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Original Article

Barriers and opportunities of the circular economy in small and medium enterprises: a systematic review of the literature

Barreiras e oportunidades da economia circular em pequenas e médias empresas: uma revisão sistemática da literatura

Daiane Gonçalves da Fontoura[I], **Samuel Vinícius Bonato**[I], **Vanessa de Campos Junges**[I], **Guilherme de Oliveira Rodrigues**[I], **Catherine Santos Salomão**[I]

[I] Universidade Federal do Rio Grande, RS, Brazil

ABSTRACT

Objective: This study aimed to present a portrait of studies on Circular Economy (CE) in Small and Medium-sized Companies (SMEs) from 2011 to 2021, referring to articles published in Scopus database journals.
Methodology: A systematic literature review (RSL) was developed, which collected a sample of 141 articles, which, after being evaluated, resulted in a total of 25 studies to be investigated, falling within the scope of this proposal.
Findings: The connections between the subjects are growing, confirming that the implementation of CE aimed at SMEs has become a relevant issue that requires scientific deepening. There is a greater incidence of economic and political barriers, emphasizing the lack of financial resources combined with the lack of incentives for industries.
Research limitations: The study is restricted to just one database of journals and a limited search period to survey the articles to be investigated.
Originality/value: The research contributes by exploring the concept of CE, taking into account current discussions on the subject. It is important that the barriers that inhibit the application of CE are overcome, that a model is properly designed, and joint and strategic actions are implemented. The suggestion for future research involves the creation of a theoretical framework that articulates the identified elements and serves as a basis for SMEs, translating the transition as a path of sustainable organizational growth.

Keywords: Circular economy; Small and medium enterprises; Systematic literature review

RESUMO

Objetivo: Este estudo teve como objetivo apresentar um retrato dos estudos sobre Economia Circular (EC) em Pequenas e Médias Empresas (PMEs), no período de 2011 a 2021, referente aos artigos publicados nos periódicos da base Scopus.
Método: Desenvolveu-se uma revisão sistemática de literatura (RSL), a qual coletou uma amostra de 141 artigos, os quais após avaliados resultaram em um total de 25 estudos a serem investigados, estando dentro do escopo da presente proposta.
Descobertas: As conexões entre os assuntos são crescentes, confirmando que a implementação da EC voltada as PMEs tornou-se uma pauta relevante e que necessita de aprofundamento científico. Há maior incidência de barreiras econômicas e políticas, enfatizando a falta de recursos financeiros aliada à falta de estímulos às indústrias.
Limitações da pesquisa: O estudo restringe-se a apenas uma base de periódicos e limitação de período de busca para o levantamento dos artigos a serem investigados.
Originalidade/Valor: A pesquisa contribui ao explorar o conceito de EC, tendo em vista as discussões atuais acerca do assunto. É importante que as barreiras que inibem a aplicação da EC sejam superadas, que um modelo seja devidamente elaborado e ações conjuntas e estratégicas sejam executadas. A sugestão de pesquisas futuras envolve a criação de um framework teórico que articule os elementos identificados e sirva de base para PMEs, traduzindo a transição como um caminho de crescimento organizacional sustentável.

Palavras-chave: Economia circular; Pequenas e médias empresas; Revisão distemática de literatura

1 INTRODUCTION

Disorderly population growth, increased production of consumer goods, and the indiscriminate use of natural resources, including a linear economy, are just some of the factors that contribute to the deconstruction of a sustainable economy on a global scale. From an economic point of view, EC is a model that should replace conventional, linear material and energy flow models, addressing the issues of environmental deterioration, social equity and long and sustainable economic growth. (Kirchherr et al., 2023). In this scenario, the CE emerges, which is configured as a response to the inability of the linear model, being replaced by circular flows capable of reusing inputs.

The CE theoretical framework is spreading among business professionals, policy advocates, governments, and professors (Del Vecchio, 2021). It is currently promoted by the European Union, several national governments, including China, Japan, the United Kingdom, France, Canada, the Netherlands, Sweden, and Finland, as well as several

companies around the world (Korhonen et al., 2018a). Influencing the development of philosophies and concepts that guide production and consumption practices (Murphy and Pincetl, 2013; Pigosso and Mcaloone, 2021).

One of the application contexts of CE are companies, whether large, medium, small or micro companies, in which economic circularity brings opportunities for them to take measures to develop mechanisms and processes in order to create, share and transfer knowledge that can help to review traditional production processes and adopt new strategies. According to the EMF (2015), it was estimated that the transition to CE could reduce global emissions by 48% by 2030 and by 83% by 2050, based on current levels.

Although recent scientific literature deals with circular economic models related to sustainability, research on their implementation among SMEs is just emerging. There are specific challenges, requiring a variety of renewable and ecological innovations and practices to be implemented in these companies (Ghisellini and Ulgiati, 2020). It is also essential to create business opportunities, whether in the integration of more circular models and green technologies, or in the current and future installations of companies in all sectors, including services (Mendoza et al., 2022).

In recent years, CE has been increasingly heralded as an economic model that can replace the current linear economy, addressing issues of environmental deterioration, social equity and stimulating long-term economic growth, so as to act as a tool to achieve sustainable development. Anchored to this, recommendations for the future involve the alignment of companies with the concept of CE and the Sustainable Development Goals (SDGs), the latter with the aim of ending poverty, protecting the environment and the climate, in addition to ensuring that everyone can enjoy peace and prosperity (Paiva, 2021). In this sense, the CE has been regarded as a key to sustainable development, (Kirchherr et al., 2023). However, achieving this circular model requires cyclical and regenerative environmental innovations in the way society legislates, produces and consumes (Prieto-Sandoval et al., 2018).

Given the need for these innovations, it is highlighted that from the perspective of SMEs there are barriers that make the implementation of CE more complex in the SME sector. Given this, the behavior of suppliers, the lack of technical skills and financial restrictions are considered barriers (Chakraborty et al., 2023). On the other hand, opportunities arise through CE, such as acquiring new technologies, developing efficient resources and strategies, developing the company's image, as well as encouraging environmental policies (Chakraborty, 2023; Briguglio et al., 2021).

That said, starting from the premise that CE offers organizations and society a model capable of building a new socio-environmental expectation, the concern in providing answers about what are the current limitations and motivations that encompass the field of SMEs in the context of implementing a sustainable model. Working with the scientific field, we intend to gather, through a survey of publications, information for the following questions: (i) What are the main characteristics of publications on Circular Economy and Small and Medium-sized Companies?; (ii) *What are the barriers and opportunities to adopt the Circular Economy in Small and Medium-sized Companies?;* (iii) What are the strategies and/or determinants that facilitate the effective implementation of the Circular Economy in Small and Medium-sized Companies*?;* (iv) *What are your suggestions for future research?* To this end, the objective of this study is to present a portrait of studies on Circular Economy in Small and Medium-sized Companies, from 2011 to 2021, referring to articles published in journals in the Scopus data base.

Therefore, this article covers providing responses to the current limitations and motivations regarding CE that encompass the field of SMEs in the context of implementing a sustainable model. The development of the study is reinforced due to the fact that CE practices are not normally applied in SMEs, in order to involve an opportunity for entrepreneurial and socio-environmental growth, being considered as a high-cost investment by their owners (Mura et al., 2020). Therefore, in addition to deepening research in the area, it is possible to observe benefits and implementation difficulties, both for companies and society, as well as revealing the fruits of their intertwining.

Whether in relation to cultural awareness of a greener vision, organizational and strategy changes to support CE, as well as industrial symbiosis, energy efficiency and renewable energy solutions. It is therefore hoped that the findings identified will highlight the importance of CE in SMEs and provide a more specific explanation about the connection between the parties and performance.

2 CIRCULAR ECONOMY

The CE approach is associated with the analysis of the influence of natural resources on economic systems and the impacts of linear and open perspectives (Pearce and Turner, 1990; Bianchi and Cordella, 2023). In terms of environmental benefits, becoming more circular would help avoid emissions, reduce resource loss, and ease the burden on global ecosystems (Adami and Schiavon, 2021). CE has been proposed as one of the latest concepts to address environmental and socioeconomic issues (Witjes and Lozano, 2016). According to Salvioni and Almici (2020), circularity emerged as a philosophy that optimizes the economic, environmental and social factors of business to transform the entire society, in order to become more sustainable through the involvement of stakeholders.

It is possible to understand CE as a model that aims to reprocess waste and adequately reallocate resources, aiming to maximize the ecosystem and guarantee human well-being, so that the economic pillar also benefits (Schröder et al., 2020). The aim is to increase interest in green and sustainable growth by society and government institutions, as both are concerned about climate change, as well as the development of technologies and process improvements. As Longo et al., (2016) point out, the debate is ongoing about the appropriate management of resources and waste, combined with financial and social gains, through CE. That said, in order to draw an overview with different definitions of CE, Table 1 was developed.

Furthermore, the selection of the authors mentioned in Table 1 was made based on specific criteria that reflect their significant contributions and influences on

the development and definition of the concept of circular economy. It is important to highlight that this choice does not exclude the importance of other works and researchers in the area, but focuses on those widely recognized for their academic impact and their fundamental contribution to the advancement, understanding and practice of the circular economy.

Table 1 – Conceptual basis of the CE

Theoretical framework	**Definition**
Blomsma et al. (2019)	It is an integrated concept that involves the need to apply circular practices aimed at creating value and reducing waste.
Korhonen et al. (2018B)	It is based on a variety of different scientific and semi-scientific concepts such as ecological economics, industrial ecology, crib design, performance economics, biomimicry, eco-efficiency, resilience science, natural capitalism and cleaner production.
Milios (2018)	It incorporates the long-standing and well-established concept of resource efficiency, considering the economics of resource conservation and the potential benefits it can generate.
Kirchherr et al. (2017, 2023)	Describes an economic system based on business models that operate at the micro level (products and companies) reducing, reusing, recycling and recovering materials in production/distribution processes, meso level (eco-industrial parks) and macro level (cities, regions, countries and others) with the aim of achieving sustainable development, which means creating environmental quality, economic prosperity and social equity for the benefit of humanity.
Geissdoerfer et al. (2017)	Regenerative system that minimizes the input and waste of resources, emissions and energy leaks, reducing, closing and narrowing material and energy cycles. This can be achieved through long-term design, maintenance, repair, reuse, remanufacturing, refurbishment and recycling.
Stahel (2016)	It makes it possible to transform goods that are at the end of their useful life into reusable resources, closing circuits in industrial ecosystems and generating less waste. It changes the economic logic, making it possible to replace production with sufficiency: reuse what can be recycled, what cannot be reused, repair what is broken, remanufacture what cannot be repaired.
Wijkman & Skånberg (2015)	It has the idea that instead of discarding products before the value is fully utilized, one should use and reuse them, it is a restorative industrial system by intention and design.
EMF (2013, 2015)	An industrial economy that can be intentionally restorative, making use of renewable energy, minimizing, tracking and eliminating the use of toxic chemicals and eliminating waste through care. Thus, it provides multiple value creation mechanisms that are decoupled from the consumption of finite resources.

Source: Developed by the authors (2024)

In light of the above, it is highlighted that the potential of CE is to allow improvements in productivity and maintenance of resources, minimizing environmental problems (Wei et al., 2017). According to the aforementioned authors, economic systems should operate with the principles of recycling materials and energy that drive natural systems (Geng and Doberstein, 2008). The CE puts the production and consumption system into discussion, providing visions of how commercial relationships can be built in order to move this economy. Furthermore, the approach does not only involve preserving the environment, as it aims to regenerate it, through its integration with industrial processes (Prieto-Sandoval, 2018; EMF, 2013).

The implementation of CE can generate the following benefits for organizations: increased recognition, cost reduction, environmental recovery and ensuring the organization's long-term permanence (Ormazabal et al., 2018). Sánchez-Ortiz et al. (2020) add that in addition to focusing on productivity, CE contributes to the eco-efficiency of resources by optimizing industrial structures, working on the development and application of new technologies and mainly on the renewal and management of resources. Thus, it promotes sustainable benefits, such as efficiency, effectiveness, circularity of resources, optimization of natural resources and use of clean energy, reinforcing its importance for organizations and society as a whole (Sehnem and Pereira, 2019).

According to the EMF (2015), opportunities for organizations generated by CE involve increased profits, reduced volatility and greater security of supplies, new demand for business services, greater interaction with customers and loyalty. Furthermore, it is a structure designed to avoid waste, diversity, use of renewable energy sources, systemic thinking and prices reflecting real costs (EMF, 2015).

That said, CE activities focus exclusively on three levels: (i) macro: targeted at regions, cities, municipalities or provinces; (ii) meso: focusing on eco-industrial networks, where waste (materials or energy) from one company becomes raw material from another; (iii) micro: encompasses improving the environmental performance of

a given organization, for example, by reducing resource consumption, disposing of waste or creating more environmentally friendly products (Zhang et al., 2022; Yong, 2007; Yuan, 2013). Therefore, based on the redesign of their business models towards the implementation of CE, companies can obtain efficiency gains, reduction of inputs and prevention of waste (Geissdoerfer et al., 2017).

2.1 Small and Medium-sized Companies in the context of the Circular Economy

SMEs are mainly based on investments and business volumes that gradually transform according to the economic condition and wealth of the country. The annual report based on European SMEs in 2015 highlights that they contribute to major areas of development such as employment, adding value to companies, including micro, small and medium-sized companies.

This segment represents 90% of companies in the world (Dey et al., 2022), which play a fundamental role in changing the paradigm and transition to an economy that is environmentally and economically regenerative (Bassi and Dias, 2020). Globally, SMEs have a role in promoting inclusive and sustainable economic growth, providing employment and work, promoting sustainable industrialization, fostering innovation and reducing income inequalities (OECD, 2017). So, rEducing companies' dependence on critical resources can provide a strategic advantage and increase their resilience to material shortages and price volatility (Asif et al., 2015).

These facts reinforce the importance of achieving sustainability in SMEs to make the entire ecosystem sustainable. Understanding the right combination of economic, environmental and social factors as one of the main problems for companies as they spend efforts focused on the economy due to uncertainty on the demand sides. and supply, along with numerous competitions (Dey et al., 2022). According to the Business and Sustainable Development Commission, sustainable business models could unlock economic opportunities worth US$12 trillion and create 380 million jobs by 2030, with more than 50% located in developing countries like Brazil (Rosati et al., 2023). The

SDGs established in the 2030 Agenda are ambitious and require transformation of public and private activities. This transformation is associated with the adaptation of new, more sustainable and ethical business models, bringing technological innovations (Fukuda-Parr, 2023).

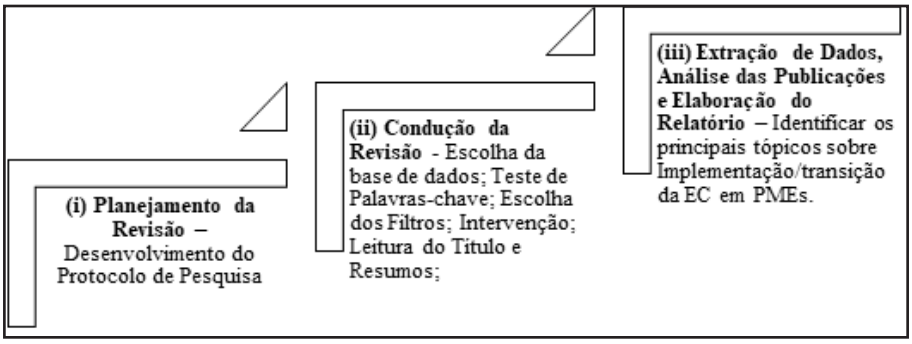
In this context, the biggest challenge for companies in the context of CE implementation is the development of circular business models that promote the sustainable use of resources and reduce dependence on critical resources (Awan and Sroufe, 2022). SMEs face specific challenges, and as the transition from sustainability to CE is also at an early stage (Ghisellini et al., 2020), a variety of renewable and environmentally friendly innovations and practices are needed. Although there is an extensive body of knowledge on sustainability, and public awareness of sustainable production and consumption patterns has increased, some economic actors are resisting this transition. For this reason, political measures, such as environmental regulations, taxes and subsidies, will play a crucial role in this process (Köhler et al., 2019).

Finally, an SME that operates in the linear economy and aims to be more sustainable must advance gradually. There are few cases in which a company manages to become circular quickly, except in the case of startups that are created with the purpose of improving management. environmental (Ormazabal et al., 2018). Furthermore, consumers are more attentive to the ideas behind CE, both in developed and developing countries, something that is being identified by companies and which, if used correctly, can generate significant returns.

3 METHOD

The present study was developed based on an SLR, in which the selection and analysis of articles related to the research followed the methodological procedures proposed by Tranfield et al. (2003) (see Figure 1).

Figure 1 – Systematic Literature Review Process



Source: Developed by the authors (2024), based on Tranfield et al. (2003)

In order to obtain an overview of the literature on articles and analyzes that portray the applicability of CE in SMEs, Scopus was used as it is the largest database of abstracts and citations of scientific literature. The choice to exclusively use this database for this study was deliberate and strategic for several reasons, such as the robust indexing and selection policy of scientific journals, ensuring that only publications of high quality and academic relevance are included in its database; continuous updating and the geographic coverage of Scopus, including a large number of journals from different parts of the world, is crucial to avoid regional bias and ensure a global and representative view of the topics covered in the research, minimizing potential inconsistencies or discrepancies that could arise when comparing data from multiple databases.

Furthermore, the choice not to use other databases in this study was made to maintain methodological consistency and focus on the use of a single source of data that best meets the specific needs of the research in question. Allowing for a more in-depth analysis and interpretation. Clearer results obtained, without the introduction of unnecessary variables or potential complexities associated with combining multiple databases. The data collection period took place in November 2021, using the following strings and Booleans: “circular economy” AND “SME” OR “small and medium-sized companies”. The search initially returned 141 results. from document to Article, Review or Article in the Press (Scopus); Language in English and the period considered 2011-

2021. The cutoff used is due to the increase in publications in this period on the topic analyzed; a database composed of 107 articles.

After carrying out the database search and extracting the results, the titles and abstracts of the remaining articles were analyzed. Studies that were not directly related to the topic were excluded. From this survey, the selected articles were coded and analyzed, in order to answer the research questions proposed in the study. The final the sample contains 25 articles, of which 82 were excluded because they were isolated, unrelated, redundant and irrelevant studies with the following exclusion criteria: (i) duplicate articles; (ii) articles that were not linked to the study area. Finally, the selected articles were compared to resolve existing doubts, and 25 relevant articles were selected for the research.

As a first step towards the study, the selected articles were read in full, organizing the information in an Excel table, in which information such as: journal, impact factor, object of study, type of study, theories were selected. used by authors and constructs, authors and country of origin. Then, in the next section, the results are presented, in order to outline the portrait of publications referring to CE in the context of SMEs.

4 OVERVIEW OF PUBLICATIONS ON CIRCULAR ECONOMY IN THE CONTEXT OF SMALL AND MEDIUM COMPANIES

There has been an evolution in the number of publications over the years on the topic, with emphasis on the period 2020 and 2021, in which only the year 2021 represents 50% of the articles published. It is noteworthy that the majority of studies are from the European continent (20 studies), which represents 81% of the analyzed sample. The European countries with the highest number of publications are Germany, Italy and Spain, followed by a smaller number of publications in other continents such as Asia, South America and North America. The prominence of the European Union is attributed to the fact that the CE concept derives from the 1976 report to the European Commission, proposed by Stahel and Reday (1981), with another important

contribution from British environmental economists Pearce and Turner (1990). In 2014, the European Commission (the body responsible for proposing new legislation) published its 2015 CE Package, with the stated aim of "closing the loop" on product life cycles (Fitch-Roy et al., 2020)

Table 2 – Circular Economy Publications in the context of Small and Medium-sized Companies

Authorship	Title	Quotes
Ormazabal et al. (2018)	Circular Economy in Spanish SMEs: Challenges and opportunities	116
Bassi and Dias (2020)	The use of circular economy practices in SMEs across the EU	71
Mura and Zanni (2020)	Circular economy in Italian SMEs: A multi-method study	62
Prieto-Sandoval et. al (2019)	Key strategies, resources, and capabilities for implementing circular economy in industrial small and medium enterprises	41
Katz-Gerro and López Sintas (2019)	Mapping circular economy activities in the European Union: Patterns of implementation and their correlates in small and medium-sized enterprises	38
Zamfir et al. (2017)	Circular economy and decision models among European SMEs	36
Ghisetti and Montresor (2020)	On the adoption of circular economy practices by small and medium-sized enterprises (SMEs): does "financing-as-usual" still matter?	30
García-Quevedo et al. (2020)	Barriers to the circular economy in European small and medium-sized firms	30
Dey et al. (2022)	Circular economy to enhance sustainability of small and medium-sized enterprises	28
Cantú et al. (2021)	Learning from Failure and Success: The Challenges for Circular Economy Implementation in SMEs in an Emerging Economy	17
Bassi and Guidolin (2021)	Resource Efficiency and Circular Economy in European SMEs: Investigating the Role of Green Jobs and Skills	16
Marrucci et al. (2022)	Antecedents of absorptive capacity in the development of circular economy business models for small and medium-sized enterprises	12
Garrido-Prada et al. (2021)	Driving the circular economy through public environmental and energy R&D: Evidence from SMEs in the European Union	4
Min et al. (2021)	Proposing circular economy ecosystem for chinese smes: A systematic review	3

Source: Developed by the authors (2024)

SMEs are still primarily focused on environmental management practices, such as obtaining environmental certification. Therefore, it is pertinent to adopt measures regarding the selection of suppliers and sources, rather than strategies to return and enrich materials and energy in the system. Aiming for greater theoretical depth, Table 2 was developed in order to highlight the main publications of the last 5 years relating to the themes of this study.

Based on the above, it can be seen that the research carried out by Ormazabal et al. (2018) is one of the most cited articles on the subject, empirically exploring the potential for implementing CE in SMEs and the perceived barriers and opportunities. The study reveals that some sectors of the economy are more willing to implement environmental strategies in some phases of the CE cycle, such as the construction sector. However, companies in the process of implementing CE do not believe that environmental commitment will increase their business profits and sustainability in the market. In addition to considering that support from public institutions is one of the most critical barriers (Ormazabal et al., 2018).

The contribution brought by the study by Prieto Sandoval et al. (2019) reports that CE-related strategies can help SMEs improve their business and environmental performance. Mura et al. (2020) show that several practices of EC were simultaneously implemented by SMEs, supporting the notion that it implies a systemic approach to strategic value creation. In particular, practices related towaste management, packaging, supply chain and product/process design represent key elements for closing the loop on material flows.

In the study by Bassi and Dias (2020), it was found that 73.2% of companies had undertaken or were in the process of undertaking at least one CE activity in the last three years - however, the situation varies between countries. The research also reflects that minimizing waste through recycling, reusing waste or selling it to another company is the CE practice most adopted by SMEs (55.4% of companies have adopted or are about to adopt this policy). Furthermore, Dey et al. (2022) discuss CE and its correlation with the sustainability performance of SMEs (economic, environmental and

social) in focus groups and consider five fields of action: take, make, distribute, use and recover, of which only doing and use contribute to overall economic, environmental and social performance, as current research reveals.

Given this, CE has emerged as an economic model to reduce current levels of environmental degradation while maintaining sustainable economic development and social value (Korhonen et al., 2018a). The transition to an CE will require commitment from many actors, including governments and companies (Garrido et al., 2021). In addition, Min et al. (2021) researched whether public environmental and energy R&D provides SMEs with the scientific knowledge and capabilities to deal with CE implementation. To solve these problems and get SMEs to better engage in CE practices, the network is the critical enabler. The network includes collaboration with large companies, industrial clusters and stakeholder engagement. Therefore, strategic partnerships with large enterprises allow SMEs to use their own advantages to exchange resources with large enterprises or upstream and downstream enterprises, compensating for the lack of investment, technology and resources (Min et al., 2021). Next, in the next subsection, the barriers and opportunities regarding CE in SMEs are exposed.

4.1 Barriers and opportunities for Circular Economy in Small and Medium-sized Companies

It is possible to identify that SMEs differ from larger organizations in terms of available resources, research, development and technology capabilities (Rizos et al., 2016). Several studies have addressed the topic of barriers and drivers for CE regardless of company size, where access to financial support and incentives can make sustainability more attractive (García□Quevedo et al., 2020). With regard to Spanish SMEs, Ormazabal et al. (2018) agreed that financial resources are crucial, but suggested that a lack of consumer demand to address environmental issues represented an important inhibiting factor. To expose the investigated context, Table 3 was developed, which reflects the main barriers to CE in SMEs.

Table 3 – Barriers to the Circular Economy in Small and Medium-sized Companies

Authorship	Barrier	Context
Cantú et al. (2021)	Economic; Social; Administrative; Policy.	Low willingness to pay; Preference when purchasing disposable products; Poor perception of recycled or reused products; Asymmetric information and no communication between employees or within company departments; Resistance from stakeholders who hold power; Hierarchical system that inhibits flexibility and innovation.
Min et al. (2021)	Policy; Social; Economic; Technological.	Lack of political support; Current market structure is not friendly to SMEs who do not have enough finance to adopt CE; Most SMEs lack capital and investment from investors due to their low turnover; Most SMEs lack knowledge and/or creativity in organizational culture.
Mura et al. (2020)	Policy; Management; Informative.	Uncertainty about response times from public administrations in the area of sustainability; Lack of coordination of regulation at EC, national, regional and local levels in the field of sustainability; Bureaucratic difficulties in applying legislation on sustainability (waste, water) by companies; Difficulty in navigating the renewable energy market; Lack of clear guidelines for defining sustainability in SMEs; Perception of sustainability as a cost and not as an investment.
Scipioni et al. (2021)	Social; Management; Economic; Institutional.	*Stakeholders* external agents, commissioners and customers present resistance, perception of lower product quality; Lack of economic resources to be invested in innovation; Conservative management stance in relation to construction techniques, materials used and lack of knowledge of related benefits.
Ormazabal et al. (2018)	Institutional; Social; Informative; Technological.	Lack of adequate technology; Lack of support from public institutions; Lack of customer interest in the environment; Lack of qualified personnel in sustainability; Lack of knowledge/skills/ awareness.
Holzer et al. (2021)	Economic; Institutional; Social.	Financial insufficiency; High investment costs; Difficulty obtaining financial resources; Lack of consumer interest in purchasing sustainable products.

Source: Developed by the authors (2024)

In addition to the above, Mura et al. (2020) and Garcés-Ayerbe et al. (2019) emphasize the lack of support from public institutions as a barrier, understanding the lack of government support for SMEs (through the provision of financing opportunities, training and effective legislation) and excessive bureaucracy as significant barriers (Mura et al., 2019). Kirchherr et al. (2017, 2023) identify consumers' lack of interest and misinformation, along with risk-averse business culture as the main barriers. The

study by Agyemang et al. (2019) also find that barriers under companies' environmental culture and lack of interest on the part of management are significant limitations that prevent the implementation of CE practices. Despite the literature cited, several authors (Ormazabal, 2018; Prieto-Sandoval, 2018; Mura et al., 2020; Rizos et al., 2016) highlight the opportunities of CE in SMEs and its importance, requiring that companies and society are able to work together so that its implementation is carried out in the best way, developing opportunities for everyone involved. That said, Table 4 was developed, which presents some existing opportunities in the context of CE in SMEs.

Table 4 – Circular Economy Opportunities in Small and Medium-sized Companies

Category	Motivations	Authorship
Economic	Government incentives, including tax reductions, subsidies, compensation, risk capital, investment, financial facilitations and chances to participate in government programs, are facilitators of financial resources in the sustainable area.	Min et al. (2021); Cantú et al. (2021); Scipioni et al. (2021); Mura et al. (2020).
Supply chain	Use of tools to facilitate product traceability in the supply chain and configure a reverse supply chain for the return of resources.	Cantú et al. (2021).
Institutional	Green certifications, EC Laws and regulations, support for companies in developing sustainability-oriented staff training at various levels.	Scipioni et al. (2021); Mura et al. (2020).
Social	Cultural awareness regarding green aspects and media exposure.	Scipioni et al. (2021); Min et al. (2021).
Innovation	Energy efficiency and renewable energy solutions, increase in information and technology platforms for transparent management for new types of services (waste management and reuse platforms). In addition to the availability of technologies that facilitate recycling, optimization or remanufacturing, for example, more effective techniques to collect, separate and recycle discarded materials.	Scipioni et al. (2021); Cantú et al. (2021).
Organizational	Knowledge development (e.g., identification of suppliers with low environmental impact), as CE solutions make brands sustainable. In addition to promoting cultural, organizational and strategy changes to support CE.	Scipioni et al. (2021); Cantú et al. (2021); Mura et al. (2020).
Environmental	Recovery of sites in the environment, acquisition of raw materials with low environmental impact, improving existing resource management practices, promotion of sustainability policies, access to financing in the area of sustainability, training of CE-focused personnel.	Min et al. (2021); Mura et al. (2020); Ormazabal et al. (2018).

Source: Developed by the authors (2024)

Based on the above, everyone involved, directly or indirectly, can benefit through CE: SMEs can reduce costs related to raw material waste, maximize profit from processing raw material waste or reprocessing discarded products, as well as obtaining consumer recognition for adopting sustainability principles in their processes; while the environment benefits from the reduction of environmental impacts, such as excessive waste generation. Like this, the advantages for the economic and environmental spheres become evident, the first being essential for leveraging the applications of CE models (Lehmann et al., 2022), and for effective implementation, everyone involved must have an understanding of how develop it in your space.

Table 5 – Marketing strategies Circular Economy for Small and Medium Businesses

(Continued)

Authorship	Title	Strategy
Anzules-Falcones et al. (2021)	Foresight for small and medium enterprises in the context of the circular economy	Generate financial policies that help companies acquire appropriate technology; Defined process to identify suppliers that offer high quality materials; Training existing staff and hiring specialists in dealing with economic and financial issues; Design strategies that boost sales growth and profit generation in the sector; Involve universities and research centers to find improvements in production and waste management processes.
Prieto Sandoval et al. (2019)	Beyond the circular economy theory: Implementation methodology for industrial SMEs	The implementation of strategies drives the emergence of eco-innovations and organizational changes to facilitate the creation of competitive advantage in the market. Score yourselfthe Ecopyme methodology, which comprises five stages: (i) Company identity, (ii) Diagnosis, (iii) Planning, (iv)Execution (Get the ball rolling),It is(v) AssessmentIt isreturn.
Schmidt et al. (2021)	Understanding the effect of market orientation on circular economy practices: The mediating role of closed-loop orientation in German SMEs	Three distinct strategic CE practices stand out: internal environmental management, ecodesign and management, and recovery of corporate assets.

Table 5 – Marketing strategiesCircular EconomyforSmall and Medium Businesses

(Conclusion)

Authorship	Title	Strategy
Torres-Guevara et al. (2021)	Success drivers for implementingCircularеconomy: A case study from the building sector in Colombia	Five drivers are identified for the CE implementation strategy: fertile ecosystem, management commitment, identification of valuable materials, green teams and CE intermediaries.
Mura et al. (2020)	Circular economy in Italian SMEs: A multi-method study	What stands out as a differentiator is cost leadership, differentiation, operational, innovation and general performance.

Source: Developed by the authors (2024)

In view of this, there are a series of strategies to implement CE in companies, which depend on each organizational context and prove to be important for sustainable development gains. Anzules-Falcones et al. (2021), addressed the SMEs need to develop management skills and partnership links that promote the exchange of knowledge, as well as create relationships with public administration to propose strategies to face emerging challenges. That said, Table 5 presents some strategies identified in the literature investigated in the present study.

5 DISCUSSIONS AND RESEARCH AGENDA

The panorama of publications on CE in SMEs stands out mainly between the years 2020 and 2021, corresponding to half of the studies analyzed in the present study. It was also possible to observe that the European continent stood out in the number of publications on the subject. Ormazabal et al. (2018) observe that the CE incentive package launched by the European Commission in 2015 represents one of the largest and most significant contributions to the implementation of actions by European countries towards the topic, which may demonstrate the reason for the continent's representation in the CE.

Based on the studies analyzed, it was clear that SMEs still seek to achieve objectives related to environmental management practices, such as achieving

environmental certifications. This need remains a priority, given that SMEs represent a large proportion of waste and pollution in the environment, making it necessary to understand which factors affect sustainable practices in these small and medium-sized companies (Bassi and Dias, 2020).

In relation tobarriers that permeate the implementation of the circular economy in SMEs, these were identified through different spheres, such as economic, administrative, social, managerial, institutional, political, technological and informational. Under the economic scope, the authors pointed out the low perception of paying, the lack of capital and investment in SMEs, the lack of economic resources to be invested in innovation, financial insufficiency and high investment costs as obstacles to the application of CE (Cantú et al., 2021; Min et al., 2021; Scipioni et al., 2021; Holzer et al., 2021). Therefore, the high costs involved in implementing CE are considered to be too much of a reality for SMEs, which makes implementing these initiatives an arduous process. Economic barriers can be associated with market barriers, which include obstacles such as a small or unprofitable market, uncertainty about it and a deregulated competitive environment (Cantú et al., 2021).

The numerous context of information that does not correspond to the reality of the facts, as well as the lack of communication between employees or departments to resolve issues arising from this reality, are considered administrative barriers for CE in SMEs (Cantú et al., 2021). In turn, this organizational asymmetry can have consequences on how the SME is viewed externally, as the lack of consensus can negatively impact its performance.

In this same scenario, the social barrier is associated with poor perception of products, the market structure that is not receptive to SMEs, customer resistance in relation to product quality and lack of interest in sustainable products (Cantú et al., 2021; Min et al., 2021; Scipioni et al., 2021; Ormazabal et al., 2018; Holzer et al., 2021). In view of the above, it is clear that certain barriers can be triggers for the emergence of new oppositions not previously evident in SMEs. Therefore, it is important that these

organizations are able to transpose these elements in a strategic way, so that they do not result in new obstacles to implementing CE in your reality.

Complementary to this, the managerial barrier, which consists of the lack of coordination of CE regulation and has negative consequences on SME adherence (Mura et al., 2020), needs to be overcome in order for CE to become a precursor to a innovative behavior in the organization. To achieve this, the conservative management stance in relation to construction techniques and the benefits of the approach need to be re-analyzed (Scipioni et al.,2021).

To obtain new behaviors and relevant changes that move towards overcoming these barriers, it is also necessary that institutional barriers are overcome, which affect SMEs through the lack of support from public institutions and the difficulty in obtaining sufficient financial resources to adapt CE to SMEs (Scipioni et al., 2021; Holzer et al., 2021). It is also important to overcome the political issues involved, which result in uncertainty and lack of information from public administration regarding the area of sustainability, and are therefore known as political barriers (Min et al., 2021; Mura et al., 2020). In turn, the lack of information management regarding the implementation of CE in SMEs, known as an information barrier, results in misinformation regarding the processes necessary for its adoption. This happens through the lack of clear guidelines for defining sustainability in SMEs, the perception of sustainability as a cost and not as an investment and the lack of knowledge and skills (Mura et al., 2020; Ormazabal et al., 2018).

In contrast to the barriers, the literature also demonstrates opportunities regarding the implementation of CE in SMEs. These appear from an economic, institutional, social, organizational, technological and environmental perspective. From an economic perspective, they arise through government incentives, including tax reductions, subsidies, compensation, risk capital, investment, financial facilitations and chances to participate in government programs, facilitating financial resources in the sustainable area (Min et al.,2021; Cantú et.al, 2021; Scipioni et al.,2021; Mura et al.,

2020). Based on this, regulations aimed at supporting SMEs in relation to the circular economy are considered essential and necessary to support sustainable development in these companies.

Based on the support received, access to green certifications is also facilitated, which associate the SME's image with the sustainable development movement. These facilitators are considered institutional opportunities, which act in the drafting of laws that regularize the CE, as well as support for companies in the development of people aiming for sustainability (Scipioni et al., 2021; Mura et al., 2020). The development of qualified human resources corroborates the encouragement of opportunities in the social sphere, these are linked to cultural awareness in relation to green aspects and exposure in the media (Scipioni et al.,2021; Min et al.,2021).

Through the qualification of people at different levels, which allocates the necessary knowledge for implementing CE not only in large companies, but also in SMEs, it is possible for organizational opportunities aimed at developing knowledge based on the needs of IT solutions. CE for SMEs gain strength, reflecting cultural and organizational changes that encourage CE (Scipioni et al., 2021; Mura et al., 2020; Cantú et al., 2021).

Technological opportunities are also associated with the reality of CE in SMEs as a resource that encourages innovation. Among these opportunities, energy efficiency and renewable energy solutions stand out, and the need for the availability of technologies that facilitate recycling, optimization or remanufacturing is highlighted (Scipioni et al., 2021; Cantú et al., 2021). For Cantú et al. (2020), in the same sense, opportunities also arise in the supply chain through technology and innovation, which are associated with tools that facilitate product traceability within the chain.

Emerging as one of the priorities in this process, environmental opportunities are responsible for driving CE progress in the context of SMEs. Their main objectives are the recovery of spaces in the environment, the improvement of existing resource management practices and the training of people capable of CE (Min et al., 2021; Mura et al., 2020; Ormazabal et al., 2018). It is also worth highlighting that through the

literature analyzed and the deeper understanding of the phenomena that involve the barriers and opportunities that encompass the implementation of CE in SMEs. It was also highlighted which strategies are capable of facilitating SMEs to overcome possible obstacles. and improve results through CE.

To make the most of CE initiatives, the authors base the organizational strategy as a necessary point to improve their practices. Highlighting areas such as management commitment; green teams; identification of valuable materials; financial policy for acquiring appropriate technology; well-defined suppliers and processes; creation of financial policies; and the qualification of people; all of which are critical areas for the growth of the area and the design of strategies that stimulate sales growth and profit generation (Torres Guevara et al., 2021; Anzules Falcones et al., 2021).

Table 6 – Suggestions for future studies

The change from a linear economy to the EC proved to be a dubious point for SMEs, the transformation period still raises doubts that could prevent the transition from being successful. Therefore, it is suggested as a future study the development of models that specify the transition stages from a linear economy to CE;
Investigate the role that corporate asset management and recovery plays for CE practices in developed and developing countries. In view of this, an analysis of the impact of CE practices on organizational management is suggested;
In general, the circular economy can still be a question for companies, it is essential to understand what the processes involved are, what the main changes and differences are. Therefore, it is suggested that future research explore different circular practices;
With climate change and its visible consequences, sustainability has gained global appeal in recent years. Emerging practices that aim to encourage care for the environment have gained support from different sectors of society. Therefore, studies that seek to understand the relationship between companies and society to resolve the proposed challenges are necessary;
The reality of SMEs requires that changes in their operations be rigorously analyzed in advance, the low availability of human and financial resources compared to large companies causes business risks to increase. In this way, future studies will be able to analyze the influences arising from the specific organizational context throughout the implementation of a sustainable business.

Source: Developed by the authors (2024)

According to Prieto-Sandoval et al. (2019), these strategies also drive eco-innovations and changes capable of providing competitive advantages to SMEs. In

this sense, planning the actions that should impact the company's processes become essential for strategic planning to demonstrate the organization's path and objective. Making the movements differentiate it in the market and can add to its strategic purpose, which can happen through sales leadership through low cost in relation to competitors, product differentiation and performance of the product offered (Mura et al., 2020). Finally, in addition to the above, it is highlighted that the study revealed the need for research that investigates questions that have not been answered in the literature. In general, a greater understanding and development of theory about CE in SMEs is encouraged, in which Table 6 exposes theoretical gaps.

6 FINAL CONSIDERATIONS

This study aimed to present a portrait of studies on Circular Economy in Small and Medium-sized Companies, from 2011 to 2021, referring to articles published in journals in the Scopus database. In view of the research carried out, it was identified that the connections between the subjects are increasing, confirming that the implementation of CE aimed at SMEs has become a relevant issue that requires scientific deepening. The study offers a broad overview about what are the current limitations and motivations regarding CE that encompass the field of SMEs in the context of implementation for a sustainable model. Bringing contributions related to barriers, motivations and strategies that commonly appear in research. It is worth highlighting that CE is a reality in the current organizational context, due to its economic, environmental and social advantages. Therefore, SMEs need well-targeted strategies to leverage their implementation, which enable the transition to a new economic model sustainable. However, it is clear that the application of CE is complex and involves numerous agents such as customers, industry employees, suppliers, government and society.

In order to unite agents (company, government, institutions and society in general), it is important that CE is a common concept for everyone. Aiming, primarily, at understanding its objective and purpose for the benefit of society. Through analysis

of the articles identified in the RSL, it is understood that the purpose of the CE involves regenerating and assisting the development of an abundant economy and fostering sustainable economic growth. The motivations, barriers and basic strategies for CE in the organization explored were viewed under the economic and environmental pillars, as they presented a greater number of advantages. There is a greater incidence of economic and political barriers, emphasizing the lack of financial resources combined with the lack of incentives for industries.

Furthermore, research gaps were identified at the industrial, social and organizational level: Develop models that specify the transition stages from a linear economy to CE; Investigate the role that corporate asset management and recovery plays for CE practices in developed and developing countries; Explore different circular practices; Understand how companies and society can adapt and respond to global challenges through CE; Explore how CE practices can be incorporated into the social system in which SMEs operate; Investigate the role of consumers in the shift from linear to CE economies; Analyze the influences related to specific contextual elements of organizational learning along the dimensions for the implementation of a sustainable business model; Investigate the use of a framework or *framework* appropriate to help develop CE in emerging and developing economies; Explore guidelines to facilitate the transition to a CE between general and specific areas.

Therefore, the research contributes by exploring the concept of CE, taking into account the current discussions on the subject, elaborated from the RSL. To achieve the aforementioned advantages, it is important that the barriers that inhibit the application of CE are overcome, and that a CE model is properly designed and joint and strategic actions are executed. The suggestion for future research involves the creation of a theoretical framework that articulates the identified elements and serves as a basis for SMEs that wish to obtain a vision of how to act in circular logic, translating the transition as a path of sustainable organizational growth.

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Authors

1 – Daiane Gonçalves da Fontoura

Institution: Universidade Federal do Rio Grande – Rio Grande, RS
Graduated in Administration from Federal University of Rio Grande
Orcid: https://orcid.org/0000-0003-2427-0251
E-mail: fontdada@gmail.com

2 – Samuel Vinícius Bonato

Institution: Universidade Federal do Rio Grande – Rio Grande, RS
Doctor in Production Engineering from Federal University of Rio Grande do Sul
Orcid: https://orcid.org/0000-0002-2486-4909
E-mail: svbonato@gmail.com

3 – Vanessa de Campos Junges

Institution: Universidade Federal do Rio Grande – Rio Grande, RS
Doctor in Administration from Federal University of Santa Maria
Orcid: https://orcid.org/0000-0002-9722-6617
E-mail: vanessadecamposjunges@gmail.com

4 – Guilherme de Oliveira Rodrigues

Institution: Universidade Federal do Rio Grande – Rio Grande, RS
Graduated in Administration from Federal University of Rio Grande
Orcid: https://orcid.org/0009-0003-2940-7920
E-mail: guilhermeeor@gmail.com

5 – Catherine Santos Salomão

Institution: Universidade Federal do Rio Grande – Rio Grande, RS
Graduated in Administration from Federal University of Rio Grande
Orcid: https://orcid.org/0009-0006-2193-1260
E-mail: cathe_santos@hotmail.com

Contribution of authors

Contribution	[Author 1]	[Author 2]	[Author 3]	[Author 4]	[Author 5]
1. Definition of research problem	√	√	√		
2. Development of hypotheses or research questions (empirical studies)	√	√	√		
3. Development of theoretical propositions (theoretical work)	√	√	√	√	√
4. Theoretical foundation / Literature review	√	√	√	√	√
5. Definition of methodological procedures	√	√	√		
6. Data collection	√				
7. Statistical analysis	√	√	√		
8. Analysis and interpretation of data	√	√	√		
9. Critical revision of the manuscript			√	√	√
10. Manuscript writing	√	√	√	√	√
11. Other (please specify)					

Conflict of Interest

The authors have stated that there is no conflict of interest.

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