

Research Development on Sustainable Business Models

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ABSTRACT

This study presents a comprehensive bibliometric analysis of the research on sustainable business models, drawing from the Google Scholar database and focusing on the period from 1991 to 2024. The analysis identifies key themes, influential authors, and collaborative networks within the field, highlighting the central role of sustainable business practices, the increasing importance of digital transformation, and the adoption of circular economy principles. By mapping the intellectual structure of the field, the study provides valuable insights into the evolution of sustainable business models and suggests pathways for future research. The findings emphasize the need for interdisciplinary collaboration and the integration of innovative strategies to advance sustainability in business. Despite its limitations, this study offers practical implications for academics, businesses, and policymakers, aiming to align research and practice with global sustainability goals.

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1. INTRODUCTION

In the wake of global challenges such as climate change, resource depletion, and societal inequalities, the concept of sustainability has gained unprecedented importance in the business domain [1], [2]. Sustainable business models are not merely trends but essential strategies for long-term economic success and environmental stewardship [3]. These models integrate environmental, social, and economic dimensions to promote resilience and innovation [4]. Over the past decades, an increasing number of scholars and practitioners have recognized that sustainable business practices are critical to mitigating the adverse impacts of industrial activities on the

planet while ensuring economic viability and societal benefits [5].

The evolution of sustainable business models can be traced back to the increased awareness and regulatory pressures regarding corporate responsibility and environmental management [6]. Traditional business models, primarily focused on financial performance, have been reevaluated in light of their environmental and social impacts [7]. This shift is evident in the growing body of literature that explores diverse aspects of sustainability in business, from green technologies and eco-efficiency to corporate social responsibility and ethical governance [3]. The academic interest in sustainable business models reflects a broader shift towards sustainability that is responsive to the needs of a wide range of stakeholders

including consumers, employees, communities, and governments [8], [9].

However, the academic exploration of sustainable business models is vast and fragmented. Various disciplines such as management, environmental science, economics, and sociology contribute to a rich yet complex landscape of research. This multidisciplinary approach highlights the multi-faceted nature of sustainability but also poses challenges in synthesizing the research findings into actionable knowledge. As such, there is a pressing need to map the existing research landscape to understand the prevailing trends, gaps, and future directions. This is where bibliometric methods come into play, offering a systematic approach to quantitatively analyze the extensive body of literature on sustainable business models.

Bibliometric analysis serves as a powerful tool to navigate through this extensive body of knowledge, enabling researchers to identify the most influential studies, authors, and journals that shape the field of sustainable business models [10], [11]. By employing citation analysis, co-word analysis, and network analysis, bibliometric studies can uncover the evolution of key themes and the interconnections between different research domains [12], [13]. This approach not only enhances the understanding of the field's structure but also helps in spotting emerging trends and under-researched areas that hold potential for significant impacts.

Despite the growing body of literature on sustainable business models, there remains a lack of comprehensive synthesis that integrates the diverse perspectives and findings into a cohesive framework. The existing studies are scattered across various disciplines, leading to a piecemeal understanding of the concepts and practices that define sustainable business models. This fragmentation hinders the development of holistic strategies that can effectively address the complexities of sustainability in the business context. Therefore, a bibliometric analysis is essential to distill and integrate the vast amounts of

research, providing a clearer and more structured comprehension of the field.

The objective of this research is to systematically review and synthesize the literature on sustainable business models using a bibliometric approach. This study aims to map the intellectual structure of the field, identifying the key themes, trends, and gaps in the literature. By doing so, it seeks to offer a comprehensive overview that can inform future research directions and assist practitioners and policymakers in developing more integrated and effective sustainable business strategies. This research will contribute significantly to the theoretical and practical understanding of sustainable business models, highlighting pathways for future innovations and implementations in sustainability practices.

2. LITERATURE REVIEW

2.1 *Evolution of Sustainable Business Models*

The concept of sustainable business models has evolved significantly over the past few decades, transitioning from niche practices to mainstream strategies integral to organizational success and resilience. [14] define a sustainable business model as one that creates, delivers, and captures value for all stakeholders without depleting the natural, economic, and social capitals that future generations depend on. The literature emphasizes the triple bottom line approach—people, planet, profit—as foundational to these models, highlighting the need for businesses to perform not just economically, but also socially and environmentally [15].

A critical review by [16] categorizes sustainable business model innovations into technological, social, and organizational innovations. Technological innovations often involve the development and use of green technologies or processes that reduce environmental impact. Social innovations focus on improving human well-being and empowerment, while organizational innovations involve restructuring business practices to align with sustainability goals. These categorizations illustrate the

multidimensional nature of sustainable business models, reflecting an integration of various domains of sustainability into core business operations.

2.2 Key Theoretical Frameworks

Several theoretical frameworks underpin the study of sustainable business models. The Resource-Based View (RBV) is particularly prominent, suggesting that firms can achieve sustainable competitive advantages by leveraging unique resources that are valuable, rare, inimitable, and non-substitutable [17]. [18] Natural Resource-Based View (NRBV) extends this by integrating environmental resources as critical inputs to firm strategy. Another influential framework is the Stakeholder Theory, which posits that businesses should manage relationships with all stakeholders who can affect or are affected by the firm's operations [19]. These frameworks provide the theoretical underpinnings for understanding how sustainable business practices can be integrated into the core strategic management of companies.

2.3 Bibliometric Studies on Sustainable Business Models

Bibliometric analyses have been increasingly used to examine the research trends and patterns within the field of sustainable business models. [20] conducted a comprehensive bibliometric analysis and found that research on sustainable business models is highly interdisciplinary, with contributions from fields such as management, economics, environmental science, and ethics. This study highlighted the dynamic nature of the field, showing shifts in focus from environmental management in the early 2000s to more integrated approaches

that encompass social, economic, and environmental perspectives.

A significant contribution to the literature is the work by [21], who performed a citation network analysis to identify the most influential authors and articles in the field. Their findings reveal a growing emphasis on circular economy models, which aim to minimize waste through the continuous use of resources. Circular economy practices are increasingly seen as vital to the development of sustainable business strategies that can adapt to and mitigate the impacts of global environmental challenges.

3. METHODS

This study employs a bibliometric analysis to systematically review and analyze the literature on sustainable business models, utilizing data sourced exclusively from the Google Scholar database. The analysis focuses on identifying key themes, influential authors, and prominent journals within the field using citation analysis, co-word analysis, and network analysis. VOSviewer, a powerful tool for constructing and visualizing bibliometric networks, is employed to process and visualize the data, which spans publications from the past two decades. This approach provides a comprehensive understanding of the intellectual structure and research trends in the domain of sustainable business models, offering valuable insights into the evolution of the field and highlighting potential areas for future research.

4. RESULTS AND DISCUSSION

4.1 Data Metrics Citation

Table 1. Citation Metrics

Publication years:	1991-2024
Citation years:	33 (1991-2024)
Papers:	980
Citations:	554292
Cites/year:	16796.73
Cites/paper:	565.60
Cites/author:	330346.09

Papers/author:	455.87
Author/paper:	2.73
h-index:	287
g-index:	735
hI,norm:	201
hI,annual	6.09
hA-index	112
Papers with ACC >= 1,2,5,10,20:	
956,947,902,806,596	

Source: Publish or Perish, 2024

Table 1 provides a comprehensive overview of the citation metrics for research on sustainable business models published between 1991 and 2024. Over the span of 33 years, a total of 980 papers have been published, garnering 554,292 citations, which translates to an impressive average of 16,796.73 citations per year and 565.60 citations per paper. The citation metrics also indicate a strong author contribution, with 330,346.09 citations per author and an average of 455.87 papers per author, suggesting that this field is dominated by prolific researchers. The data reveals a robust collaboration among authors, with an average of 2.73 authors per paper. The h-index of 287 indicates that 287

papers have been cited at least 287 times, while the g-index of 735 reflects the sustained influence of highly-cited papers. The normalized h-index (hI,norm) of 201 and the annual h-index (hI,annual) of 6.09 further underscore the consistent impact of research in this domain over time. The hA-index of 112 shows the average quality of the top-cited papers. Additionally, a significant proportion of papers have accumulated citations, with 956 papers cited at least once, 947 at least twice, 902 at least five times, 806 at least ten times, and 596 at least twenty times, indicating a broad and impactful research output in sustainable business models.

4.2 Citation Analysis

Table 2. Top Cited Literature

Citation	Author and Year	Title	Findings
103656	[17]	Firm resources and sustained competitive advantage	Barney's work introduces the Resource-Based View (RBV) of the firm, which argues that a firm's unique resources and capabilities can provide a sustained competitive advantage if they are valuable, rare, inimitable, and non-substitutable. This framework has become a cornerstone in strategic management and helps in understanding how firms can leverage their internal strengths to maintain a competitive edge.
23075	[22]	Business model generation: a handbook for visionaries, game changers, and challengers	Osterwalder and Pigneur's book offers a practical guide to designing innovative business models. It introduces the Business Model Canvas, a strategic management template for

Citation	Author and Year	Title	Findings
			developing new business models or documenting existing ones. The canvas is widely used for its simplicity and effectiveness in visualizing different aspects of a business.
17370	[23]	Creating shared value: How to reinvent capitalism—And unleash a wave of innovation and growth	Porter and Kramer propose the concept of Creating Shared Value (CSV), which suggests that businesses can generate economic value by identifying and addressing social issues that intersect with their business. This approach shifts the focus from traditional corporate social responsibility to integrating societal improvement into core business strategies.
13805	[24]	Business models, business strategy and innovation	Teece's paper explores the relationship between business models, strategy, and innovation. He argues that a well-designed business model is essential for commercializing new technologies and innovations, and that the ability to innovate in business models is crucial for sustaining competitive advantage in rapidly changing markets.
7975	[25]	The Circular Economy—A new sustainability paradigm?	This paper examines the concept of the Circular Economy (CE), which aims to minimize waste and make the most of resources by creating closed-loop systems. The authors argue that CE represents a new sustainability paradigm that has the potential to transform traditional linear economic models into more sustainable practices that prioritize resource efficiency and waste reduction.
7807	[26]	The business model: recent developments and future research	Zott, Amit, and Massa provide a comprehensive review of the business model literature, highlighting the diversity of definitions and approaches to studying business models. They identify key themes such as value

Citation	Author and Year	Title	Findings
			creation, innovation, and strategic management, and call for more research into the dynamic aspects of business model evolution.
7783	[27]	Conceptualizing the circular economy: An analysis of 114 definitions	Kirchherr and colleagues analyze 114 definitions of the Circular Economy, finding significant variation in how the concept is understood and applied. Their analysis reveals that while the Circular Economy is widely seen as a means to enhance sustainability, there is a lack of consensus on its precise definition, which could hinder its implementation and effectiveness.
6578	[28]	Clarifying business models: Origins, present, and future of the concept	This paper by Osterwalder, Pigneur, and Tucci traces the origins and evolution of the business model concept, clarifying its definition and components. The authors discuss the relevance of business models in understanding how firms create, deliver, and capture value, and highlight the importance of continued research to address emerging challenges and opportunities in business model innovation.
6108	[29]	Towards the sustainable corporation: Win-win-win business strategies for sustainable development	Elkington's work introduces the Triple Bottom Line (TBL) concept, advocating for businesses to focus on social and environmental performance alongside financial performance. He argues that sustainable development can be achieved through "win-win-win" strategies that benefit businesses, society, and the environment simultaneously.
5489	[30]	Open business models: How to thrive in the new innovation landscape	Chesbrough's book on open business models explores how companies can leverage external ideas and resources to innovate more effectively. He discusses the shift from closed to open innovation paradigms and

Citation	Author and Year	Title	Findings
			emphasizes the importance of collaboration, intellectual property management, and new revenue models in thriving within the modern innovation landscape.

Source: Publish or Perish Output, 2024

The table highlights seminal works in the field of business models and sustainability, showcasing the foundational theories and innovative concepts that have significantly shaped academic and practical discourse. Barney's Resource-Based View emphasizes the role of unique firm resources in achieving sustained competitive advantage, while Osterwalder and Pigneur's Business Model Canvas has become a widely adopted tool for strategic business planning. Porter and Kramer's Creating Shared Value concept redefines capitalism by integrating social value into business strategies. Teece's exploration of the interplay between business models, strategy, and innovation underscores

the importance of innovation for maintaining competitive advantage. The growing focus on sustainability is evident in the works of Geissdoerfer et al., who introduce the Circular Economy as a new paradigm, and Elkington's Triple Bottom Line, which advocates for balancing social, environmental, and financial performance. Additionally, Chesbrough's Open Business Models highlight the shift towards more collaborative and open innovation practices. These influential works collectively underscore the evolving understanding of business models, particularly in the context of sustainability and innovation.

4.3 Co-Word Network Visualization Analysis

4.3.1 Network Visualization

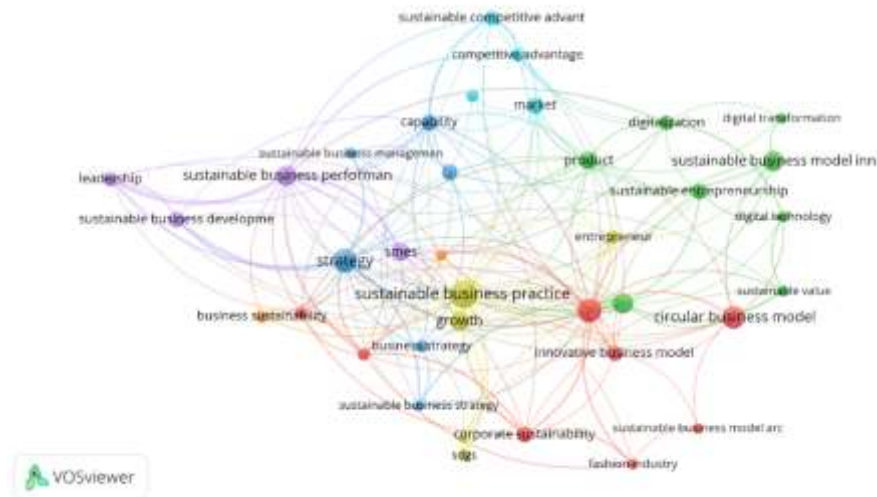


Figure 1. Network Visualization

Source: Data Analysis, 2024

The VOSviewer network visualization presented in the figure 1 illustrates the co-occurrence of keywords related to sustainable business models. The map is organized into clusters, each represented by a different color, indicating the thematic grouping of closely related concepts.

The size of the nodes (keywords) reflects their frequency of occurrence in the literature, while the thickness of the links between them represents the strength of their co-occurrence relationships. At the center of the network, the term "sustainable business practice" is

prominent, signifying its central role in the discourse on sustainable business models.

One significant cluster, highlighted in green, focuses on themes related to digital transformation and innovation within sustainable business models. Keywords such as "digitalization," "digital technology," "sustainable business model innovation," and "sustainable entrepreneurship" are closely connected, indicating a strong emphasis on how digital technologies are enabling new sustainable business practices. The cluster suggests that research in this area is increasingly exploring the intersection between sustainability and digital innovation, reflecting the growing importance of technology in driving sustainable business strategies.

Another prominent cluster, shown in red, revolves around the concept of "circular business model." This cluster includes related terms like "corporate sustainability," "innovative business model," and "sustainable value," highlighting the research focus on rethinking traditional linear business models in favor of circular approaches that emphasize resource efficiency and waste reduction. The connections within this cluster suggest a robust research interest in how businesses can adopt circular models to enhance sustainability while maintaining or improving economic performance.

The blue cluster is centered around "sustainable competitive advantage" and

"strategy," indicating the strategic considerations involved in adopting sustainable business practices. This cluster connects with terms like "capability," "market," and "competitive advantage," suggesting that research in this area is focused on how companies can develop the capabilities needed to integrate sustainability into their core strategies and leverage it for long-term competitive advantage. The emphasis on strategy and competitive advantage reflects the understanding that sustainability is not just a moral imperative but also a strategic opportunity for businesses.

Overall, the visualization reveals a diverse and interconnected landscape of research on sustainable business models. The clustering of keywords indicates that the field is multidimensional, with distinct but related areas of focus, including digital transformation, circular economy, and strategic management. The network also highlights the centrality of sustainable business practices as a unifying theme across these research areas, underscoring the importance of integrating sustainability into all aspects of business operations. This interconnectedness suggests that future research may continue to explore these themes in an increasingly integrated and holistic manner, reflecting the complex and evolving nature of sustainable business models.

4.3.2 Overlay Visualization

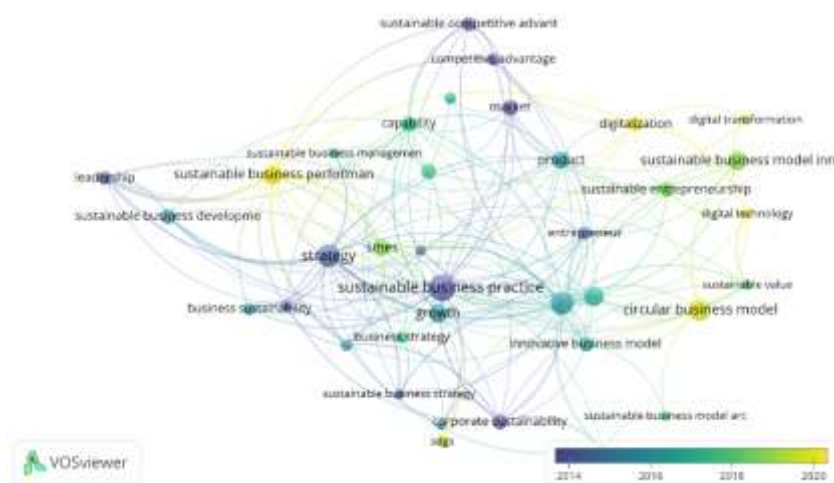


Figure 2. Overlay Visualization

Source: Data Analysis, 2024

The figure illustrates a temporal network visualization of keywords related to sustainable business models, created using VOSviewer. The colors of the nodes represent the average publication year associated with each keyword, ranging from 2014 (in blue) to 2020 (in yellow). This temporal aspect allows us to observe the evolution of research topics within the field, showing which areas have been more recently developed and which have been established for a longer period.

Notably, the keywords related to "digitalization," "digital transformation," and "sustainable business model innovation" are depicted in yellow and green hues, indicating that these topics have gained prominence in more recent years, particularly from 2018 onwards. This trend reflects the increasing integration of digital technologies in sustainable business practices, highlighting the field's shift towards exploring how digitalization can drive innovation and sustainability. The connections between these

recent terms and more established concepts such as "sustainable business practice" and "circular business model" suggest a growing interest in merging traditional sustainability strategies with cutting-edge technological advancements.

Conversely, keywords like "sustainable business performance," "leadership," and "business sustainability" are shown in shades of blue and purple, indicating that these topics have been more extensively researched in earlier years, around 2014 to 2016. This suggests that foundational research in sustainable business models focused on performance metrics and leadership before the more recent surge in technology-driven sustainability strategies. The central position of "sustainable business practice" across the timeline underscores its enduring importance as a core concept that connects various aspects of sustainable business model research, from strategic leadership to technological innovation.

4.3.3 Density Visualization

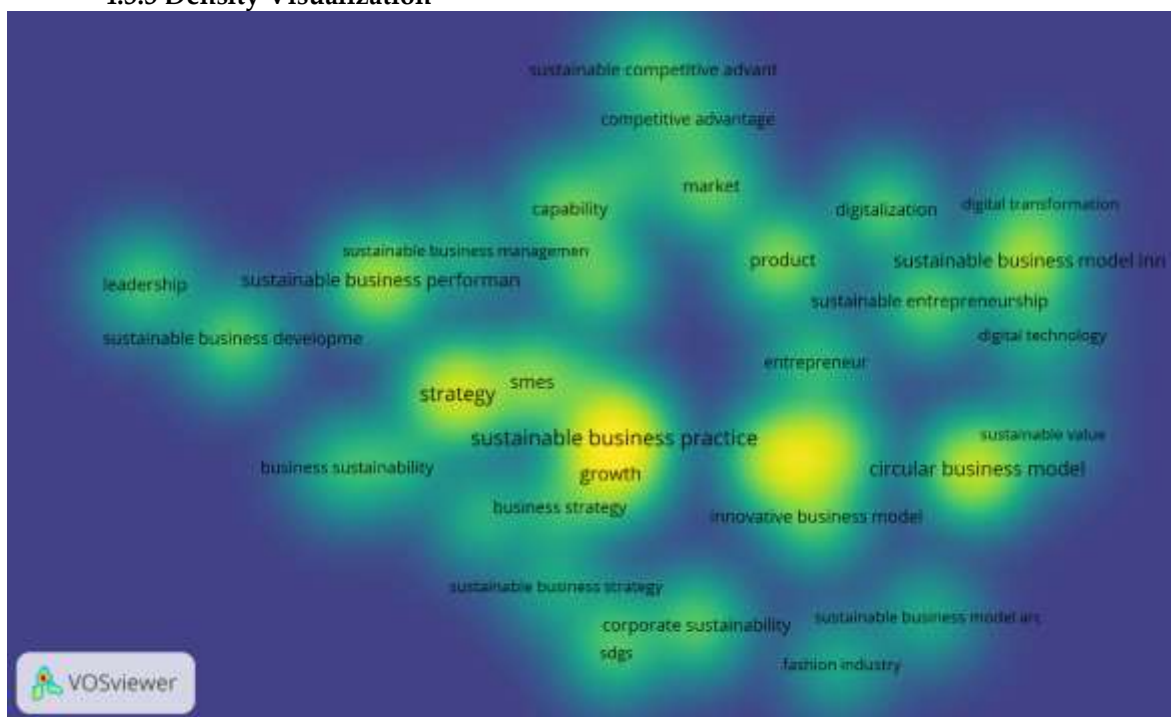


Figure 3. Density Visualization

Source: Data Analysis, 2024

The figure represents a density visualization of keyword occurrences related to sustainable business models, created using VOSviewer. In this heatmap-style

visualization, the intensity of the color (ranging from green to yellow) indicates the density of occurrences, with yellow areas representing higher concentrations of

research activity. The central and brightest region of the map corresponds to the keywords "sustainable business practice," "growth," and "strategy," indicating that these topics have been the focal points of significant research interest. This suggests that much of the scholarly work in the domain of sustainable business models has concentrated on how businesses can integrate sustainability into their core practices and strategies while ensuring growth.

Other notable areas of high density include "circular business model" and "sustainable business model innovation," both of which appear in bright yellow, reflecting the growing academic focus on innovative

approaches to sustainability, particularly in the context of the circular economy. Additionally, clusters around terms like "digitalization," "digital transformation," and "corporate sustainability" are visible, albeit with slightly less intensity, indicating emerging but still robust areas of research. This pattern reveals that while the foundational concepts of sustainable business practices and strategy remain central, there is a rising interest in exploring how digital transformation and innovative models can further advance sustainability objectives in business.

4.4 Co Authorship Network Visualization Analysis

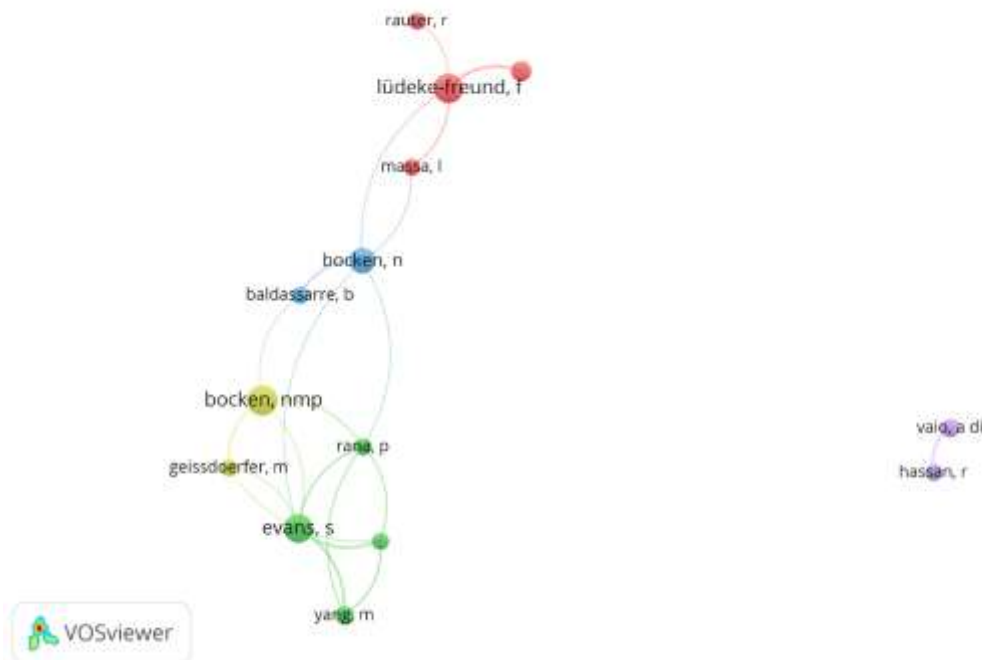


Figure 4. Author Collaboration Network

Source: Data Analysis, 2024

The figure represents a co-authorship network visualization, highlighting collaborations among researchers in the field of sustainable business models. The different colors indicate distinct clusters of co-authors who frequently publish together. The largest cluster, centered around "lüdeke-freund, f," "massa, l," and "bocken, n," suggests a tightly-knit group of researchers who have significantly contributed to the literature through collaborative efforts. Another prominent cluster includes "bocken, nmp,"

"geissdoerfer, m," and "evans, s," indicating another strong collaborative network within the field. Additionally, smaller clusters, such as those involving "vaio, a di" and "hassan, r," are visible, suggesting that these researchers also work closely together but are less connected to the larger groups. The visualization underscores the importance of collaboration in advancing research on sustainable business models, with certain key individuals acting as central nodes in their respective networks.

4.5 Practical Implication

The insights derived from the co-authorship network and the bibliometric analysis of sustainable business models have significant practical implications for both academia and industry. For academics, understanding the collaborative networks among leading researchers can help identify potential collaborators, mentors, and thought leaders in the field. By engaging with these networks, researchers can enhance the quality and impact of their work, contribute to advancing knowledge in sustainable business practices, and stay at the forefront of emerging trends. Moreover, institutions and funding bodies can leverage this information to foster strategic partnerships and collaborations, aligning research efforts with global sustainability goals.

For businesses, the findings emphasize the importance of adopting innovative and sustainable business models, particularly in the context of digital transformation and the circular economy. Companies can draw on the extensive research in these areas to implement practices that not only improve environmental and social outcomes but also drive long-term profitability and competitive advantage. The integration of sustainability into core business strategies, as highlighted by the central themes in the bibliometric analysis, is crucial for businesses aiming to remain relevant in a rapidly evolving market. By adopting strategies that emphasize resource efficiency, waste reduction, and digital innovation, businesses can create value for a broader range of stakeholders, including customers, employees, and the community.

Policymakers and industry leaders can also benefit from these findings by using them to inform the development of policies and regulations that promote sustainable business practices. Understanding the key areas of research focus—such as sustainable business practices, circular economy models, and digital transformation—can guide the creation of incentives and support mechanisms that encourage businesses to adopt more sustainable practices. Additionally, the emphasis on collaboration

within the academic community suggests that fostering partnerships between academia, industry, and government could accelerate the adoption of sustainable business models, leading to more resilient and sustainable economies.

4.6 Limitation

One limitation of this study lies in its reliance on data exclusively from the Google Scholar database, which, while comprehensive, may not capture all relevant literature, particularly from highly specialized or less widely indexed journals. Additionally, the bibliometric analysis is constrained by the accuracy and completeness of metadata within the database, potentially leading to biases in the identification of key themes and influential authors. The study also primarily focuses on co-occurrence and co-authorship networks, which, while informative, may overlook the depth and context of individual research contributions. Lastly, the analysis is inherently retrospective, and while it highlights trends up to the present, it may not fully capture emerging or nascent research areas that are just beginning to gain traction in the field of sustainable business models.

1. CONCLUSION

In conclusion, this study provides a comprehensive bibliometric analysis of the research landscape surrounding sustainable business models, offering valuable insights into the key themes, influential authors, and collaborative networks that have shaped the field over the past three decades. The findings highlight the central role of sustainable business practices, the growing importance of digital transformation, and the adoption of circular economy principles as critical components of sustainable business strategies. Despite its limitations, the study underscores the significance of interdisciplinary collaboration and the need for continued research to address emerging challenges and opportunities in sustainability. These insights are not only academically enriching but also offer practical guidance for businesses, policymakers, and researchers

aiming to advance sustainability in their respective domains.

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