

Reduce, reuse, recycle: circular economic principles, sustainability and entrepreneurship in developing ecosystems

Reduce, reuse,
recycle

1041

Geetika Madaan

*University Centre for Research and Development (UCRD), Chandigarh University,
Mohali, India*

Amrinder Singh

Jain University (Deemed to be University), Bangalore, India

Amit Mittal

Chitkara Business School, Chitkara University, Rajpura, India, and

Padmakar Shahare

MIT College of Management, MIT ADT University, Pune, India

Received 30 March 2023

Revised 13 June 2023

31 July 2023

18 September 2023

26 December 2023

22 February 2024

8 March 2024

Accepted 13 March 2024

Abstract

Purpose – The circular economy (CE) promotes the recovery of value from waste while also working towards achieving long-term environmentally sustainable goals. The goal of this research is to explore the challenges, opportunities, future scope and green practices that small and medium-sized firms (SMEs) face as they move from the linear economy to the CE.

Design/methodology/approach – Based on a structured questionnaire, a survey was conducted with representatives from 163 SMEs in India. The data were analysed using co-variance based structural equation modelling technique.

Findings – This research identifies various challenges, including consumer acceptability, worries about awareness, recyclability issues, financial constraints and the absence of a defined management plan for SMEs in adopting the CE. Further, strong management will, innovation, technical up-gradation, training of employees, employee motivation and appropriate guidelines are recognized as essential possibilities for CE implementation.

Originality/value – While there has been some work on CE, no studies have directly compared these efforts with the goal of shifting from a linear economy to a CE. Given the transient nature of many archives, it is critical that the efforts put into them and the opinions of those who work in them be recorded so that communities can benefit from a shared linear economy in making decisions about their own history.

Keywords Circular economy, Linear economy, Recycle, Small and medium enterprises (SMEs), Sustainability, Transformation

Paper type Research paper

1. Introduction

There is no one moment or person from where the idea of a circular economy (CE) emerged; rather, it emerged independently in several academic circles (García-Barragán *et al.*, 2019). Various theoretical frameworks, such as industrial ecology, biomimicry and cradle-to-cradle design principles are connected to the idea of a CE (Rada, 2023). CE is based on the findings of industrial ecology, which examines the material and energy fluxes inside industrial processes (Rada, 2023). Biomimicry is the process of building human systems after the successful forms and techniques seen in nature. Cradle-to-cradle design is an approach to product and system development that considers the full extent of the product's or system's impact on the environment over its entire life cycle, from raw material extraction to final



Journal of Small Business and
Enterprise Development
Vol. 31 No. 6, 2024
pp. 1041-1066

© Emerald Publishing Limited
1462-6004

DOI 10.1108/JSBED-01-2023-0009

disposal. All these connected ideas work together to further the cause of the CE development (García-Barragán *et al.*, 2019).

The development and energy of systems in both open and closed states are central to the general systems theory that biologist Ludwig von Bertalanffy developed. The concept was then adapted to various fields, including economics via the concept of the CE (CE). According to Boulding (1966) circular economic system is essential to ensuring the long-term viability of human existence on Earth (Aftenei *et al.*, 2022).

Further, Stahel and Reday (1981) describe how increasing labour may decrease energy-intensive activities, therefore laying the groundwork for the ideas of the CE (Figge *et al.*, 2023). There are other theories – for instance, resource-based view (Kraaijenbrink *et al.*, 2010), the natural resource-based view (Andersén, 2021), stakeholder theory (Kwieceń, 2020), legitimacy or institutional theory (Risi *et al.*, 2023) – that discussed CE in different contexts. For example, in stakeholder theory, CE business models are considered as a specific type of sustainable business models that are mainly oriented towards the responsible use of resources. The specificity of solutions for the CE affects, among others, maintaining relations between enterprises and their stakeholders (Kwieceń, 2020). The existing study is based on the economic theory of reuse, reduce and recycle.

The term CE is an economic system within which the maximum use is extracted from resources and minimum waste is generated for disposal (Deutz, 2019; Centobelli *et al.*, 2023). Researchers have defined sustainability as the balanced integration of economic performance, social inclusiveness and environmental resilience, to the benefit of current and future generations (Geissdoerfer *et al.*, 2017; Prieto-Sandoval *et al.*, 2018; Tapaninaho and Heikkinen, 2022).

This study's goal is to identify Small Medium Enterprises (SMEs) issues, opportunities and future potential as they move from a linear to CE (Abubakari *et al.*, 2021; Suryantini *et al.*, 2021). The linear economy (LE) has been around for a long time, yet it does not promote sustainable growth (Bajnoczki *et al.*, 2021; Rana *et al.*, 2023). There are various challenges associated with the LE, namely, financial losses for businesses, resource price volatility, problems in obtaining necessary materials, using up all of a resource until there are none left, enhanced oversight, costs associated with trash disposal and treatment (Sariatli, 2017; Neves and Marques, 2022). To alleviate the challenges associated with a LE, a transition was deemed necessary, resulting in CE (Sharma *et al.*, 2021; Virmani *et al.*, 2022). The shift from LE to CE for small medium enterprises is not easy, but it is crucial to attaining sustainability goals (Torres-Guevara *et al.*, 2021; Okour *et al.*, 2021).

SMEs are responsible for a significant portion of India's manufacturing sector, and adopting a LE has been shown to be beneficial for SMEs (Singh *et al.*, 2018). The importance of the shift from CE to LE exemplifies the potential and expanded coverage of manufacturing by Indian SMEs (Sharma *et al.*, 2021). One of the primary reasons the authors set out to conduct this research is to learn important information that will aid SMEs in implementing CE and achieving sustainability (Goyal *et al.*, 2018; Sharma *et al.*, 2021). In the study of Sharma *et al.* (2021), the findings suggested that the shift from LE to CE cannot be facilitated by governmental pressure for CE implementation. However, the existing study tried to identify how management will, innovation, technical up-gradation, training of employees, employee motivation and appropriate guidelines are recognized as essential possibilities for CE implementation. This makes the existing research differ from the Sharma *et al.* (2021) study, especially in Indian context. Moreover, diverse issues such as the number of environmental challenges posed by SMEs, lack of research support on existing LE practices and the difficulty of providing assistance to SMEs were identified while transformation to CE (Goyal *et al.*, 2018). The current work aims to address these issues by filling up existing knowledge gaps. Hence, the main purpose of the study is to analyse the most significant challenges, opportunities, future scope and green practices among SMEs and to analyse its impact on

sustainable performance in CE. Further, the mediating role of Transformation from LE to CE was also evaluated.

This study is divided into seven sections. First section has dealt with introduction. Next, [Section 2](#) deals with review of literature. [Section 3](#) discusses research methodology. [Section 4](#) deals with results of the study. [Section 5](#) and [Section 6](#) elaborates with the discussion, conclusion and implications. [Section 7](#) explains the limitations and directions for future research.

2. Conceptualisation, review of literature and hypotheses development

2.1 Criteria for the selection of literature review

This section explains the steps for extraction of documents for analysing the literature in the current domain. Scopus and Web of Science database were used for extraction of documents.

The study included the articles with keywords such as “Circular Economy” AND “Linear Economy” AND “sustainability” OR “sustainable development” from 2010 to 2022 as no studies relating to the current topic were published before 2010. A total of 337 documents in Scopus were retrieved. Articles written in English language were only included in the study. Further, Preferred Reporting Items for Systematic Reviews (PRISMA) and Meta-Analysis techniques were applied for filtering the relevant research papers ([Moher et al., 2009](#)) ([Figure 1](#)). After screening, only 71 articles were analysed for the literature review.

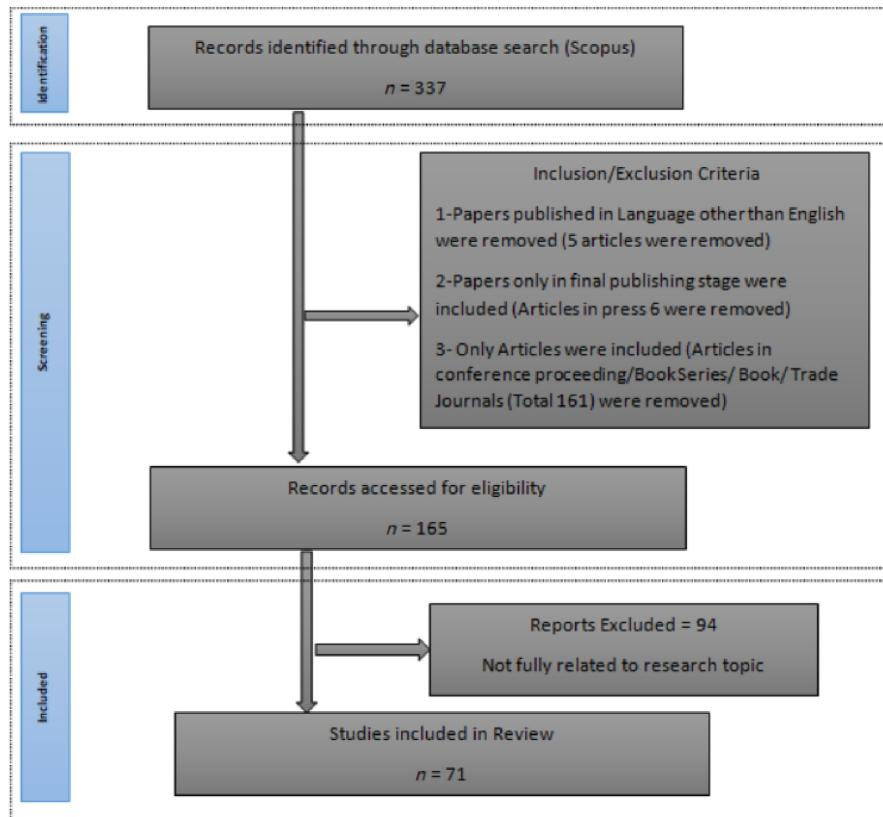


Figure 1.
Criteria for selection of
articles through
[PRISMA flowchart](#)
[Moher et al., 2009](#)

2.2 Linear economy (LE)

The “take, make and dispose” ethos is at the heart of the linear economic paradigm. The process begins with the collection of raw materials and ends with the delivery of finished goods to consumers (Upadhayay and Alqassimi, 2018). These by-products of consumption eventually end up in a landfill or an incinerator (Upadhayay and Alqassimi, 2018). If the current rate of recycling plastic (14% per year) continues, there will be more plastic than fish in the seas by 2050. There is an annual loss to the tourist, shipping, and fishing sectors of \$13 billion due to plastic pollution of the world’s waterways (Kaplan, 2016; Upadhayay and Alqassimi, 2018). There are hundreds of things in this category, including but not limited to aluminium, steel, papers, cans, leathers, oils and fossil fuels (Afteni *et al.*, 2022). As a result of unhealthy rivalry among businesses, product life cycles have been shortened, rendering many things outdated and leading to an increase in garbage that threatens to upset the delicate ecological balance. Resource flow in a LE ends up in the garbage or landfills (Upadhayay and Alqassimi, 2018; Afteni *et al.*, 2022). Despite the obvious drawbacks, many companies continue to use this manufacturing process because of the cheap cost of raw materials brought about by more competition and less necessary regulations and legal consequences (Upadhayay and Alqassimi, 2018).

2.3 Circular economy (CE)

Research into the CE is crucial in assisting with climate change adaptation, and plays a key role in expediting the CE transition throughout the world (Nijman-Ross *et al.*, 2023; Centobelli *et al.*, 2023). The CE promotes a transition away from the conventional extract-produce-dispose economy towards a restorative and regenerative one, with an emphasis on maximising product value throughout its entire life cycle (Upadhayay and Alqassimi, 2018). To reduce waste in the industrial ecosystem and maximize resource use, the CE repurposes products towards the end of their useful lives (Geissdoerfer *et al.*, 2017). The principles of “reuse, recycle, repair and remanufacture” are central to its ethos. Proper waste management is the model’s economic advantage because it fosters a performance economy, prioritizes resource efficiency and places a premium on increasing both nature’s capital and its resilience (Webster, 2017; Afteni *et al.*, 2022). The process through which resources are sent back into the production cycle is given the highest priority. Instead of dumping, CE model prioritize products reuse, recycling, refurbishment and remanufacture (Carissimi *et al.*, 2023).

2.4 Linear economy (LE) to circular economy (CE): transformation phase

All throughout the world’s marketplaces, a new trend known as the CE is beginning to emerge, thus replacing the more traditional LE (Morseletto, 2020). This shift from “Linear to CE” has been emphasized by the European Commission as “the shift towards CE, which aims to keep as much of the value of its goods, materials, and resources in circulation as feasible, and minimizes waste production, which aids EU attempts for a more sustainable, productive, and profitable economy” (Jones and Comfort, 2017). Waste minimization and new chances for value generation are two further benefits of the CE approach (Silva *et al.*, 2019). Numerous nations, both developed and emerging, have voiced their desire to see the CE flourish as an alternative to the more traditional LE (Dey *et al.*, 2020). Making the economic system “regenerative” and “restorative” is central to the goals of CE, which include maximising the use of existing resources (Jones and Comfort, 2017). The LE was shown to be unsustainable, posing a long-term risk to human and non-living creations alike, prompting the realisation that a change to the CE was necessary (Arruda *et al.*, 2021). Contrarily, the LE model will fail to meet the rising demand for resources (Sehnem *et al.*, 2019).

The European Commission cites the CE's ability to prolong the useful life of products and materials as one of its defining characteristics (Corvellec *et al.*, 2022). The result of this phenomenon will be less waste and more material for manufacturing. Despite the promising outcomes of the move from a linear to a CE, this transformation is not without its challenges (Heshmati, 2017). According to research commissioned by the European Commission, businesses and consumers are two of the most important players in the shift towards a CE (Ekins *et al.*, 2019). A new company's journey towards the CE confronts a number of obstacles, including human resource management, financial management, stakeholder management, consumer acceptability concerns and other organisational impediments (Geissdoerfer *et al.*, 2017).

2.5 Sustainable CE in SMEs

The idea of a CE has become one of the most talked-about and significant sustainability notions in recent years (Figge *et al.*, 2023). One solution to the central challenge in sustainable development, which is the unsustainable nature of present resource usage, is to use circular resource use (Malesios *et al.*, 2021). In a broader ecological system with finite resources, the economy exists as an open subsystem (Figge *et al.*, 2023). The two networks rely on one another. Both the ecological system and the economic system influence the ecological system's sources and sinks (Rana *et al.*, 2023). The CE has the potential to integrate both (Figge *et al.*, 2023).

Few concepts in sustainability have been as popular and influential as that of CE. Circular resource use is one of several responses to the un-sustainability of current resource use – a key problem in sustainable development (Tsvetkova *et al.*, 2020). The economy as an open subsystem is embedded in a larger ecological system with limited resources (Unal *et al.*, 2019). Both systems are interdependent. The ecological system provides the physical limits of economic activity and the economic system impacts the sources and sinks of the ecological system (Adamu *et al.*, 2019). The CE promises to combine aspects of both (Shashi *et al.*, 2023).

Many economies throughout the world rely on SMEs as their backbone (Amiri *et al.*, 2023; Rodríguez-Espíndola *et al.*, 2022). Many SMEs are risk-averse because they are under so much pressure to succeed in the market while having so little resources to work with Howard *et al.* (2022), Rodriguez-Espíndola *et al.* (2022). The size of a company is an important consideration since it may modify the results of implementing sustainable practices. Smaller businesses often can't afford to make the necessary expenditure since they have more pressing needs (Rodríguez-Espíndola *et al.*, 2022). The importance of environmental and social elements to the overall performance of SMEs makes it necessary to demonstrate the potential advantages of investing in sustainable projects from several perspectives (Sharma *et al.*, 2021; Soni *et al.*, 2023).

Due to the differences in operations between small and big businesses, the CE models used by the two may be distinct (Goyal *et al.*, 2018). Investment capital, adaptability to change and the regional structure of the markets serviced all play a role in influencing the ways in which SMEs operate (Deutz, 2019). For the latter, while the concept of a CE has been more generally associated with rich nations, it is possible for a CE to flourish in less developed nations as well (Rodriguez-Espíndola *et al.*, 2022). Embracing CE could seem like an insurmountable task in a big growing nation like India, where a major portion of the SME sector is still unorganised and often gets inadequate help from government reform initiatives (Sohal *et al.*, 2022). This study lays out the groundwork for a CE in SMEs in India, centred on a waste-reduction culture that prioritises recycling, reusing, repurposing and product repairs. However, without a plan or strategy for the future, much of this is carried out in a disorganised and informal manner. To shed light on the interplay between CE and its social, technological and environmental contexts, the study consults the socio-technical system (STS) theory. The

study provides evidence from four exemplary SMEs' transitions to CEs, focusing on topics like motivation, strategy/practices and the obstacles/hurdles encountered, based on a qualitative study.

The immense potential and innovation shown by emerging countries make the study of the CE model in their context particularly vital for future growth. However, the function of the CE in these economies is poorly supported by research (Afteni *et al.*, 2022; Sohal *et al.*, 2022). Research on the use of CE by SMEs in developing nations like India is also limited (Sharma *et al.*, 2021). Hence, this article focuses on the challenges, opportunities, future scope and green practices as they move from the linear to CE in SMEs in India.

2.6 Circular economy: potential

In addition to its environmental and economic advantages, CE also has the potential to benefit businesses and workers alike (Kirchherr *et al.*, 2017). Adopting a CE is beneficial in the long run, as shown by research and industry perspectives; It not only keeps resources available, but also decreases waste, both of which are crucial for long-term growth (Korhonen *et al.*, 2018). There have been many case studies conducted in many industries that highlight the potential benefits from adopting CE techniques (Meseguer-Sánchez *et al.*, 2021). Prospects for economic growth, environmental protection, and less waste are the most prominent benefits of the CE. The economic worth of raw materials may be preserved via the adoption of CE initiatives in manufacturing and other sectors (Mazur-Wierzbicka, 2021). As the government and other stakeholders are prepared to recognise the importance of implementing the CE, its advantages over the LE may also be envisioned. Nonetheless, it is possible for smaller facilities and enterprises to take the plunge (Murray *et al.*, 2017). Businesses must embrace the CE since it fosters the development of product differentiation strategies, which in turn aids in the attainment of a competitive edge. Implementation of the CE is being accelerated by government involvement and the neo technological paradigm in the industrial sector (Prieto-Sandoval *et al.*, 2018). With the right kind of strategic leadership, a company's adoption of a business model based on the principles of the CE may result in resource conservation and, in turn, sustainable development over the long term (Purwanto and Prasetyo, 2021). An analysis of the automotive industry demonstrates that the CE's techniques, such as reuse, significantly reduce the price of sheet metal waste, making it a money-saving strategy as well (Hosseiniyan *et al.*, 2021).

2.7 Circular economy: challenges

Several well-established obstacles hinder the successful implementation of the shift from the linear to the CE (Sariati, 2017). The challenges of CE have been the subject of a number of studies. Yaduvanshi and Krishnamurthy (2016) authored one India focussed study and stated that "Indian waste management practices are less effective. Adapting CE practices, educating/increasing awareness of effective waste management methods go a long way towards accepting new sustainability policies and practices." One of the basic tenets of CE is the recovery of value from consumables and other materials that have reached the end of their useful lifecycles via waste management and recycling efforts (Geissdoerfer *et al.*, 2017; Sehnem *et al.*, 2019; Velenturf and Purnell, 2021; Afteni *et al.*, 2022). However, some emerging nations are unable to manage their trash because of several obstacles. There is a shortage of resources, people aren't aware of it, the policy framework isn't clear, and there isn't enough information (Afteni *et al.*, 2022). There are various obstacles that may be put in the way of a successful CE, such as the need for high-quality technology, well-thought-out designs and cutting edge technologies including a competent workforce in order to implement strategies of reuse and remanufacturing (Ioannidis *et al.*, 2021). Huge capital needs, greater initial cost for upgrading facilities, risk and indeterminacy and the absence of authoritative structures

and regulations are just a few of the other important challenges to implementing a CE. It has been shown via research that environmental and regulatory uncertainty in the business world impedes the adoption of the CE since it does not foster a favourable attitude among managers (Velenturf and Purnell, 2021). One study used a systematic literature review to examine the challenges faced by the CE (Michelini *et al.*, 2017). It found that the law, the economy, the academic system, the training system, the availability of funds and the mentality of management towards the CE all pose significant hurdles for businesses making in order to switch from LE to CE (Morseletto, 2020).

SMEs manage a significant portion of manufacturing and production, making them crucial to the economies of both industrialised and developing countries (Chizayfard *et al.*, 2021) though the bulk of environmental degradation may be attributed to these SMEs (Bajnoczki *et al.*, 2021). As a result, SMEs' adoption of CE is critical, and further study is needed to identify the most important aspects that might aid in this adoption and attract the attention of academics. While there is some research linking SMEs with CE, it is determined to be quite limited via the literature review.

In the context of emerging countries like India's SMEs and the adoption of CE, the search turned up just two studies (Production and Harisekar, 2021; Malik *et al.*, 2022). There is a dearth of studies examining the CE in the Indian setting.

Over the last decade, a plethora of works on the CE have been published. However, there is little literature describing the steps necessary for businesses to begin using CE as they make the transition to it. Research of the existing literature has led to the conclusion that quantitative evaluation studies are quite uncommon. For the existing study quantitative methods are important to apply as it offers a systematic and rigorous approach to research that allows for objective measurement, analysis, and interpretation of data, making existing study well suited for addressing a wide range of research questions. Much of the research relies on conceptual themes, theoretical frameworks or single and multiple case studies with large sample sizes. Lastly, no research has been identified that provides a comprehensive overview of the opportunities, challenges and requisites for the shift from the linear to the CE, especially as it pertains to Indian SMEs.

Research questions have been defined in the existing study:

- RQ1. What are the challenges, opportunities and future scope in a circular economy?
- RQ2. What is the impact of green practices towards the SMEs' sustainable performance in a circular economy?
- RQ3. How does transformation from linear economy to circular economy mediates the relationship between endogenous and exogenous variables?

2.8 Hypotheses of the study

- Ha1. Transformation from LE to CE mediates the relationship between opportunities and sustainable performance.
- Ha2. Transformation from LE to CE mediates the relationship between challenges and sustainable performance.
- Ha3. Transformation from LE to CE mediates the relationship between future scope and sustainable performance.
- Ha4. Transformation from LE to CE mediates the relationship between green practices and sustainable performance.

3. Methodology

The existing study aims to provide information on the challenges, opportunities, future scope and green practices for the transformation from an LE to a CE. The present study is exploratory and descriptive in nature and purposive sampling technique is used in the study. Purposive sampling technique is applied, as the researcher relies on his own judgement to choose the sample from the population. A standardized questionnaire administered for the survey and distributed among 244 senior management employees of Indian SMEs from Delhi, NCR. Permission from human resource department of each SME was obtained prior to distribution of questionnaire. Out of 244 questionnaires, 163 filled questionnaires were received hence generating an overall response rate of 66.8%. The questions were measured on a five-point Likert scale. The list of items and source from where the questions were adopted are illustrated in [Table 1](#).

Based on the literature review, the study proposes a conceptual framework to analyse the mediating impact of transformation from LE to CE between the exogenous and endogenous variables ([Samadhiya et al., 2023](#)). The study also validates the relationship and understands the reasons of their association along with exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The rationale behind choosing EFA and CFA is that scale adaptation research often uses both confirmatory and exploratory factor analyses. [Orcan \(2018\)](#) proposes using EFA if the link between the items is unknown, whereas CFA should be used if the association has been evaluated and the factors and associated items are known. The employment of these techniques, and the sequence in which they were used, varied considerably from one research of scale adaptation to the next ([Orcan, 2018](#)).

The existing study proposes the following conceptual framework of transformation from LE to CE in [Figure 2](#).

4. Results

The results of the study started with estimation of demographic characteristics of respondents ([Table 2](#)) and then descriptive statistics (mean and standard deviation) ([Table 3](#)) of the survey variable conducted. The reliability test for each variable encompassing 5 to 4 ([Table 4](#)) statement was analysed. Thereafter, KMO, Bartlett's test and exploratory factor analysis was applied to analyse the factors for the study ([Table 5](#), [Table 6](#), [Table 7](#)). Total 6 factors were identified ([Table 7](#)).

To measure the internal consistency among the set of items in a group ([Table 4](#)), it is found that the scale is reliable as estimated value of Cronbach's alpha is greater than acceptable threshold limit which is 0.60 ([Rana et al., 2023](#)). Internal consistency is present in all the latent and mediating variables, namely, opportunities in CE ($n = 5$, 0.849), challenges in CE ($n = 4$, 0.928), future scope in CE ($n = 4$, 0.829), green practices followed by small and medium enterprises ($n = 4$, 0.833), transformation from LE to CE ($n = 4$, 0.922) and sustainable performance of small medium enterprises ($n = 4$, 0.818).

[Table 5](#) conducted the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy to assess the strength of the partial correlation among the variables and stated the estimated value of KMO is 0.887 which is close to acceptable threshold limit of 1. Bartlett's test of sphericity depicts whether the sample size is large enough to perform Factor analysis and found significant at 0.000.

This means that the original number of factors is equal to the number of variables utilized in factor analysis. Though there will be some changes, the 25 variables will not all be eliminated. Only the top six variables will be preserved. As a result ([Table 6](#)), the current and all previous components together account for the total percentage of variation of 76.470%.

The Pearson correlations between "factors" and "items" are included in the rotated component matrix ([Table 7](#)). These are called factor loadings, and they enable us to see which

S. No.	Codes	Latent variables and mediating variables of the study	References	Reduce, reuse, recycle
1	CCEa	Remanufacturing is an expensive endeavour	Arruda <i>et al.</i> (2021), Unal <i>et al.</i> (2019)	
2	CCEb	There was a lack of “management will” to implement CE	Morales and Belmonte-Urena (2021)	
3	CCEc	Inability to reuse the material due to a lack of technology	Meseguer-Sánchez <i>et al.</i> (2021)	
4	CCEd	Recycling is challenging since it depends on the substance. Not every company can recycle since it relies on the nature of waste	Ragossnig and Schneider (2019)	
5	OCEe	SMEs are concerned about the environment. Moreover, SMEs are interested in implementing CE	Dey <i>et al.</i> (2020)	
6	OCEf	The 3 Rs (reduce, reuse and recycle) are beneficial for gaining a competitive edge	Ioannidis <i>et al.</i> (2021)	
7	OCEg	Recycling campaigns might be effective in attracting customers in a few instances	Ragossnig and Schneider (2019)	
8	OCEh	CE contributes to the achievement of long-term sustainability	Henriques <i>et al.</i> (2022)	
9	OCEi	The reuse of materials is beneficial to resource conservation; however, it is dependent on the item being reused	Cooper and Gutowski (2017)	
10	FSCEj	To make the shift to a CE, it is necessary to invest in new technologies and upgrade existing ones	Reike <i>et al.</i> (2017)	
11	FSCEk	It is necessary for the government to intervene in order to give assistance to SMEs in their efforts to adopt CE	Hartley <i>et al.</i> (2020)	
12	FSCEl	SMEs must educate their clients and consumers about the advantages of recycled items and other environmentally friendly activities	Rizos <i>et al.</i> (2016)	
13	FSCEm	SMEs and customers need incentive. SMEs might be encouraged to adopt CE practices by offering tax breaks	Deyganto (2022)	
14	SMEGn	SMEs are not well-versed in CE terminology. However, they are aware of a number of environmentally friendly projects	Bianchi (2014), Choi <i>et al.</i> (2018)	
15	SMEGo	Government pressure alone will not be enough to bring about CE adoption	Daniel (2019)	
16	SMEGp	Utilization of non-traditional raw materials (For example, in the furniture industry, more iron is used than wood)	Hartini <i>et al.</i> (2019)	
17	SMEGq	Keeping single-use plastics to a minimum	Herberz <i>et al.</i> (2020)	
18	TLECEr	Government assistance, rather than government coercion, is essential in order to make the shift from LE to CE	Sariati (2017)	
19	TLECEs	Human reckless consumerism has a greater negative impact on the environment than industrial activity	Chizaryfard <i>et al.</i> (2021)	
20	TLECEt	Guidelines from responsible authorities to SMEs are necessary for smooth transition	Garcés-Ayerbe <i>et al.</i> (2019), Mazur-Wierzbicka (2021)	
21	TLECEu	It is necessary to have “management will” in order to implement CE.	Upadhayay and Alqassimi (2019)	
22	SPSMEv	Ability to withstand the financial burden of transition expenses	Adamu <i>et al.</i> (2019)	
23	SPSMEw	Increase in knowledge among management about CE	Production and Harisekar (2021)	
24	SPSMEx	SMEs enhance prior expertise with CE adoption	Malesios <i>et al.</i> (2021)	
25	SPSMEy	Consumer acceptance issue need to resolved	Tsvetkova <i>et al.</i> (2020)	

Source(s): Created by authors

Table 1.

Description of measurement of variables

1049

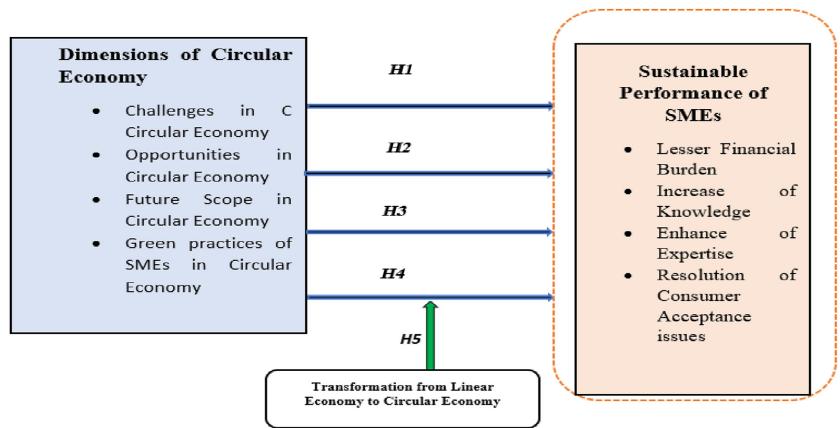


Figure 2.
Conceptual framework
of the study

Source(s): Adapted from Sharma *et al.* (2021)

Attributes	Category	Number	Percentage (%)	Cumulative percent (%)
<i>Firms' age</i>	Less than 5 years	68	41.71	41.71
	Between 5 and 10 years	56	34.35	76.06
	From 11 to 15 years	23	14.11	90.17
	From 16 to 20 years	9	5.52	95.69
	Over 20 years	7	4.31	100.00
<i>Cost of the projects</i> (One lakh is one hundred thousand) INR: Indian rupee	Less than INR 5 lakhs	45	27.60	27.60
	INR 5 to 10 lakhs	63	38.65	66.25
	INR 11 to 15 lakhs	25	15.33	81.58
	INR 16 to 20 lakhs	21	12.88	94.46
	More than 20 lakhs	9	5.54	100.00
<i>Size of firm</i>	Less than 5 persons employed	26	15.95	15.95
	Between 5 and 10 persons employed	72	44.17	60.12
	From 11 to 15 persons employed	43	26.38	86.50
	From 16 to 20 persons employed	18	11.04	97.54
	Over 20 persons employed	4	2.46	100.00

Table 2.
Demographics characteristics of SMEs in the study

Source(s): Created by authors

features our components may have. Component 1 correlates strongly with CCEa (0.785), CCEb (0.867), CCEc (0.781) and CCEd (0.690). Component 2 correlates strongly with OCEe (0.843), OCEf (0.862), OCEg (0.869), OCEh (0.865) and OCEi (0.868). Component 3 correlates strongly with FSCEj (0.830), FSCEk (0.799), FSCEl (0.801) and FSCEm (0.750). Component 4 correlates strongly with SMEGn (0.755), SMEGo (0.836), SMEGp (0.805) and SMEGq (0.820). Component 5 correlates strongly with TLECEr (0.674), TLECES (0.746), TLECEt (0.768) and TLECEu (0.698). Component 6 correlates strongly with SPSMEv (0.834), SPSMEv (0.834), SPSMEw (0.845), SPSMEx (0.830) and SPSMEy (0.713).

	N	Minimum	Maximum	Mean	SD	Reduce, reuse, recycle
Remanufacturing is an expensive endeavour	163	1	5	3.34	0.974	
There was a lack of "management will" to implement CE	163	1	5	3.33	0.970	
Inability to reuse the material due to a lack of technology	163	1	5	4.39	0.790	
Recycling is challenging since it depends on the substance.	163	1	5	4.26	0.865	
Not every company can recycle since it relies on the nature of waste						1051
SMEs are concerned about the environment. Moreover, SMEs are interested in implementing CE	163	1	5	4.09	1.024	
The 3 Rs (reduce, reuse and recycle) are beneficial for gaining a competitive edge	163	1	5	4.29	0.711	
Recycling campaigns might be effective in attracting customers in a few instances	163	1	5	4.10	0.910	
CE contributes to the achievement of long-term sustainability	163	1	5	4.10	0.848	
The reuse of materials is beneficial to resource conservation; however, it is dependent on the item being reused	163	1	5	4.28	0.848	
To make the shift to a CE, it is necessary to invest in new technologies and upgrade existing ones	163	1	5	4.17	0.722	
It is necessary for the government to intervene in order to give assistance to SMEs in their efforts to adopt CE	163	1	5	3.77	0.913	
SMEs must educate their clients and consumers about the advantages of recycled items and other environmentally friendly activities	163	1	5	3.18	1.127	
SMEs and customers need incentive. SMEs might be encouraged to adopt CE practises by offering tax breaks	163	1	5	4.42	0.823	
SMEs are not well-versed in CE terminology. However, they are aware of a number of environmentally friendly projects	163	1	5	3.80	1.017	
Government pressure alone will not be enough to bring about CE adoption	163	1	5	4.54	0.641	
Utilization of non-traditional raw materials (for example, in the furniture industry, more iron is used than wood)	163	1	5	4.50	0.661	
Keeping single-use plastics to a minimum	163	1	5	4.02	0.949	
Government assistance, rather than government coercion, is essential in order to make the shift from LE to CE	163	1	5	4.15	0.681	
Human reckless consumerism has a greater negative impact on the environment than industrial activity	163	1	5	4.06	0.841	
Guidelines from responsible authorities to SMEs are necessary for smooth transition	163	1	5	4.05	0.852	
It is necessary to have "management will" in order to implement CE	163	1	5	4.17	0.672	
Ability to withstand the financial burden of transition expenses	163	1	5	4.33	0.607	
Increase in knowledge among management about CE	163	1	5	4.29	0.693	
SMEs enhance prior expertise with CE adoption	163	1	5	4.37	0.657	
Consumer acceptance issue need to resolved	163	1	5	4.36	0.682	
Valid N (listwise)	163					

Table 3.

Descriptive statistics

Source(s): Created by authors

4.1 Measurement model

4.1.1 Model fit summary. Maximum likelihood parameter estimation with listwise elimination of missing instances was used throughout the studies done in AMOS 23.0 (Arbuckle, 2006). A number of metrics were employed to assess overall model fit, including, "the goodness-of-fit

Table 4.
Reliability test

Latent variables and mediating variable	Number of items	Estimated value of Cronbach's alpha
Opportunities in CE	5	0.849
Challenges in CE	4	0.928
Future scope in CE	4	0.829
Green practices followed by small and medium enterprises	4	0.833
Transformation from LE to CE	4	0.922
Sustainable performance of small medium enterprises	4	0.818

KMO and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy	0.887
Bartlett's test of sphericity	3035.560
Approx. Chi-square	
df	300
Sig	0.000

Table 5.
KMO and
Bartlett's test**Source(s):** Created by authors

statistic, the GFI, the AGFI, the CFI, and the root mean square error of approximation (RMSEA)." Model fit is deemed excellent if the RMSEA is less than 0.05, the GFI, AGFI, and CFI are all more than 0.95, and the non-significant χ^2 statistic is present. To be considered a good match, an RMSEA of less than 0.08 must be obtained. In the sample of SMEs, the overall model fit was excellent (Table 8).

4.1.2 Confirmatory factor analysis. The CFA empirical findings of the connections between variables and constructs represented by the data are used to examine the fitness, reliability, and validity of six measured constructs. CFA was employed on the existing survey to answer the most critical questions to ensure that all variables were distinct 0.50. Moreover, for all constructs the values of CR is greater than AVE values. The AVE was compared to the appropriate inter-construct squared correlation estimations in order to determine its discriminant validity. Additionally, the values of the AVE's square roots exceeded those of all other cross-correlations, confirming the sufficient discriminant validity (Table 9). This means that the measurement model is valid and reliable in terms of the construct it was built from.

4.2 Path analysis

The entire structural equation modelling model is accurate and dependable. In Figure 3, constructs are showing positive correlation with each other. As a result, the null hypothesis is rejected and the alternative hypothesis is accepted. The indirect path is analysed among the variables. Hypothesis 1 which is transformation from LE to CE mediates the relationship between opportunities and sustainable performance indicates p -value < 0.05. Therefore, null hypothesis is rejected, and alternative hypothesis is supported. Hypothesis 2 which is transformation from LE to CE mediates the relationship between challenges and sustainable performance has p -value < 0.05. Therefore, null hypothesis is rejected, and alternative hypothesis is supported. Hypothesis 3 which is transformation from LE to CE mediates the relationship between future scope and sustainable performance is supported as p -value = 0.001. Hypothesis 4 which is transformation from LE to CE mediates the relationship between green practices and sustainable performance having p -value < 0.05.

Component	Total	Initial eigenvalues		Extraction sums of squared loadings		Rotation sums of squared loadings	
		% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
1	9.545	38.179	38.179	9.545	38.179	38.179	4.154
2	3.127	12.510	50.689	3.127	12.510	50.689	3.233
3	2.326	9.302	59.991	2.326	9.302	59.991	3.141
4	1.785	7.140	67.131	1.785	7.140	67.131	3.026
5	1.224	4.897	72.028	1.224	4.897	72.028	2.911
6	1.111	4.442	76.470	1.111	4.442	76.470	2.652
7	0.681	2.725	79.195				10.609
8	0.578	2.313	81.508				76.470
9	0.524	2.136	83.644				
10	0.503	2.011	85.655				
11	0.423	1.693	87.348				
12	0.407	1.629	88.976				
13	0.345	1.380	90.356				
14	0.308	1.231	91.587				
15	0.302	1.208	92.794				
16	0.257	1.028	93.822				
17	0.226	0.903	94.725				
18	0.216	0.864	95.589				
19	0.207	0.828	96.417				
20	0.199	0.797	97.214				
21	0.175	0.699	97.913				
22	0.162	0.647	98.560				
23	0.145	0.580	99.141				
24	0.121	0.484	99.625				
25	0.094	0.375	100.000				

Extraction method: principal component analysis
Source(s): Created by authors

Table 6.
Exploratory factor analysis

		Component				
	1	2	3	4	5	6
CCEa					0.785	
CCEb					0.867	
CCEc					0.781	
CCEd					0.690	
OCEe	0.843					
OCEf	0.862					
OCEg	0.869					
OCEh	0.865					
OCEi	0.868					
FSCEj				0.830		
FSCEk				0.799		
FSCEl				0.801		
FSCEm				0.750		
SMEGn	0.755					
SMEGo	0.836					
SMEGp	0.805					
SMEGq	0.820					
TLECEr					0.674	
TLECEs					0.746	
TLECEt					0.768	
TLECEu					0.698	
SPSMEv		0.834				
SPSMEw		0.845				
SPSMEx		0.830				
SPSMEy		0.713				

Extraction method: principal component analysis

Rotation method: Varimax with Kaiser Normalization^a**Note(s):** a. Rotation converged in 6 iterations**Source(s):** Created by authors**Table 7.**
Rotated component matrix

Model summary (M_0) of fit index	Revised CFA	Criteria	Decision
Ratio to Chi-square/df (CMIN/df)	1.521	<3	Good model fit
Comparative fit index (CFI)	0.954	>0.90	Moderate reliable fit
Root mean square error of approximation (RMSEA)	0.057	<0.08	Good model fit
Tucker–Lewis index (TLI)	0.934	>0.90	Good model fit
Parsimony goodness-of-fit index (PGFI)	0.826	>0.50	Good model fit
Goodness of fit index (GFI)	0.951	>0.90	Good model fit
Adjusted goodness of fit index (AGFI)	0.842	>0.80	Good model fit
Root mean square residual (RMR)	0.035	<0.05	Good model fit
PCLOSE	0.162	>0.05	Good model fit

Table 8.
Model summary

Therefore, null hypothesis is rejected, and alternative hypothesis is supported. [Figure 4](#) represents path analysis. The hypotheses summary is provided in [Table 10](#).

5. Discussions and recommendations

The research aims to identify challenges, opportunities, future scope and green practices of SMEs as they move from LE to CE. The results show that SMEs realise that implementing CE model in the SMEs production setting is crucial as there are various challenges the

SMEs are facing. Further, it is appropriate for sustainable development since it aids in lowering adverse environmental impacts. It's encouraging to see that the surveyed SMEs care about the environment, since this points to their potential for joining the CE (Meseguer-Sánchez *et al.*, 2021). SMEs are divided on whether industries are the primary cause of environmental degradation, or if other factors, such as wasteful consumption, also play a role. Contrary to popular belief, most SMEs are not familiar with the concepts and methods of the "CE" (Figge *et al.*, 2023). According to the results of the research, SMEs support and execute the three Rs, a practice that is comparable to that of the CE, even if they are not familiar with CE methods and terminology. The research also shows that implementing eco-friendly practices is beneficial for SMEs and may even provide them an edge in the market. As a result of shifting consumer preferences and growing environmental consciousness, small businesses are confident that goods crafted from recycled materials will find a ready market (Unal *et al.*, 2019; Amiri *et al.*, 2023). There are some SMEs that are hesitant to sell recycled items to consumers because of quality concerns and a general lack of knowledge about the benefits of recycling. The research by Hazen *et al.* (2017) cites similar findings.

In any case, as per the European Commission, "consumers and businesses" are the most important factors in the shift to the CE (Rodríguez-Espíndola *et al.*, 2022). The survey also found that recyclability concerns and a lack of resources are the main reasons why SMEs are unable to recycle their goods (Howard *et al.*, 2022). Despite the fact that previous, researches have indicated that recycling is a viable CE practise in the food business, this study indicated that it is not (Bajnoczki *et al.*, 2021). According to the findings, the food business is a prime candidate for the implementation of the CE model, since it presents several recycling and waste management opportunities (Unal *et al.*, 2019; Bajnoczki *et al.*, 2021; Ioannidis *et al.*, 2021). The research also notes that material reuse may contribute to resource conservation; however, it is not an option for all products. The ability to reuse or recycle a material is, however, subject on the characteristics of the substance in question (Sharma *et al.*, 2021). According to the results, SMEs either lack the resources necessary to re-manufacture old items or would need to spend much more in order to organise re-manufacturing (Tsvetkova *et al.*, 2020). The research revealed that lack of managerial will, lack of technology, lack of competent labour, lack of financial resources, lack of awareness, lack of knowledge and lack of experience are the main barriers to switching from a linear to a CE. The results are consistent with those from prior research, although those studies focused on much larger corporations. The research also revealed that government involvement, technological advancement, established agencies for monitoring and control, business tax credits for SMEs, education of workers, plus awareness of the marketing the CE are all necessary for a successful transformation (Adamu *et al.*, 2019). SMEs also need to be encouraged to effectively adopt the principles of the CE (Adamu *et al.*, 2019).

	CR	AVE	MSV	MaxR (H)	OCF	SMEG	FSCE	CCE	TLECE	SPSME
OCF	0.868	0.550	0.234	0.941	<i>0.742</i>					
SMEG _p	0.831	0.522	0.330	0.938	0.414	<i>0.723</i>				
FSCE	0.804	0.553	0.327	0.891	0.322	0.572	<i>0.673</i>			
CCE	0.757	0.538	0.330	0.897	0.483	0.574	0.349	<i>0.66</i>		
TLECE	0.81	0.52	0.254	0.883	0.634	0.432	0.650	0.568	<i>0.721</i>	
SPSME	0.88	0.65	0.345	0.901	0.535	0.339	0.641	0.353	0.454	<i>0.806</i>

Source(s): Created by authors

Table 9.
Master validity
measures

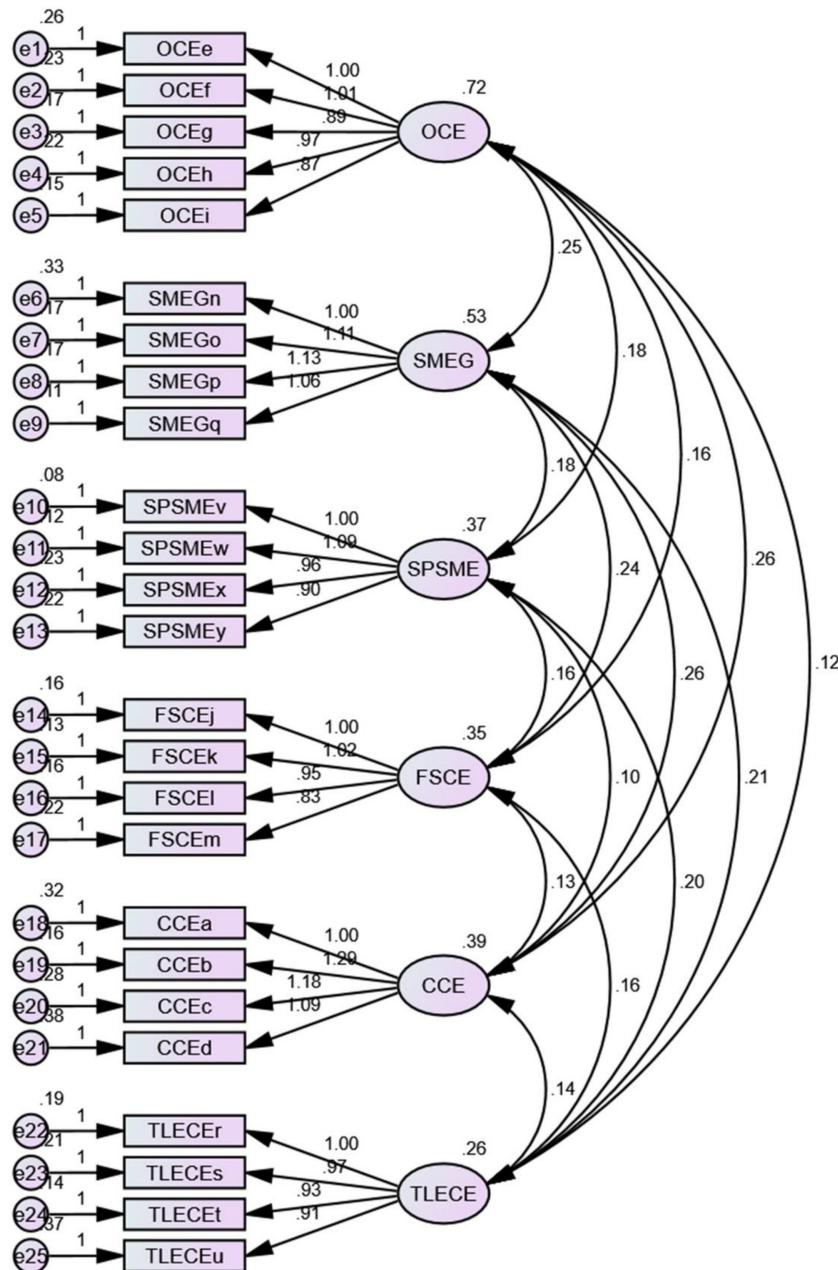


Figure 3.
Measurement model

Source(s): Created by authors

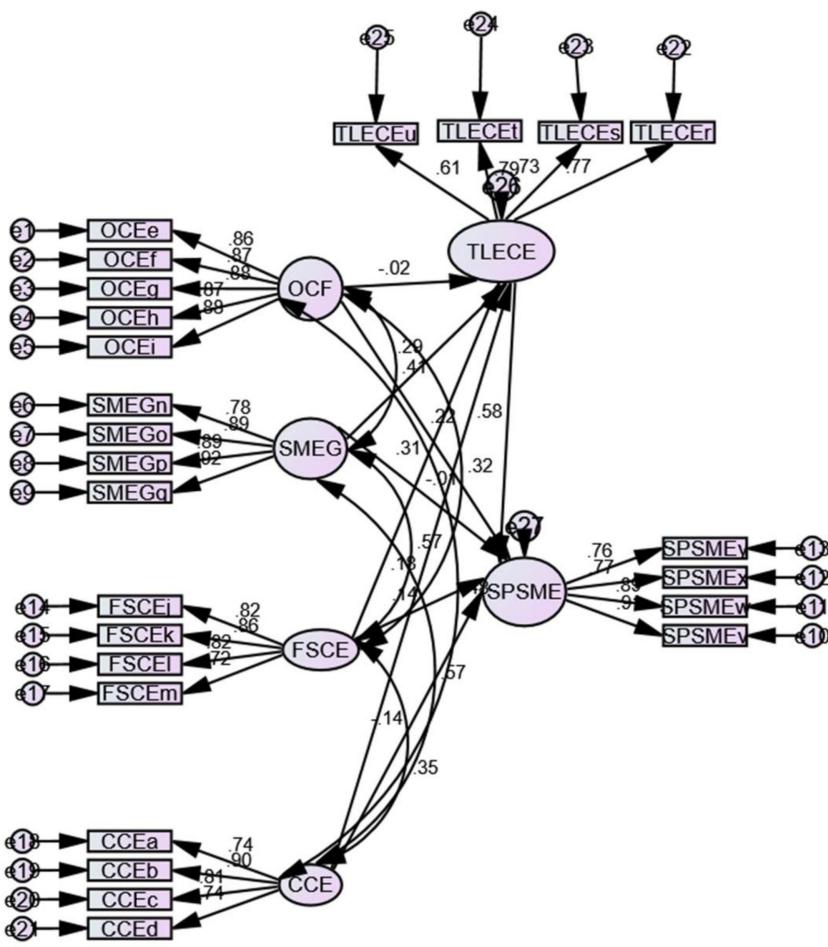


Figure 4.
Path analysis

Source(s): Created by authors

The existing study further elaborates the discussion by answering the research questions which are outlined below.

- (1) RQ1: What are the challenges, opportunities and future scope in CE?

Industries' attempts to incorporate CE strategies into their operations face a number of challenges (Silva *et al.*, 2019). According to the current research on the CE, the major challenges that businesses need to address are Insufficient availability of recycling technology, concern about losing regular consumers, inadequate application of localized regulations, lack of familiarity in developing business models and expensive initial investment (Stahel, 2016). The existing study identified various opportunities associated with the shift to a CE (Jones and Comfort, 2017). The opportunities are employ limited resources more efficiently, lessen pollution, keep the environment and people safe, revitalise economies and improve and expand employment opportunities (Arruda *et al.*, 2021). As a result, there is growing optimism that shifting from the present "take-make-

Table 10.
Hypothesis testing

Hypothesis of the study	Hypothesized path/ structural relationship	Standardized estimates	p- values	Status
Ha1: Transformation from LE to CE mediates the relationship between opportunities and sustainable performance	SPSME ← TLECE ← OCE	0.745	0.03	Supported
Ha2: Transformation from LE to CE mediates the relationship between challenges and sustainable performance	SPSME ← TLECE ← CCE	0.645	0.025	Supported
Ha3: Transformation from LE to CE mediates the relationship between future scope and sustainable performance	SPSME ← TLECE ← FSCE	0.876	0.001	Supported
Ha4: Transformation from LE to CE mediates the relationship between Green practices and sustainable performance	SPSME ← TLECE ← SMEGp	0.665	0.016	Supported

Source(s): Created by authors

dispose” paradigm to a CE would lead to environmental sustainability ([Sehnem et al., 2019](#)). The future scope is also analysed in detail and documented that the findings can provide practical insights into how CE can be adopted in SMEs, especially in emerging markets ([Soni et al., 2023; Corvellec et al., 2022](#)). Researchers can also explore CE enabling circular supply chains and shows how these practices may benefit the supply chains where companies operate, beyond their business processes ([Carissimi et al., 2023](#)).

- (2) **RQ2:** What is the impact of green practices towards the SMEs sustainable performance in CE?

In response to global threats such as environmental risks, climate change and the depletion of non-renewable natural resources, manufacturers are shifting toward more environmentally friendly practices ([Goyal et al., 2018](#)). Sustainable development objectives in the CE are advanced by beginning with green practices and working outwards. The goal of the CE is to maximise the use of existing resources via the three “R’s: reduce, reuse, and recycle.” By extending items’ useful lives in this manner, waste may be put to good use, and an eco-friendlier manufacturing model can be built over time.

- (3) **RQ3:** How does transformation from LE to CE mediates the relationship between endogenous and exogenous variables?

SMEs added that the government plays an important role, but not in requiring businesses to transform, but rather encouraging and motivating them to adopt to changes ([Malesios et al., 2021](#)). In light of these results, it seems that stringent government regulations aimed at adopting the CE may not be productive. Because of this, it’s not simply the government’s regulations that matter, but also the good will of management towards the CE. In the absence of “management will,” an organisation is more likely to embrace CE techniques out of necessity than out of any desire to proactively improve the environment or increase profits. On the whole, the results show that SMEs are eager to adopt CE practices, and even those that haven’t done so yet have plans to do so. On the other hand, the CE is of no interest to micro or extremely tiny businesses. Both the lack of available funding for SMEs and a general lack of relevant experience are major roadblocks on the path to full implementation of the CE ([Deutz, 2019](#)). Although there is no question that the company will reap numerous benefits from investing in the CE process eventually, doing so initially needs capital. Many environmental

hazards go unaddressed because SMEs prioritise quick wins above longer-term concerns like protecting the environment (Upadhayay and Alqassimi, 2018).

To sum up, the opportunities and preconditions for the transition contribute to the success of CE, whereas challenges and forced adoption led to the failure of CE. The results of this study, which is based on survey with SMEs, are consistent with the previous research in many respects. The reason for this is that big companies sometimes serve as a stepping stone for SMEs when it comes to implementing new business models. However, in the context of the CE, both large corporations and SMEs are hamstrung by a number of restrictions. Large corporations have one distinct advantage over SMEs: they are better equipped to oversee the arduous task of managing their monetary and other resources.

5.1 Specific recommendations

The specific recommendations for SMEs in the Indian context based on the findings of this study are outlined below point-by-point:

- (1) To identify inefficiencies and waste, it is important to conduct a comprehensive evaluation of resource utilisation in the operations of SMEs. Energy, water, raw materials, and other manufacturing inputs fall under this category. Put steps in place to make the most efficient use of resources and reduce waste by identifying each resource.
- (2) Making things that can be repaired and recycled last longer. Consider using renewable or recycled resources into SMEs production procedures. Make repairs and refurbishments simpler by designing goods with modular components. This also needs to be communicated to end users.
- (3) To recycle and repurpose resources from items that have reached the end of their useful life, invest in a reverse logistics network. For the purpose of refurbishing, remanufacturing or recycling, set up take-back programmes to gather unwanted items from consumers.
- (4) Put financial resources into technologies like blockchain, AI and the Internet of Things to make supply chains more transparent, monitor product lifecycles and improve resource management. In order to reduce wastage and make the most efficient use of resources, it is important to promote innovation in product design and production methods.
- (5) Collaborate with suppliers to find ethical and environmentally friendly sources for supplies. Providers of goods and services with a high percentage of recycled content should be given preference. Cut down on transportation-related expenses and emissions, look into local sourcing options.
- (6) Encourage a mindset shift towards sustainability and circularity by educating and training staff. Involve workers in finding ways to save money and make better use of resources.
- (7) Promote sustainable goods and behaviours by informing consumers about the CE and its concepts. Educate them on proper product disposal and recycling methods.
- (8) SMEs in India may lessen their negative effects on the environment, boost their competitiveness and aid in sustainable development by implementing these suggestions.

6. Conclusion and implications

After analysing the existing literature critically, this research added to the body of knowledge via a novel study in which researchers interacted directly with SMEs. The paper makes a

substantial contribution by bringing together, in one place, all the important variables for the successful transition from LE to CE, all proven using instances based on SMEs. The study updates the previous research on CE by including the most current publications in the field. The quantitative evaluation of the findings show that SMEs in India are not actively participating in the process of transition. Nonetheless, they are interested in bringing it about because of the advantages they recognise. Secondly, introducing CE strategies in management from a financial, environmental, organisational, health, technological and social perspective is crucial for the firm to systematically apply these strategies. Converting non-convertible waste to cash is difficult for SMEs. There is a pressing requirement to use recyclable or reusable raw resources in this study. According to the existing research, SMEs need to know how their target markets think and act in order to solve problems with product acceptability. The research indicates that SMEs are not ready to adopt the CE as it is; consequently, successful steps towards the CE may be achieved by organisational reconfiguration, technological upgrades and knowledge improvement. Institutional structures and robust financing sources need to be modified to ensure the successful maintenance of CE implementation. When it comes to the efficient implementation of the CE, SMEs require immediate government engagement in the form of policy formulation and incentive (both monetary and nonmonetary). Strategies including law creation, standardisation efforts and ecolabelling initiatives should be supported since governments and institutions play important roles in implementing the CE. Eco-friendly product development is a vital part of the transition to a CE and hence deserves significant attention. The small and medium-sized business community is less enthusiastic since many of them fear the costs associated with implementing the CE model will outweigh the benefits. Tax breaks, loans, scholarships and subsidies are just some of the incentives that might assist kickstart the CE process inside a firm. However, there must be adequate collaboration and coordination between many different entities, such as the government, businesses, supply chain actors, customers and the public. Although circular economies are now commonplace across the globe, their implementation in India is only getting started, and a lot more work has to be done to make it a success, especially for SMEs. It may be concluded that there is a balance between the ground reality and theoretical knowledge.

Academics, other researchers and corporate decision-makers stand to gain the most from this study's conclusions. This research contributes to the growing body of literature on the topic of CE implementation in Indian SMEs. Decision-makers in the company will be able to use the information and insights gained from the study to help ease the transformation. Increasing innovation in many economic spheres is a direct result of rethinking materials and products for circular usage. High-quality, cutting-edge goods that last longer and help consumers save money in the long run will be made available to the public. There are several advantages to a CE for the customer as well as the environment. By reducing the need for techniques like planned obsolescence, material reuse may increase the longevity of the goods. Finally, economy at a circular level offer promise as a paradigm for helping businesses achieve their 3PL (people, profit and the planet) satisfaction objectives.

SMEs and policymakers can have various benefits of CE such as it decreases pollution, natural resource use and trash accumulation. It may help the local economy if it promotes manufacturing models that utilise recycled materials sourced from trash in the area; It promotes faster economic growth, more jobs and more innovation in the industrial sector; Relying less on imported materials is one benefit of recycling locally sourced materials.

7. Limitations and future recommendation

However, the study did discover a handful of caveats that made the current investigation unable to manage. Although researchers had hoped for a larger response rate, respondents

were unyielding and reluctant to take part in the survey. More research involving the relationship of SMEs in the CE may be done in the future since there is still room to grow in this sector. As a result, this study may serve as a solid launch-pad for future studies. The research used a quantitative method to present its results, but a multi-case-based decision model or other qualitative methods might be used in the future to predict outcomes more accurately. The role of digital transformation in enabling CE can also be explored by the researchers as this topic is of social relevance (Antikainen *et al.*, 2018). Further, future studies can also explore distributed leadership in facilitating CE practices (Soni *et al.*, 2023). The findings can provide practical insights into how CE can be adopted in SMEs, especially in emerging markets (Soni *et al.*, 2023). Researchers can also explore CE enabling circular supply chains and shows how these practices may benefit the supply chains where companies operate, beyond their business processes (Carissimi *et al.*, 2023).

References

- Abubakari, A., Ofori, K.S., Boateng, H., N'Da, K. and Hinson, R.E. (2021), "The effect of foreign market knowledge on SME export performance: a study of non-traditional SMEs in Ghana", *Global Knowledge, Memory and Communication*, Vol. 71 Nos 6/7, pp. 546-563, doi: [10.1108/GKMC-03-2021-0054](https://doi.org/10.1108/GKMC-03-2021-0054).
- Adamu, A.A., Wan, C.Y. and Gorondutse, A.H. (2019), "Determinants of sustainable performance of SMEs: a proposed framework", *International Journal of Research and Scientific Innovation (IJSRI) | VI(Vi)*, pp. 182-188, available at: www.rsisinternational.org
- Afteni, C., Păunoiu, V. and Afteni, M. (2022), "Study on the transition from the linear economy to the CE", *Annals of "Dunarea de Jos" University of Galati, Fascicle V, Technologies in machine building*, Vol. 39 No. 1, pp. 49-55, doi: [10.35219/tmb.2021.1.08](https://doi.org/10.35219/tmb.2021.1.08).
- Amiri, A.M., Kushwaha, B.P. and Singh, R. (2023), "Visualisation of global research trends and future research directions of digital marketing in small and medium enterprises using bibliometric analysis", *Journal of Small Business and Enterprise Development*, Vol. 30 No. 3, pp. 621-641, doi: [10.1108/JSBED-04-2022-0206](https://doi.org/10.1108/JSBED-04-2022-0206).
- Andersén, J. (2021), "A relational natural-resource-based view on product innovation: the influence of green product innovation and green suppliers on differentiation advantage in small manufacturing firms", *Technovation*, Vol. 104 No. February 2020, 102254, doi: [10.1016/j.technovation.2021.102254](https://doi.org/10.1016/j.technovation.2021.102254).
- Antikainen, M., Uusitalo, T. and Kivikytö-Reponen, P. (2018), "Digitalisation as an enabler of CE", *Procedia CIRP*, Vol. 73 March, pp. 45-49, doi: [10.1016/j.procir.2018.04.027](https://doi.org/10.1016/j.procir.2018.04.027).
- Arbuckle, J.L. (2006), *Amos 7.0 User's Guide*, SPSS, Chicago, IL.
- Arruda, E.H., Melatto, RAPB, Levy, W. and Conti, D.M. (2021), "CE: a brief literature review (2015-2020)", *Sustainable Operations and Computers*, Vol. 2 May, pp. 79-86, doi: [10.1016/j.susoc.2021.05.001](https://doi.org/10.1016/j.susoc.2021.05.001).
- Bajnoczki, C., Illes, Z. and Szendro, P. (2021), "The perspective of SMEs on the challenges of the CE in the 21st century Hungary", *Progress in Agricultural Engineering Sciences*, Vol. 17 No. 1, pp. 101-132, doi: [10.1556/446.2021.00038](https://doi.org/10.1556/446.2021.00038).
- Bianchi, P. (2014), "Small and medium-sized enterprises in the European perspective", Lodz University of Technology Press, pp. 119-130.
- Boulding, K.E. (1966), "The economics of the coming spaceship earth", *Environmental Quality in a Growing Economy*, The Johns Hopkins Press, Baltimore, pp. 3-14.
- Carissimi, M.C., Creazza, A., Pisa, M.F. and Urbinati, A. (2023), "Circular economy practices enabling circular supply chains: an empirical analysis of 100 SMEs in Italy", *Resources, Conservation and Recycling*, Vol. 198, pp. 22-27, doi: [10.1016/j.resconrec.2023.107126](https://doi.org/10.1016/j.resconrec.2023.107126).

- Centobelli, P., Cerchione, R. and Jhamb, D. (2023), "Double-edged circularity: comparative assessment of circular and non-circular consumers", *Ecological Economics*, Vol. 212 No. 1, pp. 22-28, doi: [10.1016/j.ecolecon.2023.107931](https://doi.org/10.1016/j.ecolecon.2023.107931).
- Chizayfard, A., Trucco, P. and Nuur, C. (2021), "The transformation to a CE: framing an evolutionary view", *Journal of Evolutionary Economics. Journal of Evolutionary Economics*, Vol. 31 No. 2, pp. 475-504, doi: [10.1007/s00191-020-00709-0](https://doi.org/10.1007/s00191-020-00709-0).
- Choi, J.H., Kim, S. and Yang, D.H. (2018), "Small and medium enterprises and the relation between social performance and financial performance: empirical evidence from Korea", *Sustainability (Switzerland)*, Vol. 10 No. 6, pp. 15-19, doi: [10.3390/su10061816](https://doi.org/10.3390/su10061816).
- Cooper, D.R. and Gutowski, T.G. (2017), "The environmental impacts of reuse: a review", *Journal of Industrial Ecology*, Vol. 21 No. 1, pp. 38-56, doi: [10.1111/jiec.12388](https://doi.org/10.1111/jiec.12388).
- Corvellec, H., Stowell, A.F. and Johansson, N. (2022), "Critiques of the CE", *Journal of Industrial Ecology*, Vol. 26 No. 2, pp. 421-432, doi: [10.1111/jiec.13187](https://doi.org/10.1111/jiec.13187).
- Daniel, C.O. (2019), "Assessing the role of green marketing in small and medium enterprises", *International Journal of Scientific and Research Publications (IJSRP)*, Vol. 9 No. 1, p. 8585, doi: [10.29322/ijrsp.9.01.2019.p8585](https://doi.org/10.29322/ijrsp.9.01.2019.p8585).
- Deutz, P. (2019), *CE. Second Edi*, *International Encyclopedia of Human Geography*, 2nd ed., Elsevier, doi: [10.1016/B978-0-08-102295-5.10630-4](https://doi.org/10.1016/B978-0-08-102295-5.10630-4).
- Dey, P.K., Malesios, C., De, D., Budhwar, P., Chowdhury, S. and Cheffi, W. (2020), "CE to enhance sustainability of small and medium-sized enterprises", *Business Strategy and the Environment*, Vol. 29 No. 6, pp. 2145-2169, doi: [10.1002/bse.2492](https://doi.org/10.1002/bse.2492).
- Deyganto, K.O. (2022), "The effect of tax incentives practices on the sustainability of micro, small and medium enterprises in Ethiopia during the outbreak of corona virus pandemic", *Journal of Innovation and Entrepreneurship*, Vol. 11 No. 1, pp. 1-15, doi: [10.1186/s13731-022-00194-8](https://doi.org/10.1186/s13731-022-00194-8).
- Ekins, P., et al. (2019), "The CE: what, Why, How and Where. Managing environmental and energy transitions for regions and cities", *Managing Environmental and Energy Transitions for Regions and Cities*, pp. 1-89, available at: <https://www.oecd.org/cfe/regionaldevelopment/Ekins-2019-Circular-Economy-What-Why-How-Where.pdf>
- Figge, F., Thorpe, A.S. and Gutberlet, M. (2023), "Definitions of the CE: circularity matters", *Ecological Economics*, Vol. 208 January, 107823, doi: [10.1016/j.ecolecon.2023.107823](https://doi.org/10.1016/j.ecolecon.2023.107823).
- Garcés-Ayerbe, C., Rivera-Torres, P., Suárez-Perales, I. and Leyva-de la Hiz, D. (2019), "Is it possible to change from a linear to a CE? An overview of opportunities and barriers for european small and medium-sized enterprise companies", *International Journal of Environmental Research and Public Health*, Vol. 16 No. 5, p. 851, doi: [10.3390/ijerph16050851](https://doi.org/10.3390/ijerph16050851).
- García-Barragán, J.F., Eyckmans, J. and Rousseau, S. (2019), "Defining and measuring the CE: a mathematical approach", *Ecological Economics*, Vol. 157 No. October 2018, pp. 369-372, doi: [10.1016/j.ecolecon.2018.12.003](https://doi.org/10.1016/j.ecolecon.2018.12.003).
- Geissdoerfer, M., Savaget, P., Bocken, N.M. and Hultink, E.J. (2017), "The CE – a new sustainability paradigm?", *Journal of Cleaner Production*, Vol. 143 February, pp. 757-768, doi: [10.1016/j.jclepro.2016.12.048](https://doi.org/10.1016/j.jclepro.2016.12.048).
- Goyal, S., Esposito, M. and Kapoor, A. (2018), "CE business models in developing economies: lessons from India on reduce, recycle, and reuse paradigms", *Thunderbird International Business Review*, Vol. 60 No. 5, pp. 630-631, doi: [10.1002/tie](https://doi.org/10.1002/tie).
- Hartini, S., Wicaksono, P.A., Prastawa, H., Hadyan, A.F. and Sriyanto (2019), "The environmental impact assessment of furniture production process using the life cycle assessment", *IOP Conference Series: Materials Science and Engineering*, Vol. 598 No. 1, p. 012078, doi: [10.1088/1757-899X/598/1/012078](https://doi.org/10.1088/1757-899X/598/1/012078).
- Hartley, K., van Santen, R. and Kirchherr, J. (2020), "Policies for transitioning towards a CE: expectations from the European union (EU)", *Resources, Conservation and Recycling*, Vol. 155 January, 104634, doi: [10.1016/j.resconrec.2019.104634](https://doi.org/10.1016/j.resconrec.2019.104634).

- Hazen, B.T., Dubey, R., Gunasekaran, A., Childe, S.J., Bryde, D.J., Giannakis, M., Foropon, C. and Roubaud, D. (2017), "Big data analytics and artificial intelligence pathway to operational performance under the effects of entrepreneurial orientation and environmental dynamism: a study of manufacturing organisations", *International Journal of Production Economics*, Vol. 226, 107599, doi: [10.1016/j.ijpe.2019.107599](https://doi.org/10.1016/j.ijpe.2019.107599).
- Henriques, J., Azevedo, J., Estrela, M. and Dias, R. (2022), "Relating industrial symbiosis and sustainable development goals", *Materials Proceedings*, Vol. 5 No. 11, pp. 111-117, doi: [10.3390/materproc2021005111](https://doi.org/10.3390/materproc2021005111).
- Herberz, T., Barlow, C.Y. and Finkbeiner, M. (2020), "Sustainability assessment of a single-use plastics ban", *Sustainability (Switzerland)*, Vol. 12 No. 9, p. 3746, doi: [10.3390/su12093746](https://doi.org/10.3390/su12093746).
- Heshmati, A. (2017), "A review of the CE and its implementation", *International Journal of Green Economics*, Vol. 11 Nos 3/4, p. 251, doi: [10.1504/ijge.2017.10010876](https://doi.org/10.1504/ijge.2017.10010876).
- Hosseiniān, A., Ylä-Mella, J. and Pongrácz, E. (2021), "Current status of CE research in Finland", *Resources*, Vol. 10 No. 5, p. 40, doi: [10.3390/resources10050040](https://doi.org/10.3390/resources10050040).
- Howard, M., Böhm, S. and Etherley, D. (2022), "Systems resilience and SME multilevel challenges: a place-based conceptualization of the CE", *Journal of Business Research*, Vol. 145 December 2020, pp. 757-768, doi: [10.1016/j.jbusres.2022.03.014](https://doi.org/10.1016/j.jbusres.2022.03.014).
- Ioannidis, A., Chalvatzis, K.J., Leonidou, L.C. and Feng, Z. (2021), "Applying the reduce, reuse, and recycle principle in the hospitality sector: its antecedents and performance implications", *Business Strategy and the Environment*, Vol. 30 No. 7, pp. 3394-3410, doi: [10.1002/bse.2809](https://doi.org/10.1002/bse.2809).
- Jones, P., Comfort, D., Zelhof, B., Mokete, M., Rai, B.P. and Soman, B.K. (2017), "Towards the CE: a commentary on corporate approaches and challenges", *Journal of Public Affairs*, Vol. 17 No. 4, pp. 1-5, doi: [10.1002/pa.1680](https://doi.org/10.1002/pa.1680).
- Kaplan, S. (2016), By 2050, there will be more plastic than fish in the world's oceans, study says, available at: https://www.washingtonpost.com/news/morning-mix/wp/2022/01/20/by-2050-there-will-be-more-plastic-than-fish-in-the-worlds-oceans-study-says/?noredirect=on&utm_term=c42c8984c28e
- Kirchherr, J., Reike, D. and Hekkert, M. (2017), "Conceptualizing the CE: an analysis of 114 definitions", *Resources, Conservation and Recycling*, Vol. 127 September, pp. 221-232, doi: [10.1016/j.resconrec.2017.09.005](https://doi.org/10.1016/j.resconrec.2017.09.005).
- Korhonen, J., Honkasalo, A. and Seppälä, J. (2018), "CE: the concept and its limitations", *Ecological Economics*, Vol. 143, pp. 37-46, doi: [10.1016/j.ecolecon.2017.06.041](https://doi.org/10.1016/j.ecolecon.2017.06.041).
- Kraaijenbrink, J., Spender, J.C. and Groen, A.J. (2010), "The Resource-based view: a review and assessment of its critiques", *Journal of Management*, Vol. 36 No. 1, pp. 349-372, doi: [10.1177/0149206309350775](https://doi.org/10.1177/0149206309350775).
- Kwiecień, K. (2020), "Circular business models: a stakeholder theory perspective", *Acta Universitatis Nicolai Copernici*, Zarządzanie, Vol. 47 No. 3, p. 65, doi: [10.12775/aunc_zarz.2020.03.006](https://doi.org/10.12775/aunc_zarz.2020.03.006).
- Malesios, C., De, D., Moursellas, A., Dey, P.K. and Evangelinos, K. (2021), "Sustainability performance analysis of small and medium sized enterprises: criteria, methods and framework", *Socio-Economic Planning Sciences*, Vol. 75, November, 100993, doi: [10.1016/j.seps.2020.100993](https://doi.org/10.1016/j.seps.2020.100993).
- Malik, A., Sharma, P., Sharma, P., Vinu, A., Karakoti, A., Kaur, K., Gujral, H.S., Munjal, S. and Laker, B. (2022), "CE adoption by SMEs in emerging markets: towards a multilevel conceptual framework", *Journal of Business Research*, Vol. 142 March, pp. 605-619, doi: [10.1016/j.jbusres.2021.12.076](https://doi.org/10.1016/j.jbusres.2021.12.076).
- Mazur-Wierzbicka, E. (2021), "Towards CE—a comparative analysis of the countries of the European Union", *Resources*, Vol. 10 No. 5, p. 49, doi: [10.3390/resources10050049](https://doi.org/10.3390/resources10050049).
- Meseguer-Sánchez, V., Gálvez-Sánchez, F.J., Molina-Moreno, V. and Wandosell-Fernández-de-Bobadilla, G. (2021), "The main research characteristics of the development of the concept of the CE concept: a global analysis and the future agenda", *Frontiers in Environmental Science*, Vol. 9 July, pp. 1-16, doi: [10.3389/fenvs.2021.704387](https://doi.org/10.3389/fenvs.2021.704387).

- Michelini, G., Moraes, R.N., Cunha, R.N., Costa, J.M. and Ometto, A.R. (2017), "From linear to CE: PSS conducting the transition", *Procedia CIRP*, Vol. 64, pp. 2-6, doi: [10.1016/j.procir.2017.03.012](https://doi.org/10.1016/j.procir.2017.03.012).
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G. and PRISMA Group (2009), "Academia and clinic annals of internal medicine preferred reporting items for systematic reviews and meta-analyses", *Annals of Internal Medicine*, Vol. 151 No. 4, pp. 264-269, doi: [10.7326/0003-4819-151-4-200908180-00135](https://doi.org/10.7326/0003-4819-151-4-200908180-00135).
- Morales, M.E. and Belmonte-Urena, L.J. (2021), "Theoretical research on CE and sustainability trade-offs and synergies: a bibliometric analysis", *2021 IEEE International Conference on Technology and Entrepreneurship, ICTE 2021*, doi: [10.1109/ICTE51655.2021.9584537](https://doi.org/10.1109/ICTE51655.2021.9584537).
- Morseletto, P. (2020), "Targets for a CE", *Resources, Conservation and Recycling*, Vol. 153 No. October 2019, 104553, doi: [10.1016/j.resconrec.2019.104553](https://doi.org/10.1016/j.resconrec.2019.104553).
- Murray, A., Skene, K. and Haynes, K. (2017), "The CE: an interdisciplinary exploration of the concept and application in a global context", *Journal of Business Ethics*, Vol. 140 No. 3, pp. 369-380, doi: [10.1007/s10551-015-2693-2](https://doi.org/10.1007/s10551-015-2693-2).
- Neves, S.A. and Marques, A.C. (2022), "Drivers and barriers in the transition from a linear economy to a CE", *Journal of Cleaner Production*, Vol. 341 No. April 2021, 130865, doi: [10.1016/j.jclepro.2022.130865](https://doi.org/10.1016/j.jclepro.2022.130865).
- Nijman-Ross, E., Umutesi, J.U., Turay, J., Shamavu, D., Atanga, W.A. and Ross, D.L. (2023), "Toward a preliminary research agenda for the CE adoption in Africa", *Frontiers in Sustainability*, Vol. 4, doi: [10.3389/frsus.2023.1061563](https://doi.org/10.3389/frsus.2023.1061563).
- Okour, M.K., Chong, C.W. and Abdel Fattah, F.A.M. (2021), "Knowledge management systems usage: application of diffusion of innovation theory", *Global Knowledge, Memory and Communication*, Vol. 70 Nos 8/9, pp. 756-776, doi: [10.1108/GKMC-08-2020-0117](https://doi.org/10.1108/GKMC-08-2020-0117).
- Orcan, F. (2018), "Exploratory and confirmatory factor analysis: which one to use first?", *Eğitimde ve Psikolojide Ölçme ve Değerlendirme Dergisi*, Vol. 9 No. 4, pp. 414-421, doi: [10.21031/epod.394323](https://doi.org/10.21031/epod.394323).
- Prieto-Sandoval, V., Jaca, C. and Ormazabal, M. (2018), "Towards a consensus on the CE", *Journal of Cleaner Production*, Vol. 179, pp. 605-615, doi: [10.1016/j.jclepro.2017.12.224](https://doi.org/10.1016/j.jclepro.2017.12.224).
- Production, P.W. and Harisekar, V. (2021), "Increasing sustainability performance in a SME", john.
- Purwanto, E. and Prasetyo, T. (2021), "Changing the paradigm of a linear economy into a CE in residential waste management", *IOP Conference Series: Earth and Environmental Science*, Vol. 945 No. 1, p. 012054, doi: [10.1088/1755-1315/945/1/012054](https://doi.org/10.1088/1755-1315/945/1/012054).
- Rada, E.C. (2023), "Origins of the concept of CE and its evolution", *CONECT. International Scientific Conference of Environmental and Climate Technologies, (January)*, p. 141, doi: [10.7250/conect.2023.110](https://doi.org/10.7250/conect.2023.110).
- Ragossnig, A.M. and Schneider, D.R. (2019), "CE, recycling and end-of-waste", *Waste Management and Research*, Vol. 37 No. 2, pp. 109-111, doi: [10.1177/0734242X19826776](https://doi.org/10.1177/0734242X19826776).
- Rana, S., Tandon, U. and Kumar, H. (2023), "Understanding medical service quality, system quality and information quality of Tele-Health for sustainable development in the Indian", *Emerald Insight*, pp. 22-27, doi: [10.1108/K-01-2023-0005](https://doi.org/10.1108/K-01-2023-0005).
- Reike, D., Vermeulen, W.J.V. and Witjes, S. (2017), "The CE: new or refurbished as CE 3.0? — Exploring controversies in the conceptualization of the CE through a focus on history and resource value retention options", *Resources, Conservation and Recycling*, Vol. 135 February, pp. 246-264, doi: [10.1016/j.resconrec.2017.08.027](https://doi.org/10.1016/j.resconrec.2017.08.027).
- Risi, D., Vigneau, L., Bohn, S. and Wickert, C. (2023), "Institutional theory-based research on corporate social responsibility: bringing values back in", *International Journal of Management Reviews*, Vol. 25 No. 1, pp. 3-23, doi: [10.1111/ijmr.12299](https://doi.org/10.1111/ijmr.12299).
- Rizos, V., Behrens, A., van der Gaast, W., Hofman, E., Ioannou, A., Kafyeke, T., Flamos, A., Rinaldi, R., Papadelis, S., Hirschnitz-Garbers, M. and Topi, C. (2016), "Implementation of CE business models by small and medium-sized enterprises (SMEs): barriers and enablers", *Sustainability (Switzerland)*, Vol. 8 No. 11, p. 1212, doi: [10.3390/su8111212](https://doi.org/10.3390/su8111212).

- Rodríguez-Espíndola, O., Cuevas-Romo, A., Chowdhury, S., Díaz-Acevedo, N., Albores, P., Despoudi, S., Malesios, C. and Dey, P. (2022), "The role of CE principles and sustainable-oriented innovation to enhance social, economic and environmental performance: evidence from Mexican SMEs", *International Journal of Production Economics*, Vol. 248 No. June 2020, 108495, doi: [10.1016/j.ijpe.2022.108495](https://doi.org/10.1016/j.ijpe.2022.108495).
- Samadhiya, A., Agrawal, R., Luthra, S., Kumar, A., Garza-Reyes, J.A. and Srivastava, D.K. (2023), "Total productive maintenance and Industry 4.0 in a sustainability context: exploring the mediating effect of CE", *The International Journal of Logistics Management*, Vol. 34 No. 3, pp. 818-846, doi: [10.1108/IJLM-04-2022-0192](https://doi.org/10.1108/IJLM-04-2022-0192).
- Sariatli, F. (2017), "Linear economy versus CE: a comparative and analyzer study for optimization of economy for sustainability", *Visegrad Journal on Bioeconomy and Sustainable Development*, Vol. 6 No. 1, pp. 31-34, doi: [10.1515/vjbsd-2017-0005](https://doi.org/10.1515/vjbsd-2017-0005).
- Sehnem, S., Vazquez-Brust, D., Pereira, S.C.F. and Campos, L.M. (2019), "CE: benefits, impacts and overlapping", *Supply Chain Management*, Vol. 24 No. 6, pp. 784-804, doi: [10.1108/SCM-06-2018-0213](https://doi.org/10.1108/SCM-06-2018-0213).
- Sharma, N.K., Govindan, K., Lai, K.K., Chen, W.K. and Kumar, V. (2021), "The transition from linear economy to CE for sustainability among SMEs: a study on prospects, impediments, and prerequisites", *Business Strategy and the Environment*, Vol. 30 No. 4, pp. 1803-1822, doi: [10.1002/bse.2717](https://doi.org/10.1002/bse.2717).
- Shashi, Centobelli, P., Cerchione, R. and Jhamb, D. (2023), "Double-edged circularity: comparative assessment of circular and non-circular consumers", *Ecological Economics*, Vol. 212 No. 1, pp. 22-28.
- Silva, F.C., Shibao, F.Y., Kruglianskas, I., Barbieri, J.C. and Simisgalli, P.A.A. (2019), "CE: analysis of the implementation of practices in the Brazilian network", *Revista de Gestao*, Vol. 26 No. 1, pp. 39-60, doi: [10.1108/REGE-03-2018-0044](https://doi.org/10.1108/REGE-03-2018-0044).
- Singh, M.P., Chakraborty, A. and Roy, M. (2018), "Developing an extended theory of planned behavior model to explore CE readiness in manufacturing MSMEs, India", *Resources, Conservation and Recycling*, Vol. 135 June, pp. 313-322, doi: [10.1016/j.resconrec.2017.07.015](https://doi.org/10.1016/j.resconrec.2017.07.015).
- Sohal, A., Nand, A.A., Goyal, P. and Bhattacharya, A. (2022), "Developing a CE: an examination of SME's role in India", *Journal of Business Research*, Vol. 142 No. 0, pp. 435-447, doi: [10.1016/j.jbusres.2021.12.072](https://doi.org/10.1016/j.jbusres.2021.12.072).
- Soni, V., Gnekpe, C., Roux, M., Anand, R., Yaroson, E.V. and Banwet, D.K. (2023), "Adaptive distributed leadership and CE adoption by emerging SMEs", *Journal of Business Research*, Vol. 156, pp. 23-37, doi: [10.1016/j.jbusres.2022.113488](https://doi.org/10.1016/j.jbusres.2022.113488).
- Stahel, W.R. (2016), "CE – a new relationship with our goods and materials would save resources and energy and create local jobs", *Nature*, Vol. 531 No. 7595, pp. 435-438, doi: [10.1038/531435a](https://doi.org/10.1038/531435a), available at: <https://www.nature.com/articles/531435a.pdf>
- Stahel, W. and Reday, G. (1981), "The potential for substituting manpower for energy", *Report to the Commission of the European Communities*, April.
- Suryantini, N.P.S., Arsawan, I.W.E., Darmayanti, N.P.A., Moskalenko, S. and Gorokhova, T. (2021), "CE: barrier and opportunities for SMEs", *E3S Web of Conferences*, Vol. 255, p. 01017, doi: [10.1051/e3sconf/202125501017](https://doi.org/10.1051/e3sconf/202125501017).
- Tapaninaho, R. and Heikkilä, A. (2022), "Value creation in CE business for sustainability: a stakeholder relationship perspective", *Business Strategy and the Environment*, Vol. 31 No. 6, pp. 2728-2740, doi: [10.1002/bse.3002](https://doi.org/10.1002/bse.3002).
- Torres-Guevara, L.E., Prieto-Sandoval, V. and Mejia-Villa, A. (2021), "Success drivers for implementing CE: a case study from the building sector in Colombia", *Sustainability (Switzerland)*, Vol. 13 No. 3, pp. 1-17, doi: [10.3390/su13031350](https://doi.org/10.3390/su13031350).
- Tsvetkova, D., Bengtsson, E. and Durst, S. (2020), "Maintaining sustainable practices in SMEs: insights from Sweden", *Sustainability (Switzerland)*, Vol. 12 No. 24, pp. 1-26, doi: [10.3390/su122410242](https://doi.org/10.3390/su122410242).

- Unal, E., Urbinati, A. and Chiaroni, D. (2019), "Managerial practices for designing CE business models: the case of an Italian SME in the office supply industry", *Journal of Manufacturing Technology Management*, Vol. 30 No. 3, pp. 561-589, doi: [10.1108/JMTM-02-2018-0061](https://doi.org/10.1108/JMTM-02-2018-0061).
- Upadhyay, S. and Alqassimi, O. (2018), "Transition from linear to CE", *Westcliff International Journal of Applied Research*, Vol. 2 No. 2, pp. 62-74, doi: [10.47670/wuwijsr201822oasu](https://doi.org/10.47670/wuwijsr201822oasu).
- Upadhyay, S. and Alqassimi, O. (2019), "Transition from linear to CE", *Westcliff International Journal of Applied Research*, Vol. 2 No. 2, pp. 62-74, doi: [10.47670/wuwijsr201822oasu](https://doi.org/10.47670/wuwijsr201822oasu).
- Velenturf, A.P.M. and Purnell, P. (2021), "Principles for a sustainable CE", *Sustainable Production and Consumption*, Vol. 27, pp. 1437-1457, doi: [10.1016/j.spc.2021.02.018](https://doi.org/10.1016/j.spc.2021.02.018).
- Virmani, N., Saxena, P. and Raut, R.D. (2022), "Examining the roadblocks of circular economy adoption in micro, small, and medium enterprises (MSME) through sustainable development goals", *Business Strategy and the Environment*, Vol. 31 No. 7, pp. 32-37, doi: [10.1002/bse.3054](https://doi.org/10.1002/bse.3054).
- Webster, K. (2017), *The Circular Economy: A Wealth of Flows*, Ellen Macarthur Foundation.
- Yaduvanshi, N.R., Myana, R. and Krishnamurthy, S. (2016), "CE for sustainable development in India", *Indian Journal of Science and Technology*, Vol. 9 No. 46, doi: [10.17485/ijst/2016/v9i46/107325](https://doi.org/10.17485/ijst/2016/v9i46/107325).

Further reading

- Agrawal, R., Wankhede, V.A., Kumar, A., Upadhyay, A. and Garza-Reyes, J.A. (2021), "Citation", *International Journal of Productivity and Performance Management*, Vol. 71 No. 3, pp. 748-774, doi: [10.1108/IJPPM-12-2020-0676](https://doi.org/10.1108/IJPPM-12-2020-0676).
- Hair, J.F. Jr., Gabriel, M.L.D.da S. and Patel, V.K. (2014), "Modelagem de Equações Estruturais Baseada em Covariância (CB-SEM) com o AMOS: orientações sobre a sua aplicação como uma Ferramenta de Pesquisa de Marketing", *Revista Brasileira de Marketing*, Vol. 13 No. 2, pp. 44-55, doi: [10.5585/remark.v13i2.2718](https://doi.org/10.5585/remark.v13i2.2718).
- Ormazabal, M., Prieto-Sandoval, V., Puga-Leal, R. and Jaca, C. (2018), "CE in Spanish SMEs: challenges and opportunities", *Journal of Cleaner Production*, Vol. 185, pp. 157-167, doi: [10.1016/j.jclepro.2018.03.031](https://doi.org/10.1016/j.jclepro.2018.03.031).
- Rizos, V., Behrens, A., Kafyeke, T., Hirschnitz-Garbers, M. and Ioannou, A. (2015), "The CE: barriers and opportunities for SMEs", Ceps, (September), p. 25, available at: <https://www.ceps.eu/publications/circular-economy-barriers-and-opportunities-smes>
- Thorley, J., Garza-Reyes, J.A. and Anosike, A. (2019a), "The CE impact on small to medium enterprises", *WIT Transactions on Ecology and the Environment*, Vol. 231, pp. 257-267, doi: [10.2495/WM180241](https://doi.org/10.2495/WM180241).
- Thorley, J., Garza-Reyes, J.A. and Anosike, A. (2019b), "The CE impact on small to medium enterprises", *WIT Transactions on Ecology and the Environment*, Vol. 231 September, pp. 257-267, doi: [10.2495/WM180241](https://doi.org/10.2495/WM180241).
- Zamfir, A.M., Mocanu, C. and Grigorescu, A. (2017), "CE and decision models among European SMEs", *Sustainability (Switzerland)*, Vol. 9 No. 9, p. 1507, doi: [10.3390/su9091507](https://doi.org/10.3390/su9091507).

Corresponding author

Amit Mittal can be contacted at: amit.mittal@chitkara.edu.in

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgrouppublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com