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TOWARDS A CIRCULAR ECONOMY: A SYSTEMATIC REVIEW OF BUSINESS MODEL INNOVATION IN THE AGE OF SUSTAINABILITY

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ABSTRACT

Objectives: This study aims to synthesize recent developments in business model innovation (BMI) and its strategic role in accelerating the transition toward a circular economy and comprehensive sustainability practices. It specifically examines how different innovation dimensions digital, social, organizational, and bio based shape sustainable and circular business models, while highlighting critical pathways to strengthen systemic collaboration across key stakeholders.

Research Design & Methods: The study employs a systematic literature review, analyzing peer-reviewed publications from 2019 to 2024. A thematic analysis technique was used to classify innovation types, assess their contributions to sustainability and circular outcomes, and identify emerging research gaps and directions.

Findings: BMI serves as a core enabler of sustainable transformation. Digital innovation enhances transparency, real-time environmental monitoring, and process optimization. Social innovation amplifies user participation and fosters collaborative, community-based solutions. Organizational innovation institutionalizes sustainable values through policy reforms, culture change, and structural adaptation. In circular business contexts, bioeconomy innovation leverages renewable biological resources, while product–service system (PSS) innovation extends product value, increases material efficiency, and reduces waste generation. Achieving a successful transition requires active synergy among government, industry, society, and academia.

Implications & Recommendations: Future research should focus on linking sustainability-driven innovation with circular practices in energy efficiency, high performance infrastructure, and governance systems designed for low carbon futures. Policymakers and practitioners must strengthen cross sector collaboration and innovation-oriented policy frameworks.

Contribution & Value Added: This review consolidates and advances understanding of BMI pathways within circular and sustainable ecosystems, offering theoretical and practical insights to guide future research and implementation.

Keywords: Business Model Innovation; Circular Economy; Sustainable Business Models

JEL codes: O31; Q01; Q56
Article type: research paper

INTRODUCTION

The increasingly evident and widespread impacts of climate change have made achieving ecological, economic, and social sustainability a top priority that shapes public policy and management practices worldwide (Bansal, 2019; Rockström et al., 2009; Steffen et al., 2015). With the growing threat of conventional business activities potentially exceeding the planet's ecological limits, global attention to the interrelationship between sustainability, business models, and innovation is rapidly increasing, driving a transformation towards sustainable

business models that integrate economic, social, and environmental values through innovative strategies oriented towards ecological responsibility and long-term sustainability (Bocken et al., 2014; Geissdoerfer et al., 2018).

Business model innovation is a conceptual framework that explains how an organization designs, generates, and maintains value propositions that not only provide economic benefits but also create benefits for customers and stakeholders through integrated structures of activities, resources, and partnerships (Geissdoerfer et al., 2018; Teece, 2010). Organizations now face increasing pressure to incorporate sustainability into their business logic, disclose environmental goals and performance, and then reconfigure their business models to be more sustainable (e.g., shifting orientation from solely economic growth to the entire product-service life cycle) (Ferlito & Faraci, 2022). Thus, businesses need to proactively consider the full life cycle of a product or service from design and use to end of life while simultaneously adapting to evolving customer needs (Biloslavo et al., 2020). Therefore, business model innovation (BMI) emerges as the key to integrating sustainability into the logic of conventional business models, enabling the transformation from traditional business models to models that place environmental and social values alongside economic values (Brenner & Drdla, 2023).

The transition to a circular economy requires not only technological innovation and digitalization, but also business model innovation that creates sustainable value by simultaneously considering social, environmental, and economic factors (Rosa et al., 2019; Salvador et al., 2021). Business model innovation in this context is key to helping companies improve resource efficiency, extend product lifecycles, and reduce waste and emissions throughout the value chain. Studies on sustainable business models and the circular economy have gained widespread attention in recent years, as reflected in the increasing number of scientific publications and review articles that attempt to summarize the development of concepts, practices, and research directions in this field (Bocken et al., 2014; Centobelli et al., 2020; Lüdeke-Freund et al., 2019). Although research on the circular economy and sustainability has grown rapidly, there remains a gap in understanding how business model innovation can effectively accelerate an inclusive, adaptive transition to a circular economy that responds to market dynamics and global environmental policies. Therefore, this study aims to conduct a systematic review of various forms and approaches to business model innovation within the circular economy framework to identify trends, challenges, and opportunities for developing sustainable business strategies in the modern era.

LITERATURE REVIEW

Basic Concepts of Circular Economy

The circular economy is an economic development paradigm oriented towards sustainability through efficient and responsible resource management. It emphasizes the importance of reducing waste, reusing materials, and recycling to create a sustainable closed cycle while decoupling economic growth from dependence on the consumption of finite natural resources (Kirchherr et al., 2017). These are designed to be restorative and regenerative, to maintain the value of products, materials, and resources for as long as possible in the economic system through processes that allow for repeated use in various forms (Morseletto, 2020).

The circular economy is seen as a sustainability strategy that demands a holistic and systemic approach, in which the transition from a linear to a more sustainable economic system requires consideration across dimensions and timescales, and the involvement of multiple stakeholders (Vogiantzi & Tserpes, 2023). This approach is transformative, integrating circular principles into economic, business, and public policy structures to drive fundamental changes in industrial practices and production and consumption patterns (Hartley et al., 2020). Successfully implementing a circular economy in this context relies heavily on the ability to develop innovative business models and policy frameworks that support resource efficiency, waste reduction, and sustainable value creation through longer product life cycles (Geissdoerfer et al., 2020).

A circular business model (CBM) is a specific form of sustainable business model innovation (SBMI) based on circular economy (CE) principles (Biloslavo et al., 2020; Hossain,

2021; Nußholz, 2017; Rocca et al., 2023; Shakeel et al., 2020). It seeks to create an economic system that is not only oriented towards financial returns, but also considers social and environmental impacts holistically (Geissdoerfer et al., 2020). Circular economy principles emphasize the importance of maintaining the continuous circulation of technical, digital, and biological materials to optimize resource use. This approach encourages waste reduction through strategies such as material minimization, recycling, and waste avoidance from the design stage to the end of the product life cycle (Bigliardi & Filippelli, 2021).

The concept of a circular economy is built on three core, integrated principles according to the Ellen MacArthur Foundation (2019): 1) designing production and consumption systems in such a way that waste and pollution are eliminated from the design stage, rather than just managed after they arise; 2) keeping products and materials in use for the long term, through practices such as repair, maintenance, reuse, remanufacturing, and recycling; 3) actively regenerating natural systems, meaning that the economy does not simply minimize environmental damage but also restores and strengthens ecosystem capacity (e.g. through renewable energy sources, integrated biomass systems, and improved soil fertility). To summarize: the circular economy rejects the linear "take-make-dispose" logic and instead promotes a model where material value is preserved wherever possible, waste is considered a design flaw that must be eliminated, and relationships with nature are restored so that the economic system becomes restorative and regenerative in the long term (Gursel et al., 2022).

Business Model Innovation

Business model innovation is a strategic effort to integrate sustainability values into business structures and processes, both in existing systems and in the development of new models. This approach aims to create shared value that is not only economically beneficial but also has a positive impact on the environment and social welfare. In practice, this innovation requires applying a systemic perspective that integrates the three main dimensions of social, environmental, and economic sustainability (Bocken et al., 2015).

A critical part of business model innovation is moving from a closed to an open business model that focuses on collaboration among stakeholders. This shift highlights the importance of actively involving business partners, customers, communities, and other institutions in the sustainable creation and exchange of value. Through this collaborative approach, organizations can expand their innovation capacity by adopting a variety of design options identified through taxonomic analysis, covering 64 alternative strategies that reflect the variety of dimensions and needs in the process of transformation towards sustainability (Mais & Bauernhansl, 2024). In addition, the application of open innovation also strengthens the synergy between sustainability goals and digital economic development by integrating theoretical frameworks such as Resource -Based View (RBV) and Transaction Cost Theory (TCT), which simultaneously play a role in optimizing resource utilization, strengthening governance, and promoting business efficiency and resilience in the era of global transformation (Huang & Zhou, 2025).

Design Thinking is a strategic approach that plays an important role in developing sustainable business models through a process that emphasizes empathy, collaboration, and experimentation. This approach relies on participatory methods, such as workshops, brainstorming, co-creation, and prototyping, to generate innovative solutions that address stakeholder needs and sustainability challenges (Kurek et al., 2023). The integration of Circular Economy principles, product-service systems, and innovations oriented towards social and environmental values is the primary foundation for creating adaptive and regenerative business models. In addition, sustainability assessment plays an essential role in ensuring the effectiveness and positive impact of the innovation process by providing measurement tools to evaluate the economic, social, and ecological effects of various business models (Bhatnagar et al., 2022). The implementation of design principles based on systems thinking further strengthens this process by integrating sustainability assessment from the early stages of development, thereby minimizing potential negative impacts and maximizing opportunities to enhance overall sustainability (Schlüter et al., 2023).

The alignment between sustainable business models and intellectual property rights (IPR) is a strategic element that plays an important role in creating economic value while also delivering positive social and environmental impacts. As explained by Hernández-Chea et al., (2020), this integration is realized through the use of the SBM-IP Canvas, a framework that combines aspects of IPR protection and utilization strategically in each component of the business model, from idea creation to value distribution. Through this approach, organizations can optimize various forms of IPR, such as patents, copyrights, trademarks, and industrial designs, to strengthen green innovation, expand cross-sector collaboration, and accelerate the transition to a more inclusive and responsible economic system. Overall, business model innovation requires a harmonious synergy among systemic thinking, strategic partnerships, the application of sustainability-oriented design principles, and the intelligent use of resources. This combination not only supports achieving decarbonization goals and implementing a circular economy but also lays the foundation for long-term, resilient, adaptive, and sustainable business transformation.

METHODS

This study uses a systematic literature review (SLR) method, conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, which serve as the international standard for conducting and reporting literature reviews (Tranfield et al., 2003). PRISMA is the primary reference in conducting systematic reviews. This approach is designed to ensure that the review process is conducted transparently, accurately, and comprehensively, from the literature identification stage to the reporting of results, by providing a structured framework through guidelines that help researchers explain the study selection criteria, data search strategies, and the process of systematic filtering and analysis of sources. In addition, this method uses flowcharts to illustrate the article selection process visually, enabling the research process to be verified and replicated by other researchers (Page et al., 2021). This approach was chosen because it can provide a comprehensive, transparent, and structured synthesis of prior research relevant to business model innovation in the circular economy.

The literature search process was conducted using the Scopus database as the primary source, applying a search strategy focused on the categories of "title, abstract, and keywords." This search was limited to publications from 2019 to 2024 and included only peer-reviewed articles to ensure the quality and credibility of the data obtained. The search string was systematically constructed using a combination of Boolean logic from several relevant keywords, namely ("circular economy" OR "circularity") AND ("business model*" OR "business innovation") AND ('sustainability' OR "sustainable development").

This diagram systematically outlines the stages of screening, from initial selection to final selection of relevant articles, in accordance with the PRISMA approach. At the identification stage, 676 articles were found through the Scopus database. After removing 62 duplicate articles, 514 unique articles remained, which were then screened based on their titles and abstracts, resulting in the elimination of 465 articles deemed irrelevant to the research topic. A total of 49 articles that passed screening were then read in full to assess their suitability and quality against the established inclusion and exclusion criteria. Of the 13 articles assessed, only 13 met all criteria and were included in the final analysis. This process demonstrates the application of a rigorous, systematic selection process to ensure that only literature truly relevant and of high quality is used in the study.

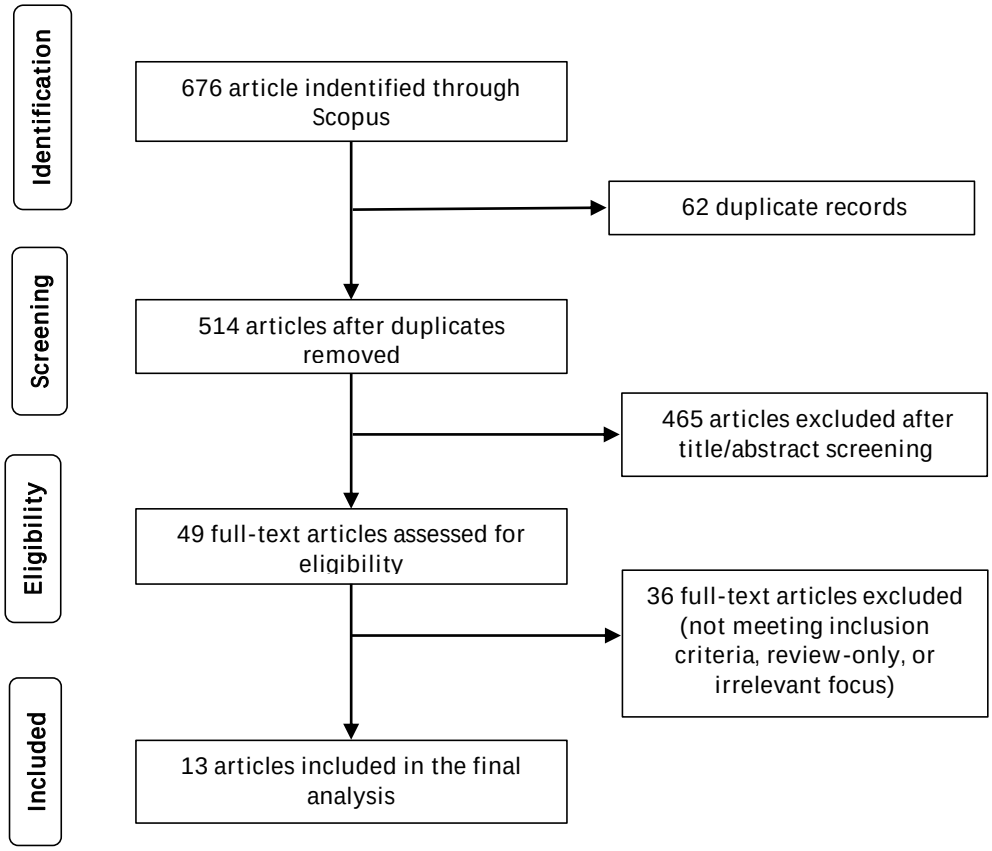

Figure 1. PRISMA Study Selection Flow

FigurFigure 2 shows the upward trend in the number of documents published from 2019 to 2024. In 2019, the number of publications was still relatively low –around 45 –but increased significantly in the following years. The sharpest increase occurred between 2019 and 2021, when the number of publications jumped to around 120 documents. After that, growth remained positive, though it slowed, with the number of publications reaching around 135 in 2022, increasing slightly in 2023, and rising again to around 155 in 2024. Overall, this graph shows that the field of research observed has experienced consistent and sustained growth, reflecting increased academic interest and scientific attention to the topic over the past five years.

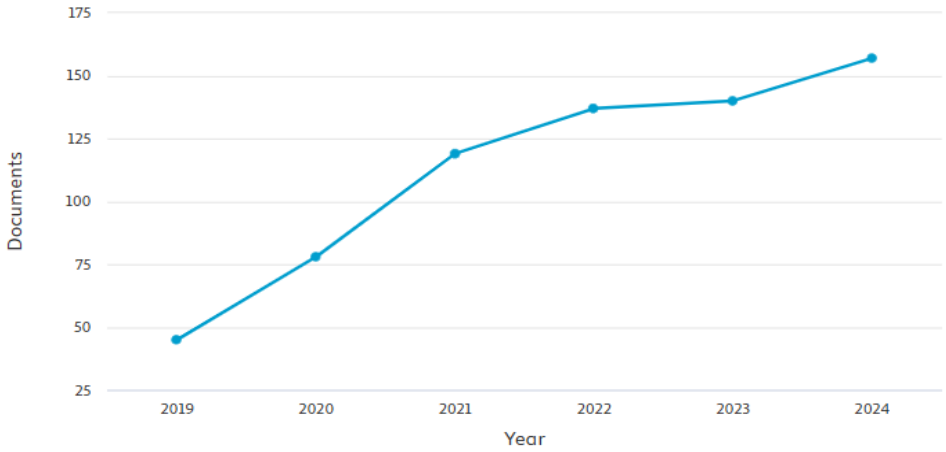

Figure 2. Total publications from 2019-2024

Figure 3 shows a horizontal bar chart depicting the number of documents or scientific publications by country. Based on the graph, Italy ranks first with the highest number of publications, approximately 120 papers. In second place is the United Kingdom with approximately 80 documents, followed by the Netherlands with approximately 65 papers. Countries such as Germany, Brazil, Spain, Sweden, France, India, and Finland have relatively balanced numbers of publications, ranging from 40 to 55 documents. Overall, this graph shows that the largest share of research comes from European countries, with Italy as the dominant contributor. This indicates that the research topics studied are of great interest in Europe, while contributions from countries outside Europe, such as Brazil and India, are still lower. This distribution also reflects the strong potential for international collaboration among European countries in related research fields.

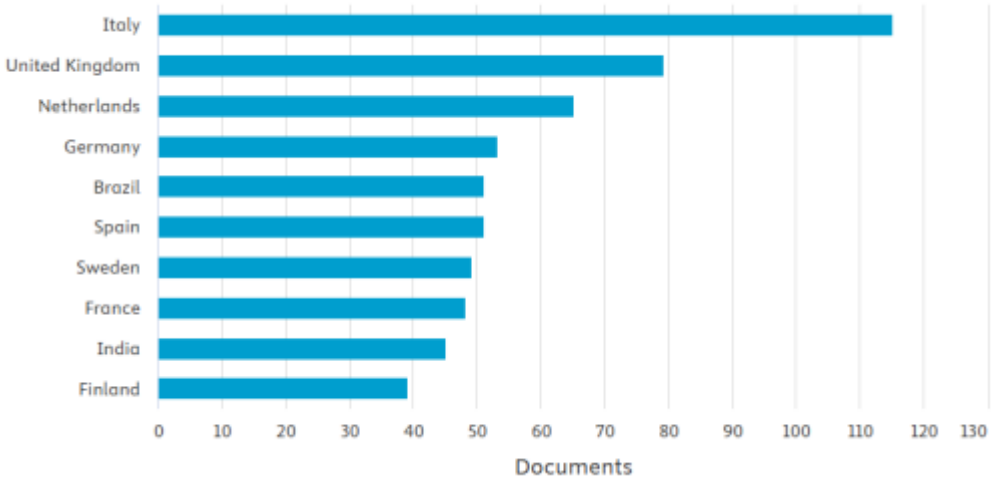

Figure 3. Distribution of scientific publications by country

RESULT

The results of this study indicate that circular business model innovation plays a strategic role in strengthening the implementation of the circular economy and advancing long-term sustainability goals. Based on an analysis of 13 articles published between 2019 and 2024, circular business models are seen not only as economic instruments but also as holistic approaches that integrate environmental and social dimensions to create sustainable value. The application of this concept focuses on optimizing resources through the principles of reduce, reuse, recycle, and remanufacture, alongside energy efficiency and technological innovations aimed at reducing waste and carbon emissions (Guldmann et al., 2019). This marked a shift from the traditional linear economic system focused on production and consumption to a regenerative economic system that prioritizes the entire product life cycle and collaboration between stakeholders across sectors (Islam et al., 2024). Furthermore, research by Brenner and Drdla (2023) shows that circular business model innovation has been proven to increase supply chain resilience, strengthen competitive advantage, and create added value through circular resource-based innovation and regenerative practices that balance profitability and environmental responsibility.

This section presents the results of the literature and content analyses, highlighting various frameworks and tools that support circular business model innovation. The study's results show that innovation plays a central role in accelerating the transformation towards sustainable, circular business models. Before further discussion, Figure 4 provides an overview of the classification of innovation types that drive two main approaches: Sustainable Business Models (SBM) and Circular Business Models (CBM). Based on the review results, three types of innovation contribute to the development of SBM, namely digital technology innovation, user-based social innovation, and organizational innovation. Meanwhile, in CBM, two main types of innovation were identified, namely bioeconomic innovation and innovation based on products, services, or product-service systems. This classification is an essential conceptual basis for understanding the

role of innovation in the process of creating, delivering, and capturing value in the context of sustainable development and the circular economy.

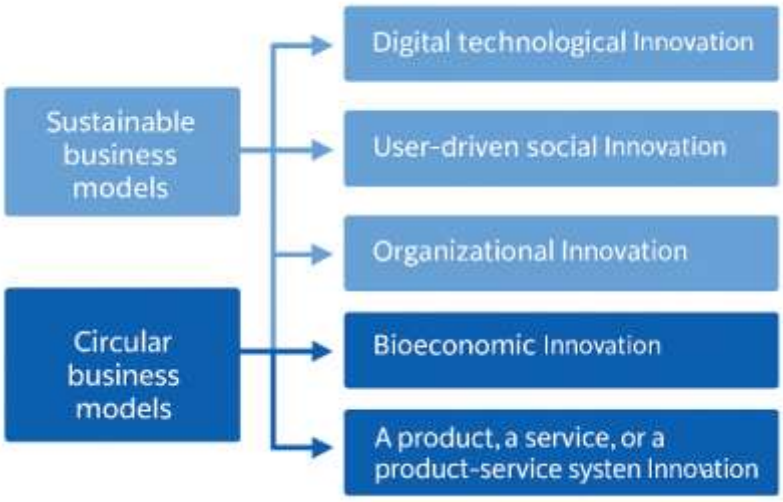

Figure 4. Key innovations driving sustainable and circular business models.

Sustainable Business Models

The concept of Sustainable Business Models (SBMs) has emerged as a strategic approach that integrates economic, social, and environmental principles into the core of business operations, aiming to create and sustain value for all stakeholders. SBMs are not only oriented towards achieving economic profits, but also emphasize a balance between profitability, social welfare, and ecological sustainability. According Cai et al., (2020), SBM is defined as a business model that "systematically incorporates sustainability objectives into the logic of value creation, delivery, and capture" to ensure the long-term sustainability of both the company and the environment.

In the modern context, SBMs are growing rapidly in line with advances in digital technology, regulatory pressure, and increasing public awareness of sustainability issues. Sustainable business models encourage companies to innovate across dimensions, including technology, social, and organizational, to transform how they create value. This innovation not only brings new efficiencies in production and distribution but also broadens the definition of value by incorporating social and environmental impacts into business performance (Rhaouti et al., 2023). The implementation of SBMs is often realized through circular economy practices, renewable energy, green supply chains, and cross-sector collaboration. Companies that successfully adopt SBMs tend to have higher adaptive capabilities in facing climate change, technological disruption, and increasingly complex social expectations (Agwu & Bessant, 2021). Therefore, innovation is a key element in the development and success of SBMs, as it enables companies to continuously update their structures, strategies, and capabilities to remain relevant and socially and ecologically responsible.

Table 1. Types of Sustainable Innovation in the Development of Sustainable Business Models (SBMs)

Types of Innovation	Description	Mechanisms in Business Model	Benefits for Sustainability
Digital Technology Innovation	Use of AI, IoT, big data, blockchain, cloud to restructure processes & services	Smart metering & energy optimization; predictive maintenance to reduce waste; sharing economy platform; blockchain for traceability	Resource efficiency, emissions reduction, increased supply chain transparency
Technology-Based Social Innovation	Co-creation with users; experiments in 'living labs' for socio-technical solutions	Living labs to pilot waste management services; co-design program for sustainable mobility; renewable energy community	Solutions better suited to local context, faster adoption, measurable social impacts
Organizational Innovation	Changes in structure, processes, motivation & governance to support green initiatives	ESG integration in strategy; green HRM; circular economy unit; lifecycle analysis-based decision process	Ensure long-term sustainability of technical & social initiatives; strengthen adaptive capacity of companies

a. Digital Technology Innovation

Digital technology innovation refers to the application of technologies such as the Internet of Things (IoT), big data/analytics, artificial intelligence, cloud, and blockchain to redesign processes, products, and value chains so as to reduce environmental impact and improve resource efficiency. In the context of sustainable business models, these technologies enable sharing models, reverse logistics systems for recycling, energy optimization, and real-time emissions monitoring-all of which can lower carbon and material footprints while enabling new value capture mechanisms. Systematic reviews show that digital transformation triggers changes in value models and offers real opportunities to integrate environmental practices into corporate strategy, although the impact depends on the organization's strategy and the capabilities built (Feroz et al., 2021).

b. User-driven or Living Labs

User-driven social innovation places users/communities as key actors in the creation and testing of sustainable solutions (co-creation, living labs, real-world experiments). This approach combines local insights, social needs, and hands on experiments so that solutions are more relevant, acceptable, and socially scalable, e.g. service design for community waste management, urban living labs for renewable energy, or green behavior adoption programs. The literature on living labs and social innovation emphasizes the strong role of user engagement in accelerating adoption and ensuring solutions consider the local cultural/environmental context (Baran & Berkowicz, 2020).

c. Oganizational Innovation

Organizational innovation includes changes in structure, managerial processes, internal capabilities, and governance (including integration of ESG principles) to support sustainability goals, e.g. establishment of circular economy units, green HR practices, reorganization of supply chains to reduce waste, or incentive mechanisms for green innovation. Recent empirical research shows that organizational innovation is often a key driver of green innovation at the firm level and can mediate the relationship between technology/fintech innovation and sustainability performance. In other words, without fundamental organizational change, technology and social initiatives are unlikely to achieve permanent sustainable impact (Chuang & Lee, 2023).

Circular Business Models

Circular Business Models (CBMs) are evolving as an innovative paradigm in sustainable business strategies that aim to decouple the relationship between economic growth and natural resource exploitation. Unlike conventional linear business models that are oriented towards one way production and consumption patterns, CBMs emphasize the importance of extending product life cycles through efficient and sustainable resource management. This approach encompasses the principles of reduce, reuse, recycle, refurbish, remanufacture, and recover, which encourages the optimization of material use and minimizes waste (Chen et al., 2021; Pieroni et al., 2019).

Circular Business Models (CBMs) combine various forms of innovation ranging from technological, social, to organizational innovations to ensure that the value of a product can be maintained for as long as possible within the economic system. This approach involves the development of a bioeconomy that focuses on the efficient and sustainable utilization of biological resources, the implementation of Product-Service Systems (PSS) that shifts business orientation from ownership to access and service, and the establishment of circular supply chains that allow material and energy flows to run in a closed cycle. In addition, the sharing economy model is also an important element that encourages the collective use of assets and resources through collaboration between individuals and organizations. The implementation of CBMs requires cross-sector coordination-between industry, consumers, research institutions, and government-to create an inclusive and adaptive innovation ecosystem (Pietrulla & Frankenberger, 2022; Reim et al., 2019).

The implementation of Circular Business Models (CBMs) is closely related to achieving the Sustainable Development Goals (SDGs), especially goals 12 and 13, which emphasize sustainable consumption and production patterns and climate change mitigation and adaptation, respectively. In this context, CBMs serve as a strategic mechanism to accelerate the transformation towards a circular economy, which is an economic system that views waste not as residue without value, but as a potential resource that can be processed and reused in a closed production chain. This approach not only demands changes at the operational aspect, but also at the level of the business model itself, particularly in terms of value proposition, value creation, and value capture, so that companies are able to create economic, social, and environmental value simultaneously (Donner & de Vries, 2021; Salvador et al., 2023). Based on a recent literature review (2019-2024), two primary forms of innovation are driving the transition to sustainability: bioeconomy innovation, which focuses on utilizing biological resources to create new environmentally friendly value, and product, service and product-service systems (PSS) innovation, which emphasizes optimizing the function and use value of products through the integration of services that extend their life cycle.

Table 2. Jenis Inovasi Berkelanjutan dalam Circular Business Models

Types of Innovation	Description	Implementation Example	Benefits
Bioeconomy Innovation	Innovations that sustainably utilize biological resources to create new economic value through the conversion of biomass and organic waste into value-added products. This approach integrates biotechnology, sustainable agriculture, and collaborative bio-based business models.	- Development of biorefineries to process agricultural waste into bioenergy, biochemicals and bioplastics. - Utilization of biomass residues for animal feed, organic fertilizer, and building materials. - Cross-sector collaboration between farmers, industry, and research institutions in circular value chains.	- Economic: Income diversification and improved resource efficiency. - Social: Increased green jobs and local economic empowerment. - Environmental: Reduced carbon emissions and organic waste, improved regeneration of natural resources.
Product-Service Systems (PSS) Innovation	Innovation that integrates product and service offerings to improve resource efficiency and extend product life cycles. PSS focuses on providing functions or outcomes, not just product ownership	- Pay-per-use, leasing, and take-back schemes for electronics and industrial equipment. - Modular product designs that are easy to repair and refurbish. - Maintenance, renewal or recycling services integrated in the service contract.	- Economic: Long-term income stability through sustainable services. - Social: Improved access to technologies and services without high ownership costs. - Environmental: Reduced consumption of new materials and product waste, extended product life.

a. Bioeconomy Innovation

Bioeconomy innovation emphasizes the sustainable use of biological resources (biomass, organic waste, microorganisms, and derived products) to create new economic value while reducing dependence on fossil raw materials. Forms of innovation include the development of biorefineries that convert agricultural waste or organic waste into valuable products (bio-based chemicals, biopolymers, bioenergy), biotechnological process improvements for production efficiency, and collaborative business models that connect producers, processors and end-users in a more closed value chain. This transformation is not only technical but also managerial and policy: successful commercialization of bio-based products often requires business model innovations (value offerings, alliances, distribution channels and ways of capturing value) that align economic, social and environmental objectives (Reim et al., 2019).

b. Product Service Systems (PSS) Innovation

Innovation in the realm of products and services is moving from simply selling goods to offering integrated solutions that fulfill customer functions with more efficient use of resources and longer life cycles. PSS models include rental, pay-per-use, centralized maintenance, refurbishment/remanufacturing, and end of life service (take-back) schemes. These approaches slow down material flow, extend product life, and can reduce the material footprint per unit of function. PSS is effective when designed in conjunction with policies, supply chains, and life-cycle assessment mechanisms so its implementation requires innovation in product design, after sales services, and new revenue models (Kjaer et al., 2019).

DISCUSSION

This review focuses on efforts to integrate and analyze in depth various studies related to forms of innovation that play a role in transforming business models towards sustainability (Sustainable Business Models/SBMs) and circularity (Circular Business Models/CBMs). Understanding how innovation contributes to the development of business models oriented

towards social, environmental, and economic value is key to creating long-term benefits for all stakeholders. Although previous literature has highlighted the importance of innovation in the Business Model Innovation (BMI) process, there is still a gap in identifying and mapping the types of innovation that specifically play a role in shaping SBMs and CBMs. Therefore, this study seeks to provide a comprehensive overview of the dynamics and current trends in innovation that support the transition of business models towards a more sustainable and circular direction. The main contribution of this analysis lies in distinguishing between two directions of business model innovation development namely, sustainability oriented innovation and circularity oriented innovation as well as grouping the types of innovation that are the main drivers in strengthening business transformation strategies towards practices that are more resilient, adaptive, and environmentally responsible.

The discussion results show that a successful transition to a circular economy requires the active involvement and synergy of all stakeholders including the government, the business world, the community, and educational institutions because this change is systemic and encompasses the entire value chain. Companies not only need to adjust their business strategies to focus on long term sustainability, but also undergo a fundamental transformation of their culture and organizational structure to support cross sector collaboration, sustainable innovation, and adaptive decision making in response to external environmental changes. In this context, dynamic capabilities are a determining factor that enables organizations to quickly identify new opportunities, reconfigure resources, and integrate new technologies and practices to improve business efficiency and resilience (Santa-Maria et al., 2022). Also, implementing circular business model innovation doesn't just focus on reducing negative impacts on the environment, like cutting down on waste and energy consumption, but also on creating positive value through using renewable resources, developing regenerative product designs, and implementing recycling strategies and closed loop supply chains that extend product lifecycles (Bocken, 2024). The role of companies is expanded from being mere producers to becoming managers of sustainable value ecosystems, where economic, social, and environmental value is created simultaneously through the integration of digital technology innovation, collaboration among stakeholders, and increased resource efficiency, thereby strengthening competitiveness while supporting the achievement of sustainable development goals (SDGs).

All identified forms of innovation contribute significantly to accelerating the transition of business models towards a more sustainable, circular direction, not only by increasing organizations' competitiveness but also by addressing complex social and environmental challenges. Each type of innovation whether technological, organizational, or systemic generally contributes to the three main dimensions of the business model, namely value creation, delivery, and capture. However, user driven social innovation appears to have the most significant influence on value creation, as it involves the active participation of communities and customers in the innovation process, thereby strengthening social relevance and long term sustainability. Overall, these findings confirm that Business Model Innovation (BMI) plays an important role as a strategic mechanism for evaluating and redesigning business models based on the "triple bottom line" principle economic, social, and environmental to maximize benefits for all stakeholders, including the community, customers, the environment, and the organization itself.

This study recommends that future research focus more on mapping and analyzing the relationship between sustainability oriented innovation and the application of circular economy principles, particularly in the context of energy conservation and efficient infrastructure management. This research focus is essential for understanding how innovation acts as a strategic link between resource efficiency, environmentally friendly technology, and the development of sustainable production and consumption systems. By examining these interrelationships, the research is expected to produce an implementable model that can support a more measurable and effective transition to circular economy practices.

CONCLUSION

Based on the review, this study confirms that business model innovation plays a strategic role as a catalyst for accelerating the transition to a circular economy and more comprehensive

sustainability practices. Innovation in business models is not only aimed at generating commercial profits but also serves as an instrument to optimize resource utilization, reduce environmental impact, and improve social welfare by creating sustainable value. In the context of sustainable business models, digital technology innovation plays a role in automating processes, increasing value chain transparency, and facilitating real time monitoring of environmental performance; user oriented social innovation strengthens community participation in developing sustainability solutions, encourages collaboration, and builds community based service ecosystems; while organizational innovation supports the adaptation of work culture, the strengthening of internal policies, and the restructuring of processes to ensure that sustainability is an integral part of corporate strategy. Furthermore, the circular business model is enriched through the application of bioeconomic innovations that utilize renewable biological resources, as well as through product, service, and product service system innovations that extend product life, improve recycling efficiency, and minimize waste generation. The success of the transformation towards a circular economy requires close synergy between the government as the regulator, the business sector as the driver of implementation, the community as users and agents of change, and educational institutions as centers for science and technology development. To strengthen the scientific and implementation foundations, future research needs to examine in greater depth the connection between sustainability oriented innovation and the application of circular economy practices, particularly in the context of energy conservation, high efficiency infrastructure design, and the development of governance systems that support the transition to a low carbon economic future.

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