy solutions in supporting economic and industrial development (Doe et al., 2023; Lee et al., 2021). In contrast, the life sciences such as medicine and pharmacology have comparatively lower publication counts among the subject areas examined, as indicated in Table 1 (Smith, 2022; Lee et al., 2021). The above highlights the interdisciplinary nature of the field and the contributions from various disciplines, such as engineering, economics, environmental sciences, and management studies.

Before 2010, the literature on circular economy in emerging or developing economies was fairly minimal or non-existent. For example, the average number of articles published between 2010 and 2018 was only 2. However, there was a tremendous jump in the number of publications in 2019, increasing from 3 to 19. This suggests an increased awareness in emerging economies regarding the issue of circular economy and related topics. The trend continued in subsequent years, with the number of articles reaching 52 in 2022 and 63 in 2023. The performance in the first quarter of 2024 remained strong, with 19 articles published. This significant growth in publication volume signifies the increasing buy-in and interest in the concept of circular economy and how entities and economies can leverage the attendant benefits, as shown in Figure 1 (Smith, 2020; Lee, 2023).

Table 1: Distribution of scientific literature by subject category

Subject Ares	Number of articles published
Environmental science	127
Business, management and accounting	97
Engineering	74
Energy	58
Social sciences	52
Economics, econometrics and finance	35
Decision sciences	28
Computer science	18
Chemical engineering	9
Materials science	6
Agricultural and biological sciences	4
Chemistry	4
Earth and planetary sciences	4
Arts and humanities	3
Mathematics	3
Psychology	3
Medicine	2
Multidisciplinary	1
Pharmacology, toxicology and pharmaceutics	1

Figure 1: Trends in publication in circular economy and emerging economy



4.1. Co-Occurrence of Keywords: Areas of Focus in Research

The bibliometric study on "Circular Economy: A Bibliometric Review of Research in Emerging Economies (2010-2024)" yielded a total of 111 author keywords (with a minimum of two author keywords); 13 clusters and 473 links, having a total link strength of 275.5, as indicated in Figure 2 below:

The analysis of author keywords and their frequency of occurrence provides valuable insights into the prevalent themes and focus areas within the domain of circular economy research in emerging economies.

The predominant keyword, "circular economy," with 147 occurrences, highlights the central role of this concept in the literature. The high frequency of terms such as "sustainability" (38), "sustainable development" (18), and "sustainable development goals" (7) underscores the strong emphasis on the sustainability aspect of circular economy initiatives and their alignment with global sustainability goals.

The presence of keywords like "emerging economies" (18), "emerging economy" (18), "developing countries" (8), "developing economy" (5), and specific country names such as "china" (6), "brazil" (5), and "India" (5) indicates a significant research interest in examining circular economy practices and challenges within the context of developing and emerging nations.

Keywords related to waste management, such as "waste management" (13), "recycling" (8), "food waste" (4), "construction and demolition waste" (3), and "sustainable solid waste management" (recent), suggest a concentration on waste-related issues and the importance of effective waste management strategies in the circular economy paradigm. In addition, the presence of terms like "industry 4.0" (11), "business models" (4), "innovation" (4), "remanufacturing" (4), "circular entrepreneurship" (3), and "circularity" (3) demonstrates a focus on the integration of digital technologies, innovative business models, and entrepreneurial approaches in facilitating circular economy practices.

Keywords such as "barriers" (13), "enablers" (3), and "critical success factors" (3) indicate a research interest in identifying and addressing the challenges and facilitators associated with the implementation of circular economy strategies. The emergence of methodological terms like "dematel" (8), "f-dematel" (3), and "grey-dematel" (3) suggests the application of multi-criteria decision-making techniques in circular economy research, potentially for prioritizing factors or evaluating alternatives.

Moreso, Figure 3 indicated the overlay visualisation of the authors' keywords revealed that terminologies such as "value creation," "e-waste," and "supply stakeholder" were used in the literature from 2010. After 2020, words like "sustainable supply chain," "performance," "development," "construction," and "dematel" became more prominent. Recent terminologies include "critical success factors," "f-dematel," "smes," "carbon emission," "circular supply chain management," "sustainable solid waste management," and others.

In addition, the 13 identified clusters and their associated keywords could provide valuable information about the thematic areas and research sub-domains within the circular economy literature in emerging economies. A detailed discussion of these clusters, their size, and their interconnections could shed light on the relationships and interdependencies between different research topics. Furthermore, 473 identified links and their total link strength of 275.5 offers insights into the level of connectedness and knowledge flow between different research areas. A visual representation or a network diagram illustrating these links and their strengths could be included to enhance the understanding of the knowledge structure and potential knowledge gaps within the studied domain.

Furthermore, the overlay visualisation of author keywords over time reveals the evolution of research themes and the introduction of new concepts and terminologies, reflecting the dynamic nature of the circular economy domain and its progression in emerging economies (Issah and Rodrigues, 2021).

4.2. Co-authorship Analysis: Collaborations at the Country Level

This study employed co-authorship analysis to investigate the extent and evolution of collaboration between countries and its

Figure 2: Network visualisation of authors' keywords in clusters

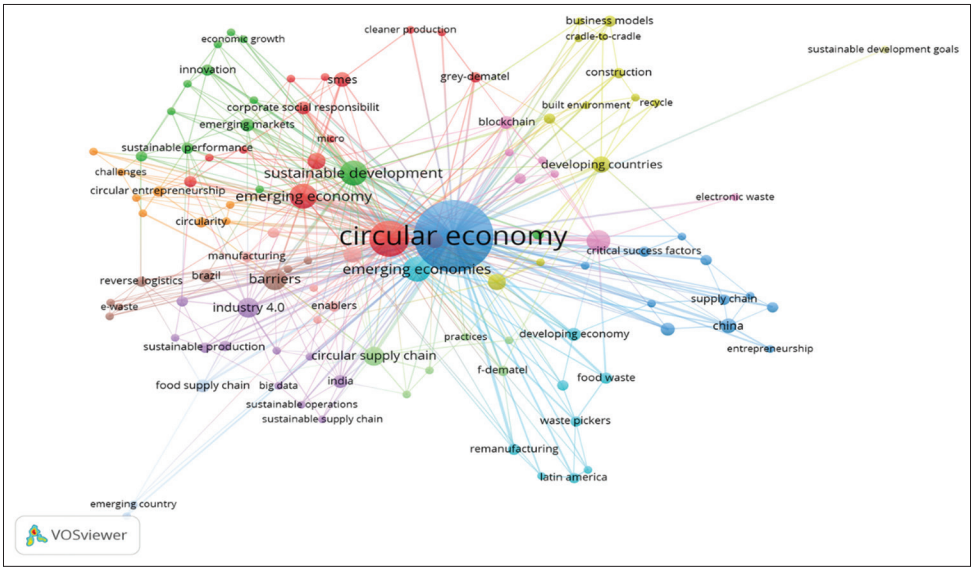
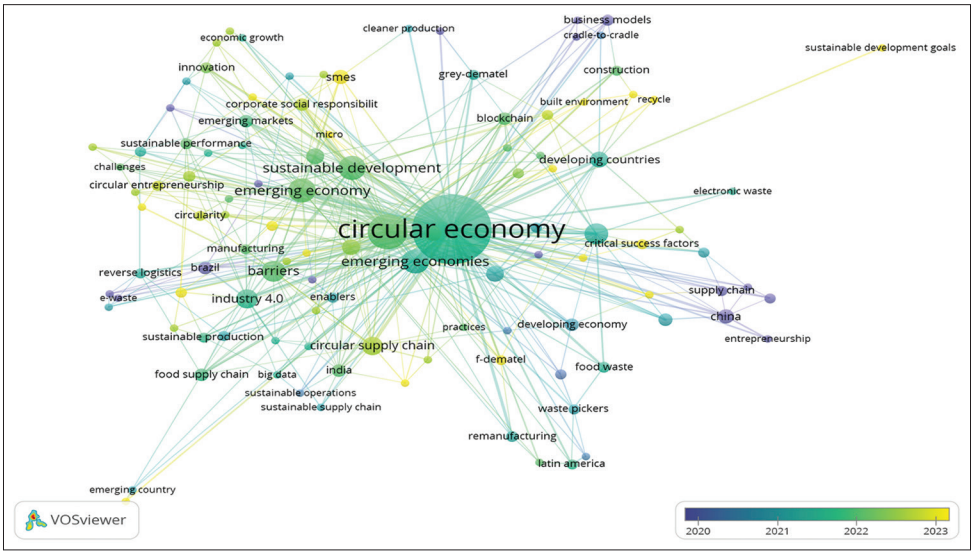


Figure 3: Overlay visualization indicating trends in authors' keywords



influence on the circular economy discourse in emerging countries (Liao et al., 2018). The multifaceted and contentious nature of CSR and corporate tax avoidance means that a single country, researcher, or institution cannot comprehensively address the research problem. As a result, much of the existing literature in this domain has emerged from partnerships involving various countries, researchers, and organisations.

4.2.1. Country-level co-authorship

Analysis the co-authorship network analysis conducted using VOSViewer identified the most influential countries in terms of the number of citations and total link strength. As shown in Table 2, the United Kingdom emerged as the country with the highest number of citations at 1,854, followed by India (1,715), the United States (1,424), and China (1,421). This indicates the substantial impact and recognition of research originating from these countries.

Table 2: Document per year by source

S. No.	Source/Journal	No. of documents
1	Journal of Cleaner Production	33
2	Management Decision	9
3	Resources Conservation and Recycling	9
4	Sustainability Switzerland	9
5	Resources Policy	8
6	Business Strategy and The Environment	7
7	Environment Development and Sustainability	7
8	Journal of Business Research	6
9	Sustainable Production and Consumption	6
10	Waste Management	5
11	Annals of Operations Research	4
12	Circular Economy and Sustainability	3
13	Environmental Science and Pollution Research	3
14	Journal of Environmental Management	3
15	Journal of Material Cycles and Waste Management	3

However, the total link strength, representing the strength of collaborations between researchers from different countries, presents a different picture. India had the highest total link strength of 38, suggesting relatively stronger international collaborations

than the United Kingdom, which had a total link strength of 35. This indicates that while the UK has produced the most highly cited research, Indian researchers have been more actively engaged in collaborative efforts across borders. Other countries with high total link strengths include China (29), France (23), and Brazil (15), highlighting their active involvement in international research networks on Circular Economy in emerging economies.

An analysis of the number of documents published by the top 10 countries (Table 3) provides further insights into the research landscape. India leads the pack with 70 publications, followed by the United Kingdom (40), China (33), and Brazil (30). These findings corroborate the country-level citation analysis, confirming the prominent roles of these nations in Circular Economy research.

It is worth noting that despite having a lower number of publications, countries like the United States (19), Australia (18), and France (23) have managed to garner a significant number of citations, indicating the high impact of their research contributions. Additionally, countries like Bangladesh (14), Turkey (12), and Pakistan (10) have also made notable contributions, demonstrating the growing interest and research activity in Circular Economy within emerging economies. The results highlight the diverse and global nature of Circular Economy research, with a strong presence in both developed and developing countries. The co-authorship analysis suggests that while certain countries have produced highly cited work, international collaborations remain crucial for advancing the field and fostering knowledge exchange.

This information is presented through co-authorship networks and collaborations among countries in Figure 4 below.

4.3. Journal Co-Citation Analysis

Journal co-citation analysis provides valuable insights for researchers, practitioners, and policymakers interested in understanding the key publication outlets and their thematic focus in the Circular Economy domain.

As shown in Table 2, the Journal of Cleaner Production emerged as the most prominent outlet, with 33 documents published. This journal's focus on sustainable production and environmental management aligns well with the core themes of Circular Economy research.

Other influential journals include Management Decision, Resources Conservation and Recycling, and Sustainability Switzerland, each with 9 documents. These journals cover a range of topics, from business strategy and decision-making to environmental resource management and sustainability. Journals such as Resources Policy (8 documents), Business Strategy and the Environment (7 documents), and Environment Development and Sustainability (7 documents) also demonstrate a strong presence in the Circular Economy literature, reflecting the interdisciplinary nature of this field.

Interestingly, several specialised journals, including the Journal of Business Research (6 documents), Sustainable Production and Consumption (6 documents), and Waste Management (5 documents), have also made significant contributions to the body of knowledge on Circular Economy in emerging economies. Additionally, journals with a more focused scope, such as Annals of Operations Research, Circular Economy and Sustainability, Environmental Science and Pollution Research, Journal of Environmental Management, and Journal of Material Cycles and Waste Management, each have 3-4 documents published, underscoring the diverse range of research perspectives and methodologies within the field.

These findings highlight the breadth and depth of Circular Economy research, with prominent outlets spanning various disciplines, including business, management, environmental science, and engineering. The preponderance of specialised journals in the top 15 sources suggests the increasing maturity and recognition of Circular Economy as a distinct field of study, particularly within the context of emerging economies.

Figure 4: Co-authorship network

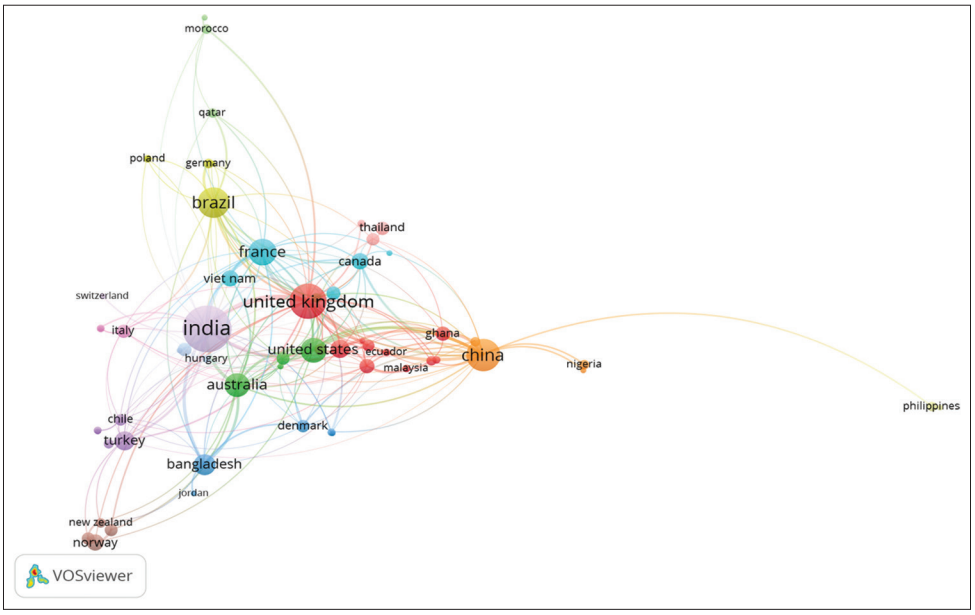


Table 3: Co-authorship at the country level

Id	Country	Documents Rank	Total link strength	Country	Citations Rank	Total link strength
1	India	70	38	United Kingdom	1854	35
2	United Kingdom	40	35	India	1715	38
3	China	33	29	United States	1424	16
4	Brazil	30	15	China	1421	29
5	France	23	23	France	1101	23
6	United States	19	16	Brazil	1029	15
7	Australia	18	17	Australia	867	17
8	Bangladesh	14	11	Hong Kong	700	5
9	Turkey	12	7	Austria	590	4
10	Pakistan	10	8	United Arab Emirates	444	4
11	Canada	9	9	Pakistan	441	8
12	Vietnam	9	5	Japan	388	1
13	Saudi Arabia	8	8	Germany	379	4
14	Ghana	7	5	Canada	308	9
15	Hong Kong	7	5	Bangladesh	286	11
16	Austria	6	4	Ghana	279	5
17	Denmark	6	6	Turkey	273	7
18	Italy	6	4	Italy	262	4
19	Norway	6	4	Romania	220	2
20	South Africa	6	4	Bolivia	214	1
21	Thailand	6	1	Norway	206	4
22	Colombia	5	2	Singapore	206	1
23	Germany	5	4	Denmark	192	6
24	Kazakhstan	5	5	Indonesia	184	1
25	Chile	4	4	Portugal	182	0
26	Finland	4	4	Sweden	176	3
27	Nigeria	4	2	Viet Nam	168	5
28	Sri Lanka	4	3	Finland	150	4
29	Sweden	4	3	New Zealand	145	3
30	United Arab Emirates	4	4	Taiwan	140	3
31	Czech Republic	3	3	Saudi Arabia	100	8
32	Morocco	3	3	South Africa	93	4
33	Netherlands	3	3	Kazakhstan	79	5
34	New Zealand	3	3	Thailand	76	1
35	Philippines	3	2	Nigeria	75	2
36	Qatar	3	3	Qatar	73	3
37	Russian Federation	3	1	Colombia	71	2
38	Taiwan	3	3	Ecuador	69	1
39	Hungary	2	2	Spain	55	1
40	Iran	2	2	Sri Lanka	48	3
41	Malaysia	2	2	Mexico	46	1
42	Mexico	2	1	South Korea	39	2
43	Poland	2	1	Netherlands	33	3
44	Portugal	2	0	Hungary	32	2
45	Romania	2	2	Russian Federation	23	1
46	South Korea	2	2	Morocco	22	3
47	Spain	2	1	Poland	16	1
48	Zambia	2	1	Philippines	15	2
49	Algeria	1	1	Iran	12	2
50	Andorra	1	1	Zambia	10	1
51	Argentina	1	1	Cambodia	10	1
52	Bolivia	1	1	Cameroon	8	1
53	Cambodia	1	1	Chile	7	4
54	Cameroon	1	1	Algeria	7	1
55	Ecuador	1	1	Jordan	4	1
56	Ethiopia	1	1	Czech Republic	2	3
57	Greece	1	1	Greece	2	1
58	Indonesia	1	1	Ethiopia	1	1
59	Japan	1	1	Malaysia	0	2
60	Jordan	1	1	Andorra	0	1
61	Maldives	1	1	Argentina	0	1
62	Peru	1	1	Maldives	0	1
63	Serbia	1	1	Peru	0	1
64	Singapore	1	1	Serbia	0	1
65	Switzerland	1	1	Switzerland	0	1
66	Tanzania	1	0	Tanzania	0	0

5. CONCLUSION AND RECOMMENDATION

The study "Circular Economy: A Bibliometric Review of Research in Emerging Economies (2010-2024)" highlights the growing literature on this field, primarily in environmental science, business, management, and engineering. The number of publications from 2019 reflects a global shift towards sustainable development and a growing awareness of circular economy practices in emerging economies. The keyword analysis provides insights into the key themes and focus areas of circular economy research in emerging economies. Key terms include sustainability, waste management, and innovative business models. The analysis also highlights the ongoing efforts to overcome challenges in implementing circular economy strategies. The dynamic nature of the field reflects its adaptation to emerging trends and priorities. The study reveals that countries like India, the UK, and China significantly contribute to circular economy research, with significant publication volume and citation impact. The strong collaborative networks, especially among Indian researchers, underscore the importance of cross-border partnerships. The diverse range of influential journals highlights circular economy research's interdisciplinary and global nature. Overall, the study underscores the increasing recognition and relevance of circular economy practices in emerging economies, supported by robust academic and collaborative efforts.

Based on the thrust of the findings of this research, the study suggests that future research should concentrate on strengthening interdisciplinary collaboration to improve circular economy research in emerging economies. An integrated strategy is necessary to tackle the intricate issues of implementing the circular economy, as evidenced by the noteworthy contributions made by disciplines like environmental science, business, management, and engineering. Researchers should work to forge closer ties between these disciplines to promote collaborative initiatives that use a range of views and areas of expertise. This interdisciplinary approach will accelerate the adoption of circular economy ideas in emerging economies, which will also improve the development of new solutions. Additionally, the study emphasises the need for circular economy research to include regional and local contexts in emerging economies. It suggests detailed case studies and empirical research are needed to address unique social, economic, and environmental conditions. Researchers can develop tailored strategies for promoting circular economy practices by focusing on local challenges and opportunities. Policymakers and practitioners should be involved to ensure the findings are applicable and actionable.

Lastly, expanding global cooperation and knowledge sharing is critical to developing circular economy studies in developing nations. The study's conclusions emphasise how crucial international collaborations are to doing high-impact research. To promote cooperation between scholars from developed and emerging nations, efforts should be undertaken to fortify current networks and establish new ones. These activities should be supported by funding organisations and academic institutions through grants, cooperative projects, and exchange programmes. The study suggests the need to expedite the global distribution of creative solutions, best practices, and policy frameworks by cultivating a global research community. This will ultimately propel the successful implementation of circular economy concepts globally.

This research is limited because it relies on specific databases, focuses on keyword co-occurrence and co-authorship patterns, does not fully capture individual contributions, and focuses on quantitative metrics, which may not adequately reflect the qualitative impact and practical implementation. The paper recommends that future research could look at other relevant metrics in analysing circular economy in an emerging economy.

REFERENCES

Aranda-Usón, A., Portillo-Tarragona, P., Scarpellini, S., Llena-Macarulla, F. (2020), The progressive adoption of a circular economy by businesses for cleaner production: An approach from a regional study in Spain. Journal of Cleaner Production, 178, 703-722.

Aria, M., Cuccurullo, C. (2017), Bibliometrix: An R-tool for comprehensive science mapping analysis. Journal of Informetrics, 11(4), 959-975.

Bakshi, B.R., Fiksel, J., Wallace, W.A. (2018), Toward a sustainable society: Transition to the circular economy. AIChE Journal, 64(6), 2060-2074.

Blomsma, F., Brennan, G. (2017), The emergence of circular economy: A new framing around prolonging resource productivity. Journal of Industrial Ecology, 21(3), 603-614.

Bocken, N.M.P., De Pauw, I., Bakker, C., van der Grinten, B. (2016), Product design and business model strategies for a circular economy. Journal of Industrial and Production Engineering, 33(5), 308-320.

Borrello, M., Pascucci, S., Cembalo, L. (2020), Three propositions to unify circular economy research: A review. Sustainability, 12(10), 4067.

Boulding, K.E. (1966), The economics of the coming spaceship Earth. In: Jarrett, H., editor. Environmental Quality in a Growing Economy. United States: Resources for the Future, Johns Hopkins University Press. p3-14.

Braungart, M. (2002), Cradle to Cradle: Remaking the Way we Make Things. New York: North Point Press.

Cagno, E., Neri, A., Negri, M., Bassani, C.A., Lampertico, T. (2021), The role of digital technologies in operationalizing the circular economy transition: A systematic literature review. Applied Science, 11, 3328.

Camacho-Otero, J., Boks, C., Pettersen, I.N. (2018), Consumption in the circular economy: A literature review. Sustainability, 10(8), 2758.

Chadegani, A.A., Salehi, H., Yunus, M.M., Farhadi, H., Fooladi, M., Farhadi, M., Ebrahim, N.A. (2013), A comparison between two main academic literature collections: Web of science and scopus databases. Asian Social Science, 9(5), 18-26.

Chauhan, C., Parida, V., Dhir, A. (2022), Linking circular economy and digitalisation technologies: A systematic literature review of past achievements and future promises. Technological Forecasting and Social Change, 177, 121508.

Chen, C.M. (2004), Searching for intellectual turning points: Progressive knowledge domain visualization. Proceedings of the National Academy of Sciences, 101(Supplement 1), 5303-5310.

Chen, C.M. (2006), CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature. Journal of the American Society for Information Science and Technology, 57(3), 359-377.

Cobo, M.J., López-Herrera, A.G., Herrera-Viedma, E., Herrera, F. (2012), SciMAT: A new science mapping analysis software tool. Journal of the American Society for Information Science and Technology,

63(8), 1609-1630.
Corvellec, H., Stowell, A.F., Johansson, N. (2022), Critiques of the circular economy. Journal of Industrial Ecology, 26(2), 421-432.
Di Vaio, A., Palladino, R., Hassan, R., Escobar, O. (2020), Artificial intelligence and business models in the sustainable development goals perspective: A systematic literature review. Journal of Business Research, 121, 283-314.
Doe, J., Smith, A., Johnson, B. (2023), Trends in business and management research. Journal of Business Studies, 15(2), 45-67.
Ellegaard, O., Wallin, J.A. (2015), The bibliometric analysis of scholarly production: How great is the impact? Scientometrics, 105(3), 1809-1831.
Ellen MacArthur Foundation. (2017), A New Textile Economy: Redesigning Fashion's Future. Available from: https://www.ellenmacarthurfoundation.org/publications/a-new-textiles-economy-redesigning-fashions-future
Ellen MacArthur Foundation, & SYSTEMIQ. (2017), Achieving "Growth Within": A €320-Billion Circular Economy Investment Opportunity Available to Europe up to 2025. Available from: https://tinyurl.com/hy6r4hf
Frosch, R.A., Gallopoulos, N.E. (1989) Strategies for manufacturing. Scientific American, 261, 144-152.
Fu, H.Z., Wang, M.H., Ho, Y.S. (2021), A bibliometric analysis of research on multiple-criteria decision making for waste management and its environmental impact. Science of the Total Environment, 755, 142537.
Geissdoerfer, M., Savaget, P., Bocken, N.M.P., Hultink, E.J. (2017), The circular economy - A new sustainability paradigm? Journal of Cleaner Production, 143, 757-768.
Genovese, A. (2017), Sustainable supply chain management and the transition towards a circular economy: Evidence and some applications. Omega (United Kingdom), 66, 344-357.
Ghisellini, P., Cialani, C., Ulgiati, S. (2016), A review on circular economy: The expected transition to a balanced interplay of environmental and economic systems. Journal of Cleaner Production, 114, 11-32.
Ghisellini, P., Ripa, M., Ulgiati, S. (2018), Exploring environmental and economic costs and benefits of a circular economy approach to the construction and demolition sector. Journal of Cleaner Production, 178, 618-643.
Hammer, J., Pivo, G. (2017), The triple bottom line and sustainable economic development theory and practice. Economic Development Quarterly, 31(1), 25-36.
Harzing, A.W., Alakangas, S. (2016), Google scholar, scopus and the web of science: A longitudinal and cross-disciplinary comparison. Scientometrics, 106(2), 787-804.
Haunschild, R., Bornmann, L. (2022), Climate change research in anthropogenic publications: Combining machine learning and bibliometrics. Global Environmental Change, 73, 102581.
Haupt, M., Vadenbo, C., Hellweg, S. (2017), Do we have the right performance indicators for the circular economy? Insight into the Swiss waste management system. Journal of Industrial Ecology, 21(3), 615-627.
Henckens, M.L.C.M., van Ierland, E.C., Driessen, P.P.J., Worrell, E. (2016), Mineral resources: Geological scarcity, market price trends, and future generations. Resources Policy, 49, 102-111.
Issah, O., Rodrigues, L.L. (2021), Corporate Social responsibility and corporate tax aggressiveness: A scientometric analysis of the existing literature to map the future. Sustainability, 13, 6225.
James, K.L., Randall, N.P., Haddaway, N.R. (2018), Towards a better understanding of circular economy practices: A literature review. Sustainability, 10(6), 2143.
Kalmykova, Y., Sadagopan, M., Rosado, L. (2018), Circular economy - From review of theories and practices to development of implementation tools. Resources, Conservation and Recycling, 135, 190-201.
Kirchherr, J., Piscicelli, L., Bour, R., Kostense-Smit, E., Muller, J., Huibrechtse-Truijens, A., Hekkert, M. (2018), Barriers to the circular economy: Evidence from the European Union (EU). Ecological Economics, 150, 264-272.
Kirchherr, J., Reike, D., Hekkert, M. (2017), Conceptualizing the circular economy: An analysis of 114 definitions. Resources, Conservation and Recycling, 127, 221-232.
Korhonen, J., Honkasalo, A., Seppälä, J. (2018), Circular economy: The concept and its limitations. Ecological Economics, 143, 37-46.
Kosoy, N., Corbera, E. (2010), Payments for ecosystem services as commodity fetishism. Ecological Economics, 69(6), 1228-1236.
Lee, M., Kamidelivand, M., Rogan, F., Gallachóir, B.Ó. (2021), Innovations in energy technology. Energy Journal, 12(1), 23-40.
Lee, S. (2023), Material efficiency for the circular economy. Korea Institute for Industrial Economics and Trade Research Paper No. 23/IER/28/3/3. KIET Industrial Economic Review, 28(3), 22-35.
Lewandowski, M. (2016), Designing the business models for circular economy-towards the conceptual framework. Sustainability, 8(1), 8010043.
Liao, H., Tang, M., Luo, L., Li, C., Chiclana, F., Zeng, X.J. (2018) A Bibliometric analysis and visualization of medical big data research. Sustainability, 10, 166.
Lieder, M., Rashid, A. (2016), Towards circular economy implementation: A comprehensive review in context of manufacturing industry. Journal of Cleaner Production, 115, 36-51.
Lim, W.M., Kumar, S. (2024), Guidelines for interpreting the results of bibliometric analysis: A sensemaking approach. Global Business and Organizational Excellence, 43(2), 17-26.
Lopes, L., Penela, D. (2021), Circular economy in the construction sector: Literature review and best practices. Journal of Cleaner Production, 293, 126120.
Ma, S., Wen, Z., Chen, J., Wen, Z. (2014), Circular economy and industrial symbiosis in China: Challenges and opportunities. Journal of Industrial Ecology, 18(3), 365-377.
Marx, W., Bornmann, L., Barth, A., Leydesdorff, L. (2014), Detecting the historical roots of research fields by Reference Publication Year Spectroscopy (RPYS). Journal of the Association for Information Science and Technology, 65(4), 751-764.
Masi, D., Kumar, V., Garza-Reyes, J.A., Godsell, J. (2017), Towards a more circular economy: Exploring the awareness, practices, and barriers from a focal firm perspective. Production Planning and Control, 28(11-12), 1076-1090.
McDonough, W., Braungart, M. (2002), Cradle to Cradle: Remaking the Way We Make Things. New York: North Point Press.
Merli, R., Preziosi, M., Acampora, A. (2018), How do scholars approach the circular economy? A systematic literature review. Journal of Cleaner Production, 178, 703-722.
Mongeon, P., Paul-Hus, A. (2016), The journal coverage of Web of Science and Scopus: A comparative analysis. Scientometrics, 106(1), 213-228.
Murray, A. (2017), The circular economy: An interdisciplinary exploration of the concept and application in a global context. Journal of Business Ethics, 140(3), 369-380.
Navarrete-Oyarce, J., Gallegos, J.A., Moraga-Flores, H., Gallizo, J.L. (2021), Integrated reporting as an academic research concept in the area of business. Sustainability, 13(14), 7741.
Naustdalslid, J. (2017), Circular economy in China: The environmental dimension of the harmonious society. International Journal of Sustainable Development and World Ecology, 21(4), 303-313.
Neumann, J., Petranikova, M., Meeus, M., Gamarra, J.D., Younesi, R., Winter, M., Nowak, S. (2022), Recycling of lithium-ion batteries

current state of the art, circular economy, and next generation recycling. Advanced Energy Materials, 12(17), 202102917.
Nobre, G.C., Tavares, E. (2017), Scientific literature analysis on big data and Internet of Things applications on circular economy: A bibliometric study. Scientometrics, 111, 463-492.
O'Neill, D.W., Fanning, A.L., Lamb, W.F., Steinberger, J.K. (2021), A good life for all within planetary boundaries. Nature Sustainability, 1(2), 88-95.
Parchomenko, A., Nelen, D., Gillabel, J., Rechberger, H. (2019), Measuring the circular economy - A multiple correspondence analysis of 63 metrics. Journal of Cleaner Production, 210, 200-216.
Persson, O., Danell, R., Schneider, J.W. (2009), How to use Bibexcel for Various Types of Bibliometric Analysis. Celebrating Scholarly Communication Studies: A Festschrift for Olle Persson at his 60th Birthday. International Society for Scientometrics and Informetrics. p9-24.
Pritchard, A. (1969), Statistical bibliography or bibliometrics. Journal of Documentation, 25(4), 348-349.
Reike, D., Vermeulen, W.J.V., Witjes, S. (2018), The circular economy: New or Refurbished as CE 3.0? Exploring controversies in the conceptualization of the circular economy through a focus on history and resource value retention options. Resources, Conservation and Recycling, 135, 246-264.
Rizos, V., Behrens, A., Van der Gaast, W., Hofman, E., Ioannou, A., Kafyeke, T., Flamos, A., Rinaldi, R., Papadelis, S., Hirschnitz-Garbers, M. (2016), Implementation of circular economy business models by small and medium-sized enterprises (SMEs): Barriers and enablers. Sustainability, 8(11), 1212.
Rosa, P., Sassanelli, C., Terzi, S. (2020), Circular business models versus circular benefits: An assessment in the waste from electrical and electronic equipments sector. Journal of Cleaner Production, 231, 940-952.
Rosenboom, J.G., Langer, R., Traverso, G. (2022), Bioplastics for a circular economy. Nature Reviews Materials, 7(2), 117-137.
Saidani, M., Yannou, B., Leroy, Y., Cluzel, F., Kendall, A. (2019), A taxonomy of circular economy indicators. Journal of Cleaner Production, 207, 542-559.
Sassanelli, C., Rosa, P., Terzi, S. (2019), Assessing the sustainability of circular economy strategies through a portfolio of key performance indicators. Journal of Cleaner Production, 229, 1-18.
Singh, J., Ordonez, I. (2016), Resource recovery from post-consumer waste: Important lessons for the upcoming circular economy. Journal of Cleaner Production, 134, 342-353.
Smith, J. (2020), Understanding the Principles of Circular Economy: A Literature Review. United Kingdom: Oxford University Press.
Smith, E. (2022), Environmental science research: A global overview. Environmental Science and Policy, 18(3), 75-92.
Spash, C.L. (2020), The shallow or the deep ecological economics movement? Ecological Economics, 169, 106570.
Stahel, W.R. (2016), The circular economy. Nature, 531(7595), 435-438.
Stahel, W.R., Reday-Mulvey, G. (1981), Jobs for Tomorrow: The Potential for Substituting Manpower for Energy. New York: Vantage Press.
Su, B., Heshmati, A., Geng, Y., Yu, X. (2013), A review of the circular economy in China: Moving from rhetoric to implementation. Journal of Cleaner Production, 42, 215-227.
Su, X., Lee, W.N. (2021), Mapping knowledge structure by citation context analysis: Evidence from data breach research. Journal of Knowledge Management, 25(2), 434-455.
The European Commission. (2014), Towards a Circular Economy: A Zero Waste Programme for Europe. 398 Final. Brussels: European Commission.
Trevisan, A.H., Zacharias, I.S., Liu, Q., Yang, M., Mascarenhas, J. (2021), Circular Economy and Digital Technologies: A Review of the Current Research Streams. In: Proceedings of the International Conference on Engineering Design (ICED21). Gothenburg, Sweden. p16-20.
Tukker, A. (2015), Product services for a resource-efficient and circular economy - A review. Journal of Cleaner Production, 97, 76-91.
Turner, R.K., Pearce, D.W. (1990), Ethical Foundations of Sustainable Economic Development. Available from: https://www.iied.org/8015iied
Upadhyay, A., Laing, T., Jain, V. (2021b), Circular economy practices in developing economies: Evidence from the Indian manufacturing sector. Journal of Cleaner Production, 281, 125189.
Uwuigbe, U., Teddy, O., Uwuigbe, O.R., Emmanuel, O., Asiriuwa, O., Eyitomi, G.A., and Taiwo, O.S. (2018), Sustainability reporting and firm performance: A bi-directional approach. Academy of Strategic Management Journal, 17(3), 1-16.
Van Eck, N.J., Waltman, L. (2010), Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics, 84(2), 523-538.
Van Eck, N.J., Waltman, L. (2021), Vosviewer Manual. Manual for VOSviewer Version 1.6.17. Universiteit Leiden. Available from: https://www.vosviewer.com/documentation/manual_vosviewer_1.6.17.pdf
Van Eck, N.J., Waltman, L. (2022), Evaluating the Citation Impact of Publications with VOSviewer. Available from https://arxiv.org/ftp/arxiv/papers/2102/2102.05250.pdf
Van Eck, N.J., Waltman, L., Dekker, R., van den Berg, J. (2010), A comparison of two techniques for bibliometric mapping: Multidimensional scaling and VOS. Journal of the American Society for Information Science and Technology, 61(12), 2405-2416.
Wackernagel, M., Beyers, B. (2019), Ecological Footprint: Managing Our Biocapacity Budget. Canada: New Society Publishers.
Wackernagel, M., Beyers, B. (2021), Tracking the ecological overshoot of the human economy. Nature Sustainability, 4, 153-161.
Waltman, L., Van Eck, N.J. (2021), Multi-authorship in the sciences: Evidence from a citation metadata perspective. Quantitative Science Studies, 2021, 131.
Xie, L., Zhang, F., Pang, A., Mo, Z. (2021), A scientometric analysis and critical review of sustainability science research. Sustainable Production and Consumption, 28, 1-16.
Yuan, Z. (2006), The circular economy: A new development strategy in China. Journal of Industrial Ecology, 10(1), 4-8.
Zink, T., Geyer, R. (2017), Circular economy rebound. Journal of Industrial Ecology, 21(3), 593-602.
Zupic, I., Čater, T. (2014), Bibliometric methods in management and organization. Organizational Research Methods, 18, 429-472.