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Revolutionizing Entrepreneurship: Circular Business Models for a Sustainable Economy

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Abstract:

This study delves into the implementation of circular business models within the entrepreneurial sector as a means to foster a sustainable economy. By conducting a qualitative review of the literature, the analysis includes academic publications and case studies that examine the principles, advantages, and challenges associated with the circular economy in entrepreneurship. The methodology involves synthesizing pertinent literature to identify effective strategies and common obstacles in adopting circular practices. The results indicate that, despite encountering financial constraints, a lack of expertise, and logistical difficulties, the circular economy presents substantial opportunities for innovation and environmental sustainability. These opportunities enhance competitiveness and contribute to long-term economic success. The discussion emphasizes the necessity of cross-sector collaboration, supportive policies, and educational programs to address these challenges. In conclusion, the research underscores the pivotal role of circular business models in transitioning to a sustainable economy, advocating for cooperative efforts among entrepreneurs, policy-makers, and academics to promote sustainable business practices that benefit both the environment and the economy.

Keywords: Circular economy, sustainability, innovation, entrepreneurship

1. Introduction

The transition towards more sustainable economies is a global imperative, given the growing recognition of environmental limits and the need for more sustainable development (Geissdoerfer et al., 2017). Within this context, circular business models (CNMs) present themselves as a promising alternative that is capable of generating long-term economic, social, and environmental value (Korhonen et al., 2018). CNMs seek to decouple economic growth from consuming finite resources by maximizing the reuse, renewal and recycling of products and materials (Lacy & Rutqvist, 2015).

Despite the growing adoption of NQFs in large corporations, their implementation in the entrepreneurial sector faces unique challenges, particularly with regard to resource scarcity and the need for innovative business models (Bocken et al., 2017). The entrepreneurial sector, known for its agility and innovativeness, plays a crucial role in the experimentation and adoption of NQFs, offering novel solutions to complex environmental problems (Stubbs, 2017).

This study aims to explore how entrepreneurs are adopting circular business models to foster a sustainable economy. By analyzing selected case studies, it can examine the strategies adopted by entrepreneurs to implement circular practices in their business models, the challenges faced and lessons learned in the process. In addition, it will seek to understand the impact of these models on the economic, environmental and social sustainability of start-ups.

Research on NQFs in the context of entrepreneurship is vital to move towards a more sustainable and circular global economy. By identifying and analyzing the practices, challenges and opportunities associated with NQFs in the entrepreneurial sector, this study will contribute to the existing body of knowledge and provide valuable insights for academics, practitioners and policy-makers interested in promoting sustainability through entrepreneurial innovation. The relevance of this study lies in its potential to contribute to sustainable development by offering a deeper understanding of how NQFs can be effectively implemented and scaled in the context of entrepreneurship. By providing empirical evidence and practical recommendations, this work aims to be a valuable resource for entrepreneurs, researchers and policy-makers, promoting a more integrated and sustainable approach to start-up and start-up management.

2. Materials and Methods

This study is based on a qualitative methodology, specifically through a comprehensive literature review, to explore and analyze the adoption of circular business models (CNMs) in the entrepreneurial sector and their contribution towards a sustainable economy. This methodological approach allows for an in-depth understanding of existing theories, practices, challenges and opportunities related to NQFs in the context of entrepreneurship.

The literature search was conducted in several academic databases, including Google Scholar and Scopus, using a combination of relevant keywords such as "circular business models," "sustainable entrepreneurship," "circular economy," and "innovation in sustainability." Filters were applied to select publications from 2000 to the present to capture the most recent trends in the field.

We included research articles, literature reviews, case studies, and conference reports that provided insights into the implementation of NQFs in the entrepreneurial sector. Papers that were not directly related to entrepreneurship or that did not explicitly address circular business models were excluded. In addition, preference was given to studies that provided concrete examples of NQF implementation, challenges, and results for start-ups and small businesses.

A thematic analysis approach was employed to analyze the data collected from the literature. This involved identifying, analyzing and interpreting patterns (themes) within the data. It began with a thorough reading of each source to obtain a general understanding of the content. This was followed by open coding, assigning codes to relevant text segments related to the objectives of the study. Similar codes were grouped together to form emerging themes, which were reviewed and refined through an iterative process of comparison with the theoretical framework of the study.

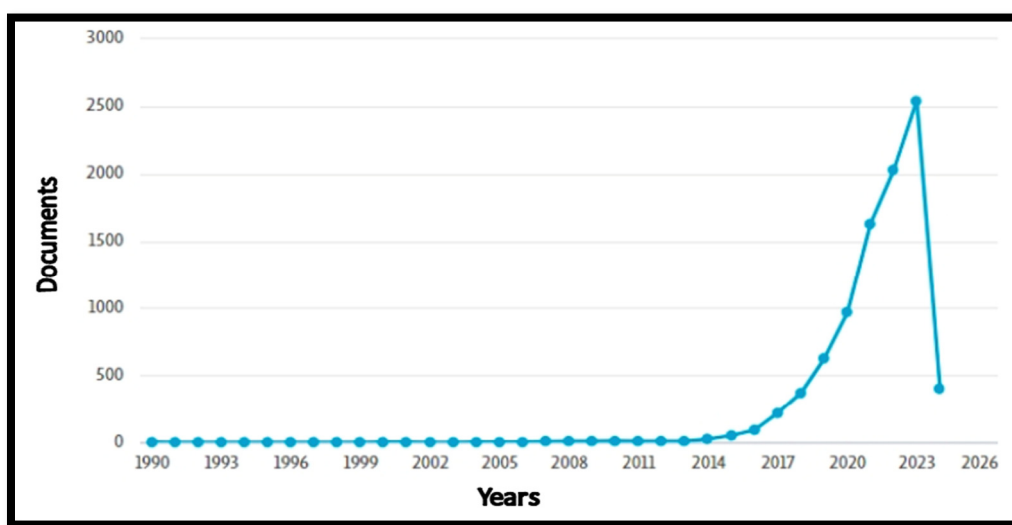


Figure 1: Per Year
Note: Scopus (2024)

In figure 1, as mentioned in the methodology, different research papers were examined from among those registered in the specialized platforms, thus identifying the years with the greatest contributions in the field of the circular economy. It was observed that from 2016 onwards, there was a continuous increase in the number of papers by researchers.

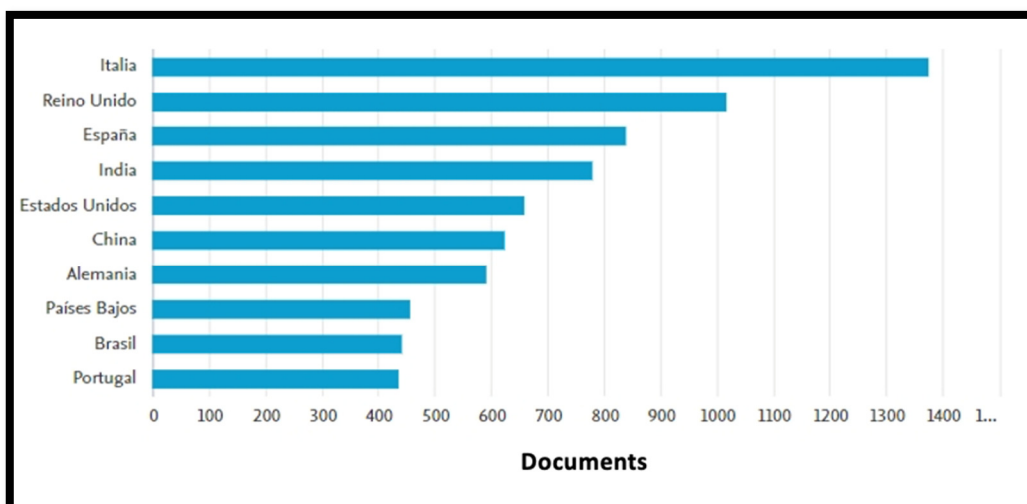


Figure 2: By Territory
Note: Scopus (2024)

standard, sets out guidelines for organizations to implement effective environmental management systems, emphasizing the importance of pollution prevention and continual improvement (ISO, 2021).

In addition, the promotion of the functional economy is another key strategy within the principle of reduction, where the sale of services is prioritized over products, thus encouraging less resource consumption. Stahel (2010) argues that the functional economy represents a transition towards more efficient resource-use systems, where wealth is generated by the circulation and maximum utilization of goods and services.

The reduction principle also highlights the importance of consumer awareness and active participation in choosing more sustainable products and services. According to a study by Young et al. (2010), environmental education and effective communication about the benefits of sustainable products can significantly influence consumers' purchasing decisions, thus promoting more responsible consumption patterns.

3.1.1.2. Re-use

Reuse is an essential pillar of the circular economy. It focuses on extending the useful life of products and materials, allowing their continued use in the same or another function before considering recycling or disposal. This approach not only prevents the waste of valuable resources but also reduces the demand for new materials and reduces waste generation (Geissdoerfer et al., 2018).

A key aspect of reuse is the ability to design products with increased durability and ease of repair. According to Cooper (2010), encouraging the repair and maintenance of products can significantly extend their useful life and decrease the environmental impact associated with the production of new goods. The implementation of product return and refurbishment systems is also part of this strategy, as demonstrated by companies that have adopted reuse-based business models to offer refurbished products at a lower cost (Bakker et al., 2014).

The collaborative economy and sharing platforms are other important examples of how reuse can be integrated into today's economy. These models promote the sharing of goods and services, maximizing their utility and minimizing the need to purchase new products. Botsman and Rogers (2010) highlight the growth of sharing and rental platforms, which facilitate the reuse of products among consumers and contribute to an economy less dependent on resource consumption.

In addition, consumer participation in reuse practices is crucial to their success. Raising awareness of the environmental and economic benefits of reuse can motivate consumers to opt for reusable or refurbished products instead of buying new ones. According to a study by Vittersø and Tangeland (2015), education and promotion initiatives can significantly increase consumer participation in the circular economy by adopting more sustainable consumption habits.

3.1.1.3. Recycling

3.1.1.3.1. January–March 2024

Recycling is positioned as a crucial strategy in the circular economy. It focuses on transforming waste into new materials or products, thus reducing dependence on virgin resources and decreasing the environmental impact associated with the extraction and processing of new materials (Ghisellini et al., 2016). This process not only contributes to the conservation of natural resources but also minimizes the emission of greenhouse gases and other pollutants resulting from waste production and disposal.

Effective implementation of recycling requires product design that considers end-of-life from the earliest stages, facilitating disassembly and separation of materials for subsequent recycling. According to Potting et al. (2017), design for recycling is an essential component that enables the efficient recovery of materials and their reintegration into the production cycle.

In addition, public policies play a key role in encouraging recycling by implementing regulations that promote sustainable practices and establishing return and reward systems to incentivize the collection and recycling of end-of-life products (Korhonen et al., 2018). These policies can include extended producer responsibility, where manufacturers are responsible for collecting and recycling their discarded products.

Collaboration between different actors in the supply chain is another critical element for successful recycling. Businesses, consumers, and government entities must work together to create efficient recycling systems that maximize material recovery. Schröder et al. (2019) highlight the importance of cooperative networks in overcoming the technical and logistical challenges associated with collecting and processing recyclable waste.

3.1.2. Components of NQFs

3.1.2.1. Design for Circularity

Design for circularity represents an innovative approach that integrates environmental and sustainability considerations from the earliest stages of product development. This approach seeks to create durable, reusable, repairable, and ultimately recyclable goods and services, minimizing waste and encouraging the reuse of resources throughout their life cycle (Bocken et al., 2016).

Implementing this principle requires a paradigm shift in product design, where functionality and resource efficiency become the key pillars. According to Tukker (2015), designing for circularity involves not only the selection of recyclable materials and ease of disassembly but also consideration of the environmental impact during the entire life cycle of the product, from the extraction of raw materials to its final disposal.

In addition, designing for circularity promotes innovative business models, such as product-service systems (PSS) that offer the functionality of a product as a service. This can significantly reduce resource consumption by extending the lifespan of products and encourage manufacturers to design more sustainable and easier-to-maintenance products (Stahel, 2016).

Collaboration between designers, engineers, businesses, and consumers is essential to the success of design for circularity. Integrating users into the design process can reveal opportunities to improve product durability and repairability and identify new ways to meet consumer needs in a sustainable way (Moreau et al., 2017).

3.1.2.2. Innovation in the Business Model

Business model innovation is essential for the transition to a circular economy. It offers new ways to create, deliver and capture value through sustainable and regenerative practices. These innovations can range from business models based on use rather than possession to product-service systems (PSS) emphasizing functionality over ownership (Bocken et al., 2014).

The circular economy demands a rethink of traditional business operations, prompting companies to explore how they can reduce the environmental impact of their products and services while maintaining their competitiveness and generating revenue. According to Lüdeke-Freund et al. (2019), this includes designing closed systems where resources are kept in use for as long as possible, and value creation is spread throughout the supply chain.

Circular business models also promote collaboration between different economic actors, including consumers, businesses and government entities. This cooperation is vital to developing infrastructures and systems that facilitate circular practices, such as recycling, reuse and repair (Geissdoerfer et al., 2017).

In addition, technology plays a crucial role in enabling circular business models through digital platforms that enable product traceability, return systems for recycling, and the sharing economy, which reduces the need for the production of new goods through sharing and reuse (Täuscher & Abdelkafi, 2017).

3.2. Adoption of NQFs in the Entrepreneurial Sector

3.2.1. Motivations for NQF Adoption

3.2.1.1. Environmental Benefits

Adopting a circular economy offers multiple environmental benefits, including significant reductions in the use of natural resources, minimization of waste generation, and reduced greenhouse gas (GHG) emissions. These benefits are crucial for mitigating climate change and preserving biodiversity and ecosystems (Korhonen et al., 2018).

The circular economy promotes the efficient use of resources through strategies such as redesigning products to improve their durability and repairability, reusing products and materials, and recycling end-of-life materials (Alcivar Soria, 2021). This contributes to a reduction in the demand for raw material extraction, which is vital to preserve natural resources and minimize the environmental impact associated with their extraction and processing (Geissdoerfer et al., 2018).

In addition, the transition to circular practices can significantly decrease CO₂ emissions by optimizing production processes, reducing the transport of materials and products, and reducing the amount of waste sent to landfills. This is essential for achieving global emission reduction targets and combating climate change (Ellen MacArthur Foundation, 2019).

Another relevant environmental benefit is the promotion of biodiversity. By reducing the need for new raw materials and minimizing negative impacts on natural ecosystems, the circular economy helps to protect and restore biodiversity (Becerra, L. 2015). This is crucial for maintaining the ecosystem services on which humanity depends, such as pollination, water and air purification, and climate regulation (Murray et al., 2017).

3.2.1.2. Economic Advantages

Author(s)	Contribution to the Circular Economy
Webster (2015)	The transition to a circular economy represents an opportunity for economic innovation, job creation and sustainable growth, redefining production and consumption practices to unlock new markets and sources of value.
Stahel (2016)	Cost reductions due to reduced dependence on raw materials are highlighted. Volatile and costly raw materials by maximizing the use and reuse of resources.
MacArthur & al. (2016) Bocken & al. (2016)	It fosters job creation in emerging sectors such as recycling, repair and remanufacturing, contributing to resource conservation and skills development in the green economy. Stimulates innovation and entrepreneurship through the need for circular solutions, opening up opportunities for the development of more sustainable products and services, including innovations in design and business models based on services.
Lacy & Rutqvist (2015)	It improves the global competitiveness of companies by adopting more efficient and sustainable practices, which enhances brand image, meets the demand for green products, and complies with environmental regulations.

Table 1: Advantages

Note: Authors (2024)

Table 1 summarises the contributions of various authors to the understanding and development of the circular economy, highlighting its potential to drive economic innovation, job creation, and sustainable growth. It takes into account the different points that the authors address to elaborate their ideas, such as improvements, development spaces, strategies, and key points that exist in different situations.

3.2.1.3. Corporate Social Responsibility

Incorporating the principles of the circular economy into corporate social responsibility (CSR) strategies enables companies to take a leading role in promoting environmental, social and economic sustainability. CSR in the framework of the circular economy encompasses not only resource efficiency and reduction of environmental impacts but also a commitment to social equity and community development (Schaltegger et al., 2016).

A fundamental aspect of CSR in the circular economy is the design of products and systems that consider the entire life cycle, minimizing negative impacts on the environment and society (Andino-Jaramillo & Palacios-Soledispa, 2023). This includes adopting clean production practices, promoting social inclusion through innovative business models and supporting local communities through sustainable job creation (Hong et al., 2023).

In addition, the circular economy offers companies an opportunity to improve their transparency and accountability. By implementing traceability systems and openly reporting on their sustainability practices, companies can strengthen their relationships with consumers, investors, and other stakeholders, building trust and fostering a culture of corporate responsibility (Eccles et al., 2014).

The circular economy also promotes social justice by prioritizing equitable access to resources and benefits derived from the economy. This involves developing products and services that are accessible to all segments of society, including vulnerable populations, and ensuring that business practices do not contribute to social or economic inequality (Porter & Kramer, 2011).

Finally, companies that embrace circular principles can lead the way towards a more sustainable future by influencing their supply chains, sectors, and public policy. Through collaboration with suppliers, competitors, and regulators, they can promote higher sustainability standards and social responsibility, thus contributing to the systemic transformation needed to address today's global challenges (Elkington, 2018).

3.2.2. Challenges in NQF Implementation

3.2.2.1. Financial Barriers

The transition to circular business models faces significant financial barriers that can limit the ability of companies to implement sustainable changes. These financial barriers include the high cost of initial investment, lack of accessible finance and credit, and uncertainty regarding returns on investment (Rizos et al., 2016).

One of the main challenges is the cost associated with restructuring production processes, acquiring new technologies and developing products designed for circularity. These initial investments can be substantial, especially for small and medium-sized enterprises (SMEs) operating with limited budgets (Bocken et al., 2016).

In addition, access to finance is a critical barrier. Despite a growing interest by financial institutions in sustainable projects, there are still limitations in the availability of credit at favourable rates for circular economy initiatives. This is partly due to the perceived risk associated with innovative business models and a lack of understanding of their long-term benefits (Le Blanc, 2015).

Uncertainty about returns on investment also plays an important role in the reluctance to adopt circular practices. Since many of the benefits of the circular economy, such as reduced operating costs and improved resource efficiency, materialize over time, it can be difficult for companies to justify the initial investment in the face of demands for short-term financial returns (Kirchherr et al., 2017).

To overcome these financial barriers, supportive policies, including tax incentives, subsidies, and financing programmes specific to the circular economy, are essential. In addition, the creation of collaborative platforms between companies, financial institutions, and governments can facilitate the sharing of risks and benefits, thus promoting greater investment in circular business models (Geissdoerfer et al., 2018).

3.2.2.2. Lack of Knowledge and Skills

The transition to a circular economy requires a significant change in production processes, business models, and the mindset and skills of those leading and working within organizations. Lack of specific knowledge and skills emerges as one of the main barriers to adopting effective circular practices (Ritzén & Sandström, 2017).

A thorough understanding of the principles of the circular economy, as well as the technical skills to implement sustainable design strategies, resource management, and innovative business models, are essential for the success of these initiatives. However, many companies find that their workforce lacks these critical competencies (Ghisellini et al., 2016). This knowledge deficit extends to top management, where strategic decision-making is crucial. A lack of familiarity with the long-term benefits of the circular economy and how these align with business objectives can lead to a lack of commitment and support for investment in circular practices (Lacy & Rutqvist, 2015).

Education and training play a key role in overcoming these barriers. Vocational training initiatives and academic programmes specific to the circular economy are vital to preparing the next generation of workers and business leaders. In addition, collaboration between businesses, educational institutions, and government agencies is essential to developing curricula that respond to labour market needs and promote sustainable innovation (Geissdoerfer et al., 2017).

To mitigate this knowledge and skills gap, companies must equally invest in continuous employee training by adopting internal training programmes and collaborations with circular economy experts. This not only improves internal competencies but also fosters a culture of learning and adaptability, key elements for business resilience in a constantly changing market environment (Stahel, 2016).

3.2.2.3. Supply Chain Challenges

The transition to a circular economy presents significant supply chain challenges, ranging from the procurement of sustainable materials to the implementation of efficient reverse logistics systems. These challenges are due, in part, to the need to reconfigure traditional supply chains towards models that prioritize reuse, recycling and waste reduction (Geissdoerfer, Morioka, de Carvalho & Evans, 2018).

One of the main challenges is to ensure a constant supply of recycled or renewable materials that meet the quality standards required for reuse in new products. Variability in the quality and availability of these materials can complicate planning and production (Savaget, Geissdoerfer, Bocken, & Hultink, 2017).

In addition, implementing reverse logistics, which includes collecting, returning, and processing end-of-life products, represents a significant logistical and financial challenge. This requires investments in infrastructure and technology, as well as reconfiguration of existing logistics systems, to enable efficient collection and recycling or reuse of products (Agrawal et al., 2015).

Collaboration between the different actors in the supply chain is key to overcoming these challenges. This involves working closely with suppliers, manufacturers, distributors and customers to create circular supply systems that are efficient and sustainable. However, goal alignment and coordination between these stakeholders can be complex, especially in global supply chains where different regulations and sustainability standards exist (Govindan & Hasanagic, 2018).

To address these challenges, the development and implementation of innovative technologies, such as digitization and the use of information and communication technology (ICT), is essential to improve the traceability and efficiency of circular supply chains. In addition, policies and regulatory frameworks that foster the circular economy can provide the necessary impetus to overcome financial and technical barriers, facilitating the transition towards more sustainable supply practices (Hofstetter et al., 2021).

3.3. Strategies for Implementing NQFs in Start-ups and Small Businesses

3.3.1. Product and Service Innovation

3.3.1.1. Products as a Service

The Products as a Service (PaaS) model represents a transformation in the way consumers access goods and services, focusing on selling functionality rather than product ownership. This approach is central to the circular economy, as it promotes resource efficiency and reduces waste generation by extending the useful life of products (Tukker, 2015).

In the PaaS model, companies retain ownership of products and offer customers access to them through service or rental contracts. This incentivizes companies to design products that are durable, easy to repair and upgrade, as they are responsible for their maintenance and eventual recycling at the end of their useful life (Bocken et al., 2016).

In addition, PaaS can lead to a closer relationship between providers and consumers, allowing companies to better understand their customers' needs and tailor the services offered to improve customer satisfaction and retention. This can open up new market opportunities and generate recurring revenue streams for companies (Lacy & Rutqvist, 2015).

However, implementing PaaS models also presents challenges, including the need to redefine sales and marketing strategies, develop customer relationship management capabilities, and adapt logistics systems to handle product returns and refurbishment (Mont, 2002).

To overcome these challenges, it is crucial to develop policies and regulatory frameworks that support the circular economy and innovative business models such as PaaS.

This includes tax incentives for circular products and services and investment in infrastructure to facilitate the collection and reconditioning of products (Stahel, 2016).

3.3.1.2. Durability and Repairability

Product durability and repairability are key pillars of the circular economy, as they extend the useful life of products and reduce waste generation. Designing durable and easily repairable products not only reduces the demand for natural resources but also offers an opportunity to reduce the environmental impact associated with the production and disposal of goods (Cooper, 2010).

The focus on durability seeks to ensure that products maintain their functionality and value for as long as possible, which implies careful selection of materials, robust design and the possibility of future upgrades. On the other hand, repairability focuses on the ease with which a product can be repaired, which requires design considerations that allow easy access to the parts that most commonly need to be replaced or repaired (Bakker et al., 2014).

These practices not only benefit the environment but also offer economic advantages for consumers and businesses. For consumers, durability and repairability mean a reduction in the frequency of product replacement and the ability to keep products running at a lower cost. For businesses, these principles can lead to increased customer satisfaction, brand loyalty and potentially, new business models based on maintenance and repair services (Mont, 2002).

Effective implementation of durability and repairability requires a change in the mindsets of producers and consumers and the support of public policies that promote sustainable design practices. This includes regulations that incentivize the manufacture of durable and repairable products and certification systems that highlight these qualities in products (Stahel, 2016).

3.4. Impacts of NQF Adoption

3.4.1. Environmental Impacts

3.4.1.1. Reduction of Waste and Emissions

Reducing waste and emissions is a key objective of the circular economy, which seeks to minimize the environmental impact of production and consumption processes by optimizing the use of resources and maximizing efficiency throughout the value chain (Geissdoerfer et al., 2017). This approach involves reducing not only the amount of waste generated but also the emissions of greenhouse gases by implementing cleaner and more sustainable production practices.

The waste reduction strategy focuses on waste prevention at the beginning of the design process, promoting the use of recyclable and renewable materials and the design of products that are easy to disassemble for future reuse or recycling (Prieto-Sandoval et al., 2018). On the other hand, emissions reduction is achieved through improved energy efficiency in production processes and the adoption of renewable energy sources, which contributes significantly to climate change mitigation.

Furthermore, the implementation of end-of-life product return and recycling systems plays a crucial role in waste reduction, allowing the recovery of materials and their reintroduction into the production cycle, minimizing the need for natural resource extraction and reducing emissions associated with the production of new materials (Korhonen et al., 2018).

Public policy and business initiatives are key to promoting waste and emissions reduction, including incentives for adopting circular economy practices, developing regulations that encourage extended producer responsibility, and investment in clean and efficient technologies (Ghisellini et al., 2016).

3.4.1.2. Resource Conservation

Resource conservation is a fundamental pillar of the circular economy. It aims to maintain the value of products, materials and resources in the economy for as long as possible, minimizing the extraction of natural resources and the environmental impact associated with their consumption (Ellen MacArthur Foundation, 2015). This approach not only seeks to minimize waste through the reuse, repair, refurbishment and recycling of products and materials but also to promote the efficient and sustainable use of natural resources.

The transition towards resource-conserving practices involves re-evaluating current production and consumption processes, encouraging the design of products with longer lifetimes, and implementing business models based on functionality rather than possession, such as product-service systems (Stahel, 2016). This approach reduces not only the demand for new resources but also the amount of waste generated, closing the life cycle of products and fostering a more regenerative economy.

Resource efficiency is also driven by technological innovation, which enables the development of cleaner and more efficient processes, improved recycling methods and the creation of alternative materials that can reduce dependence on non-renewable resources (Ghisellini et al., 2016). These innovations are crucial for moving towards production and consumption systems that are sustainable in the long term.

Furthermore, resource conservation is intrinsically linked to the protection of biodiversity and ecosystems, as the reduction in natural resource extraction contributes to reducing pressure on natural environments, helping to preserve biodiversity and ecosystem services that are essential for human well-being (Rockström et al., 2009).

3.4.2. Economic Impacts

3.4.2.1. Value Creation and New Markets

The circular economy offers a platform for creating value and opening up new markets through innovation in product design, process optimization and the development of business models that focus on sustainability and resource efficiency (Bocken et al., 2014). By focusing on product and material regeneration, companies can explore new business opportunities that respond to the growing demand for greener and more responsible solutions.

The transition to circular business models allows companies to differentiate themselves in the marketplace, enhancing their competitiveness and positioning them as sustainability leaders. This not only appeals to an increasingly environmentally conscious consumer base but can also open doors to innovative collaborations with other companies and stakeholders, creating business ecosystems that enhance circularity (Lacy & Rutqvist, 2015).

In addition, the circular economy promotes resource efficiency and long-term cost reduction, which are key to sustainable value creation. By reducing reliance on virgin resources and minimizing waste, companies can achieve significant savings and increase their profitability while making a positive contribution to the environment (Geissdoerfer et al., 2018).

Innovation in products and services that facilitate reuse, repair, and recycling also opens up new markets, such as product-as-a-service (PaaS) systems that offer consumers access to goods without the need to own them, creating an ongoing revenue stream and long-term customer relationships (Tukker, 2015).

To capitalize on these opportunities, it is essential that businesses and governments work together to develop supportive regulatory frameworks and policies that encourage the adoption of circular practices and investment in clean technologies. This enabling environment is crucial to stimulate innovation and facilitate the transition to a large-scale circular economy (Stahel, 2016).

3.4.2.2. Efficiency and Cost Reduction

Adopting circular economy practices is essential to improve resource efficiency and reduce operational costs in organizations. Waste minimization, material reuse, and process optimization not only decrease the need for virgin inputs but also reduce the amount of waste generated, leading to significant savings (Ellen MacArthur Foundation, 2013). These strategies can translate into significant competitive advantages by reducing exposure to resource price volatility and improving operational sustainability.

Implementing more efficient production systems, which prioritize recycling and end-of-life material recovery, allows companies to reduce their raw material costs and increase their resilience to market fluctuations (Stahel, 2010). In addition, designing products with efficiency and repairability in mind can extend their useful life, offering consumers more durable and economically attractive solutions.

Investing in technological innovations that facilitate the circular economy, such as sharing economy platforms and more efficient resource management systems, can also reduce operating costs and generate new sources of revenue (Bocken et al., 2016). These technologies enable more flexible and adaptive business models, capable of responding to changes in market demands and environmental regulations.

Life cycle analysis (LCA) emerges as a key tool for assessing the efficiency of processes and products from a circular perspective. It identifies opportunities for cost reduction and environmental improvement along the entire value chain (Guiné et al., 2011). This systematic approach helps companies make more informed decisions about optimizing their operations in a sustainable and economically viable way.

Collaboration between different actors in the supply chain is crucial to maximize efficiency and minimize costs. Integrating circular practices in supply chains not only improves resource management but also fosters innovation and value co-creation between suppliers, manufacturers and customers (Agrawal et al., 2015).

3.4.3. Social Impacts

3.4.3.1. Job Creation

The circular economy, by focusing on the reuse, repair, refurbishment and recycling of products and materials, has the potential to create numerous jobs across various industries. According to studies by the Ellen MacArthur Foundation (2015), the transition to a circular economy can generate millions of jobs globally by opening up new opportunities in sectors such as sustainable design, waste and resource management, and circular manufacturing.

The need to process and remanufacture products at the end of their life cycle creates job opportunities in the recycling and materials recovery sector and requires specialized skills in repairing and maintaining products to extend their lifespan (Geissdoerfer et al., 2017). This approach not only helps to reduce environmental impacts but also promotes the development of a skilled and diverse workforce.

Business models based on the circular economy, such as product-service systems and sharing economy platforms, boost job creation by fostering innovation and entrepreneurship. These models require a wide range of skills, from design and engineering to logistics and customer service, thus providing fertile ground for creating new jobs (Tukker, 2015).

Implementing circular agriculture and food production practices can also generate employment, especially in rural areas. Adopting regenerative farming techniques and more sustainable production systems improves soil health and biodiversity and requires skilled labour to manage these complex systems (Hurlings & Marsden, 2014). The transition to a circular economy demands a transformation in education and vocational training to equip the workforce with the skills needed to thrive in this new economic paradigm. Investment in training and professional development programmes in areas related to sustainability and the circular economy is crucial to ensure that workers can adapt and contribute effectively to this change (Kirchherr et al., 2017).

3.4.3.2. Social Inclusion and Community Empowerment

The circular economy offers a valuable framework for addressing social challenges, including social inclusion and community empowerment. By creating economic systems that value resource regeneration, the circular economy can promote practices that benefit both the environment and local communities (Wilson, 2007).

Circular economy-based projects can foster social inclusion by providing economic opportunities in marginalized communities. For example, recycling and composting initiatives in disadvantaged neighbourhoods not only contribute to waste management but also create jobs and foster a sense of community and belonging (Ghisellini et al., 2016).

The circular economy can also facilitate social inclusion through education and training. Investing in educational programmes that teach sustainability-related skills can open doors to economic opportunities for people who would otherwise be excluded from the labour market (Moreau et al., 2017).

Circular economy initiatives that focus on inclusive and accessible product and service design can significantly improve the quality of life of people with disabilities or special needs, thus promoting a more inclusive and equitable society (Bocken et al., 2014).

4. Discussion

The transition towards circular business models in the entrepreneurial sector is crucial to fostering a sustainable economy. This literature review has highlighted the importance of integrating circular economy principles into the core of emerging business models. Effective implementation of these models can offer significant benefits in terms of environmental sustainability, economic viability and social equity.

The adoption of circular practices promotes a significant reduction in resource use and waste generation. According to the Ellen MacArthur Foundation (2013), companies that adopt circular models can achieve a notable decrease in their environmental footprint while improving efficiency and reducing costs. This supports the findings of Ghisellini et al. (2016), who argue that the circular economy represents a balanced economic and environmental system that can lead to a sustainable future.

Entrepreneurs play a vital role in the innovation and adoption of the circular economy. However, they face specific challenges, such as the need for seed funding and developing relevant skills (Bocken et al., 2016). However, these challenges also present unique opportunities for innovation in products, services and business models that are essential for a successful transition to more sustainable practices.

There is a clear need for further research that explores how public policy and government support can facilitate the adoption of circular business models by entrepreneurs. Future research should focus on identifying specific success factors and barriers in different contexts and industry sectors and developing tools and frameworks that can guide entrepreneurs in implementing circular practices (Kirchherr et al., 2017).

The circular economy offers a promising path to sustainability, with the potential to significantly transform current business practices. For entrepreneurs, it represents an opportunity to lead the shift towards a more sustainable future, although this path is fraught with challenges. Continued support from research, public policy and cross-sectoral collaboration will be crucial to overcome these obstacles and make the most of the opportunities offered by the circular economy.

5. Conclusions

The detailed analysis of circular business models, focusing on the transition towards a sustainable economy within the entrepreneurial sector, reveals a horizon full of opportunities and intrinsic challenges. From the author's perspective, this research underlines the critical importance of adopting circular economy principles as a catalyst for sustainable change. The implementation of these models is not only imperative to mitigate the adverse environmental impacts associated with traditional business models, but also offers a viable avenue for achieving competitive advantage, fostering innovation and ensuring long-term sustainability.

The findings of this study show that although the transition to the circular economy brings significant challenges, especially in terms of financial barriers, lack of knowledge and skills, and supply chain challenges, these are not insurmountable. Collaboration between entrepreneurs, educational institutions, research organizations and government authorities is essential to overcome these obstacles. Education and training play key roles in equipping entrepreneurs with the skills needed to navigate the circular economy landscape, while government support, through favourable policies and funding, can alleviate financial barriers and encourage the adoption of circular practices.

From my perspective, it is clear that the circular economy is not simply a passing trend, but an urgent necessity and a strategic opportunity to redefine the future of entrepreneurship. Adopting circular business models represents a bold step towards building an economic system that balances growth with sustainability, ensuring that present and future generations can enjoy a healthy environment and abundant resources.

In conclusion, this study reiterates the call to action for entrepreneurs, policy-makers, researchers and society at large to embrace the principles of the circular economy. In doing so, we can collectively move towards a more resilient, inclusive and sustainable economy. The journey towards sustainability is complex and full of challenges, but with commitment, innovation and collaboration, the entrepreneurial sector can lead towards a more promising and sustainable future.

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