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A Bibliometric Analysis of the Role of Companies in Achieving the Sustainable Development Goals

Loso Judijanto[1], Muhamad Ammar Muhtadi[2], Dila Padila Nurhasanah[3]
[1] IPOSS Jakarta, Indonesia and losojudijantobumn@gmail.com
[2] Nusa Putra University and muhamad.ammar_mn19@nusaputra.ac.id
[2] Nusa Putra University and dila.padila_mn20@nusaputra.ac.id

ABSTRACT

The pursuit of Sustainable Development Goals (SDGs) has become paramount in addressing global environmental, social, and economic challenges. In this context, the role of companies in advancing sustainable development has garnered increasing attention. This research conducts a comprehensive bibliometric analysis to elucidate the landscape of research pertaining to the involvement of companies in achieving the SDGs. By systematically analyzing scholarly literature spanning from 1992 to 2024, encompassing 980 papers and 162,376 citations, key themes, trends, and gaps in the literature are uncovered. The analysis reveals a robust citation impact, with an average of 5,074.25 citations per year and 165.69 citations per paper. Notably, the study identifies prominent works such as the World Health Organization's "World Health Statistics 2016" and seminal publications by authors like T. Dyllick, J. Elkington, and J.D. Sachs, highlighting the evolving discourse on corporate sustainability and its intersection with the SDGs. Moreover, network visualizations illustrate the relational dynamics among research themes and authors, showcasing the centrality of topics like innovation and business models, while also identifying emerging areas of interest such as artificial intelligence and sustainable business practices. These findings offer valuable insights for policymakers, practitioners, and researchers, guiding future inquiries and collaborations towards addressing critical knowledge gaps in the pursuit of sustainable development.

Keywords: *Companies, Sustainable Development Goals, Bibliometric Analysis*

1. INTRODUCTION

In the wake of escalating global challenges, the Sustainable Development Goals (SDGs) have emerged as a beacon of hope, outlining a comprehensive framework for addressing pressing environmental, social, and economic issues [1], [2]. Amidst this landscape, the role of companies in advancing sustainable development has garnered increasing attention [3]. As key players in the global economy, companies wield significant influence over resource allocation, innovation, and societal impact [4]. Understanding their contributions, challenges, and opportunities in relation to the SDGs is paramount for fostering effective strategies towards a more sustainable future [5].

The intersection of corporate actions and sustainable development presents a complex and multifaceted terrain [6], [7]. Companies operate within intricate networks of stakeholders, facing diverse pressures ranging from consumer demands to regulatory frameworks [8]. Moreover, the SDGs encompass a broad spectrum of objectives, from poverty alleviation to climate action, necessitating a nuanced examination of how different industries and regions engage with these goals [9], [10]. Against this backdrop, a comprehensive bibliometric analysis offers a valuable lens to systematically map out the evolving landscape of research on this crucial nexus between companies and sustainable development.

However, amidst the growing discourse surrounding corporate sustainability, gaps persist in understanding the precise nature and extent of companies' contributions towards the SDGs [11]–[13]. Identifying these gaps and addressing pertinent research questions is essential for refining

strategies, policies, and corporate practices geared towards sustainable development [14], [15]. Hence, this research endeavors to elucidate the role of companies in achieving the SDGs through a meticulous bibliometric analysis. By scrutinizing existing scholarly literature, this study aims to uncover trends, patterns, and areas requiring further exploration, thereby informing more targeted and impactful efforts towards sustainable development.

Despite burgeoning interest and initiatives in corporate sustainability, a comprehensive understanding of the precise role companies play in advancing the Sustainable Development Goals remains elusive. This research seeks to address this gap by conducting a rigorous bibliometric analysis to systematically evaluate the existing body of research on this critical intersection. The primary objective of this study is to undertake a bibliometric analysis to elucidate the landscape of research pertaining to the involvement of companies in achieving the Sustainable Development Goals. Through this analysis, we aim to identify key themes, trends, gaps, and opportunities in the literature, providing valuable insights for policymakers, practitioners, and researchers alike.

By shedding light on the evolving discourse surrounding companies' contributions to sustainable development, this research holds significant implications for various stakeholders. Policymakers can leverage the findings to craft more targeted regulations and incentives, while businesses can glean insights to enhance their sustainability strategies and reporting practices. Moreover, academics will benefit from a comprehensive overview of the research landscape, guiding future inquiries and collaborations towards addressing critical knowledge gaps in this vital domain.

2. LITERATURE REVIEW

2.1 Sustainable Development Goals

The Sustainable Development Goals (SDGs) are a set of 17 interconnected goals established by the United Nations to address global challenges such as poverty, inequality, climate change, and environmental degradation [16]–[18]. These goals aim to achieve sustainable development in economic, social, and environmental dimensions while emphasizing inclusivity and gender equality [16], [17]. The SDGs require local action for their accomplishment, involving stakeholders like governments, businesses, civil society, and individuals. Stemming from the 2030 Agenda, the SDGs focus on eradicating poverty, combating climate change, and fostering global partnerships for sustainable development. The success of the SDGs hinges on investments in infrastructure, education, healthcare, and innovative solutions, particularly in developing nations. Ultimately, the SDGs represent a collective effort towards building a more sustainable, equitable, and prosperous world.

Companies play a crucial role in achieving the Sustainable Development Goals (SDGs) by aligning their strategies with the SDGs [19]. Research indicates that companies are increasingly expected to broaden their corporate purpose beyond profit maximization and actively contribute to the SDGs [20]. The financial stability of enterprises is highlighted as a key factor in realizing sustainable development goals, emphasizing the importance of investments and finance in this process [21]. By implementing sustainability strategies and integrating the SDGs at various organizational levels, companies can drive their contributions to the SDGs [22]. Case studies like the Indonesian "G" Company demonstrate how businesses can directly

impact SDG targets, such as decent work and economic growth, through their operations [23]. Companies can leverage their resources, influence, and innovation to make significant contributions towards achieving the SDGs.

3. METHODS

The first step in this bibliometric analysis involves collecting relevant scholarly literature from reputable academic databases. We will primarily focus on articles published in peer-reviewed journals, conference proceedings, and scholarly books. Keywords such as "companies," "corporate sustainability," "Sustainable Development Goals," and variations thereof will be used to construct comprehensive search queries tailored to each database. Additionally, we will employ citation chaining and snowball sampling techniques to identify additional relevant articles. To ensure the relevance and quality of the collected literature, we will establish clear inclusion and exclusion criteria. Included studies must be written in English and directly address the involvement of companies in achieving the Sustainable Development Goals. We will exclude articles that focus solely on theoretical frameworks or methodologies without empirical application, as well as those not relevant to the scope of corporate sustainability or the SDGs.

Once the relevant literature is identified, we will extract key bibliographic information, including authors, publication year, journal/conference title, keywords, abstracts, and citation counts. Additionally, we will categorize articles based on their thematic focus, industry sector, geographical region, and methodology employed. This systematic extraction process will ensure consistency and reliability in data collection. The extracted data will be subjected to comprehensive bibliometric analysis using specialized software such as VOSviewer. We will employ various bibliometric indicators and visualization techniques to uncover patterns, trends, and relationships within the literature. Co-authorship networks, citation networks, keyword co-occurrence networks, and bibliographic coupling analysis will be utilized to identify influential authors, seminal works, emerging topics, and interdisciplinary collaborations.

Finally, the findings from the bibliometric analysis will be interpreted to draw meaningful insights and implications for research, practice, and policy. We will identify key themes, gaps, and areas requiring further investigation in the literature on companies' contributions to the Sustainable Development Goals. Moreover, we will discuss the implications of these findings for corporate sustainability strategies, policy formulation, and future research agendas.

4. RESULTS AND DISCUSSION

4.1 Research Data Matriks

Table 1. Research Data Metrics

Publication years	: 1992-2024
Citation years	: 32 (1992-2024)
Paper	: 980
Citations	: 162376
Cites/year	: 5074.25
Cites/paper	: 165.69
Cites/author	: 90179.30
Papers/author	: 484.00
Author/paper	: 2.74
h-index	: 216
g-index	: 391
hI,norm	: 135
hI,annual	: 4.22

hA-index	: 78
Papers with ACC	: 1,2,5,10,20:786,707,581,471,340

Source: Publish or Perish Output, 2024

Table 1 provides a comprehensive overview of the research data metrics derived from the bibliometric analysis conducted on publications spanning from 1992 to 2024, encompassing a total of 980 papers and 162,376 citations. The data reveals a robust citation impact, with an average of 5,074.25 citations per year and 165.69 citations per paper. Notably, the citations per author are strikingly high, averaging at 90,179.30, indicating substantial recognition and influence within the field. On average, each author has contributed to approximately 484 papers, suggesting a collaborative research environment with an author-to-paper ratio of 2.74. The h-index, a widely recognized measure of scholarly impact, stands at 216, indicating that 216 papers have each received at least 216 citations. Additionally, the g-index, a variant of the h-index that considers the distribution of citations across papers, is calculated at 391. Moreover, the table provides insights into the hI,norm and hI,annual metrics, indicating normalized and annualized h-index values respectively. Furthermore, the hA-index, which accounts for the author's career stage, is noted at 78. Finally, the table delineates the distribution of papers with various citation thresholds (1, 2, 5, 10, and 20) revealing a descending trend in the number of papers as the citation threshold increases, with the majority of papers garnering at least one citation. Overall, this table offers valuable insights into the citation impact, authorship patterns, and distribution of highly cited papers within the research domain under examination.

4.2 Network Visualization

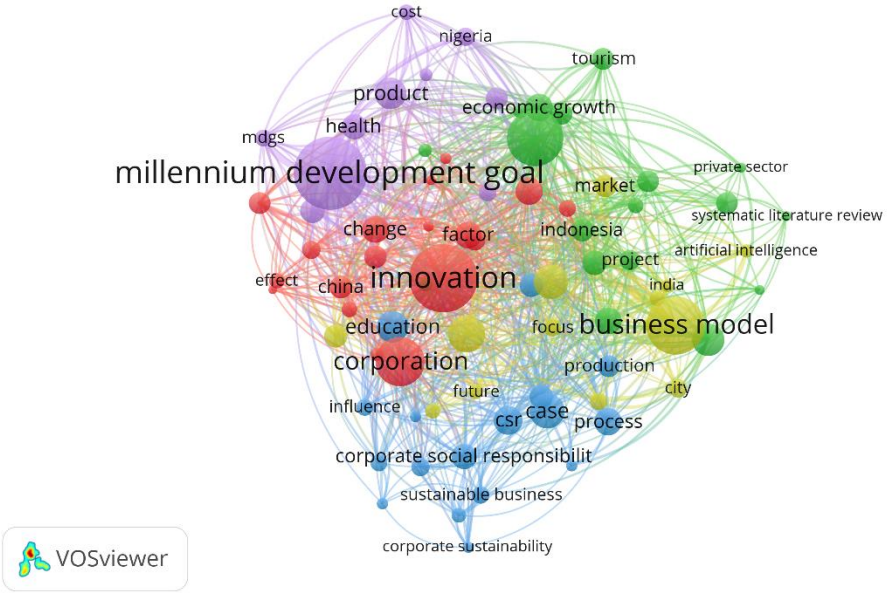

Figure 1. Network Visualization
Source: Data Analysis Result, 2024

This type of visualization is commonly used to represent the relationships between terms, subjects, or publications within a particular body of literature. Each node represents a key term or subject. The size of the node often correlates with the term's prevalence or importance in the dataset – larger nodes signify terms that occur more frequently or are more central to the research area. Nodes are colored to indicate different clusters or thematic groups. Terms that are more closely

related or more frequently appear together in the literature are grouped into the same color, signifying a thematic cluster. The lines connecting the nodes represent the strength of the relationship between terms. A thicker line indicates a stronger association or a higher number of co-occurrences between the connected terms in the literature. From the image, we can see several large nodes and clusters:

1. The largest node is "millennium development goal," indicating that this is a central term within the dataset.
2. The red cluster seems to be focused around "innovation," which is closely related to "china," "education," "corporation," and "change.", suggesting a focus on how corporations drive innovation and the role of education in this process.
3. The green cluster has "business model" as a significant node, with terms like "focus," "project," "India," and "artificial intelligence" being closely associated, indicating a theme around modern business practices and technological integration.
4. The yellow cluster features terms like "economic growth," "private sector," and "tourism," suggesting a theme around economic aspects.
5. The blue cluster includes terms such as "sustainable business," "corporate sustainability," and "csr" (corporate social responsibility), which are related to sustainability and responsible business practices.

The interconnectedness of the terms across different clusters suggests that these themes are interrelated; for example, innovation (red) might be linked to sustainable business practices (blue) and new business models (green). Finally, the presence of country names like "china," "india," "nigeria," and "indonesia" may suggest geographic focuses within the literature or specific case studies from these countries related to the other thematic terms.

4.3 Overlay Visualization

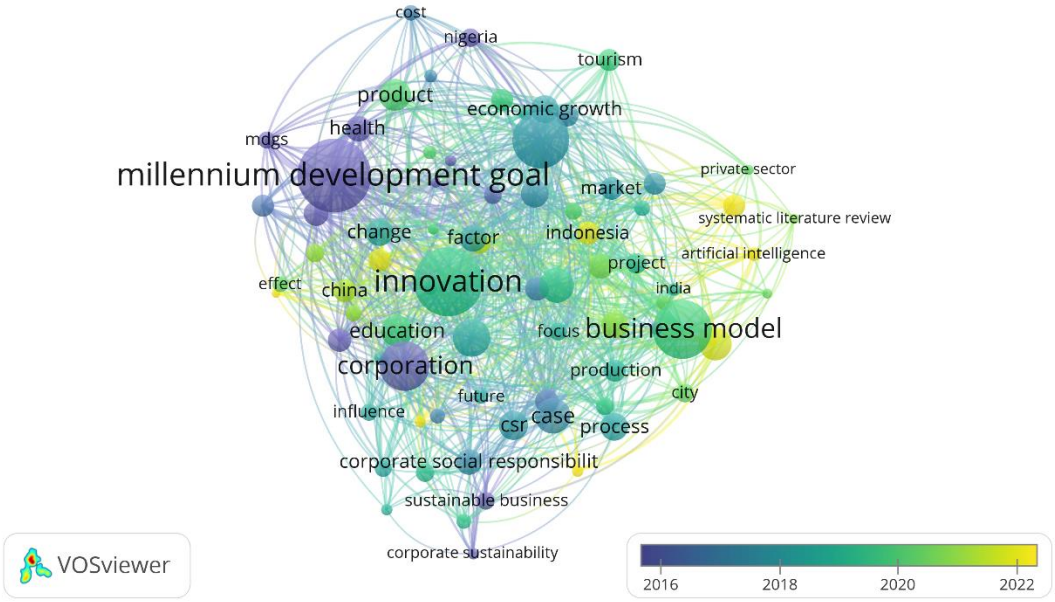

Figure 2. Overlay Visualization
Source: Data Analysis Result, 2024

The figure is a bibliometric map with an overlay of time, often used to analyze and visualize the evolution of research topics over a specified period. Nodes and edges (lines connecting the nodes) are color-coded according to the time scale presented at the bottom of the image. The gradient generally ranges from one color representing earlier years to another color representing later years. In your figure, the gradient goes from blue (2016) to yellow (2022), suggesting that the color of each term indicates when it was most discussed or relevant in the literature. The change in color of the nodes and connecting lines over the map suggests the progression of focus within the research field over time. Terms with a color closer to the blue end of the spectrum were more prominent in the literature around 2016, while terms closer to the yellow end have gained prominence more recently, around 2022. Analyzing the figure, we can make the following observations about the research trends over the years:

1. The larger, central nodes such as "millennium development goal," "innovation," and "business model" seem to have a consistent presence throughout the timeframe, indicated by the mixture of colors within these nodes. This suggests these topics have been continually relevant over the period analyzed.
2. Nodes that are mostly blue (e.g., those near "mdgs" and "health") likely represent themes that were more prevalent or emerged around 2016 but may have seen a decrease in focus or have evolved into related topics.
3. The presence of more yellow around terms like "corporate sustainability," "csr" (corporate social responsibility), and "sustainable business" suggests that the emphasis on sustainability and corporate ethics has increased in more recent literature, becoming more central towards 2022.
4. The color of the lines indicates the time when two topics were often discussed together. For example, if the line connecting "innovation" and "corporation" is greenish, it might mean that the connection between these two topics has been especially relevant around the years that the green color represents on the time scale.

4.4 Citation Analysis

Table 2. The Most Impactful Literatures

Citations	Authors and year	Title
8304	[24]	World Health Statistics 2016 [OP]: Monitoring Health for the Sustainable Development Goals (SDGs)
6158	[25]	Beyond the business case for corporate sustainability
5841	[26]	Towards the sustainable corporation: Win-win-win business strategies for sustainable development
3392	[27]	The circular economy: an interdisciplinary exploration of the concept and application in a global context
3270	[28]	What is sustainable development? Goals, indicators, values, and practice
2985	[29]	From millennium development goals to sustainable development goals
2657	[30]	The role of corporations in achieving ecological sustainability
1982	[31]	Changing course: A global business perspective on development and the environment
1918	[32]	Social entrepreneurship: Creating new business models to serve the poor

Citations	Authors and year	Title
1636	[33]	Business cases for sustainability: the role of business model innovation for corporate sustainability

Source: Publish or Perish Output, 2024

Table 2 presents the most impactful literature within the field of corporate sustainability and its relevance to achieving the Sustainable Development Goals (SDGs), as indicated by their citation counts. Topping the list is the World Health Organization's "World Health Statistics 2016," with 8,304 citations, emphasizing the crucial role of health monitoring in the context of SDGs. Following closely are seminal works such as "Beyond the business case for corporate sustainability" by T. Dyllick and K. Hockerts (2002), and "Towards the sustainable corporation" by J. Elkington (1994), highlighting the evolving discourse on integrating sustainability into corporate strategies. Additionally, the significance of concepts like the circular economy is underscored by the work of A. Murray et al. (2017), while foundational discussions on sustainable development by authors like J.D. Sachs (2012) and P. Shrivastava (1995) continue to shape scholarly discourse. Moreover, the emergence of innovative business models aimed at addressing societal challenges is exemplified by works such as "Social entrepreneurship" by C. Seelos and J. Mair (2005), and "Business cases for sustainability" by S. Schaltegger et al. (2012), reflecting a growing emphasis on corporate social responsibility and sustainable business practices. Overall, this table provides a snapshot of influential literature informing the intersection of corporate sustainability and the pursuit of SDGs, offering valuable insights for researchers, policymakers, and practitioners alike.

4.5 Author Collaboration Network

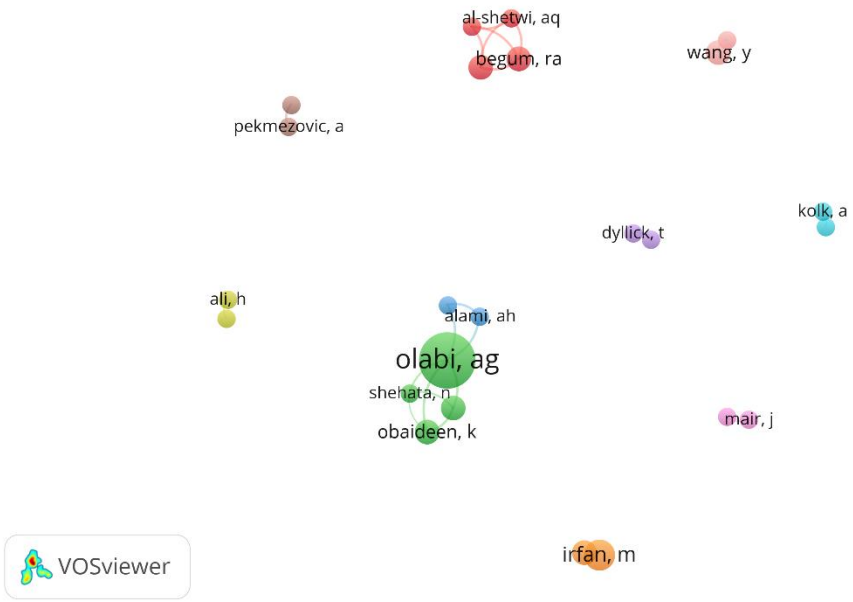

Figure 3. Author Visualization
Source: Data Analysis Result, 2024

The image above appears to be a visualization of an author collaboration network. Such visualizations are used to represent the relationships between authors in a specific research field based on their co-authorship on publications. In this network, we can observe:

1. The presence of several distinct clusters of authors, each identified by a different color. For example, there's a green cluster in the center with "olabi, ag" having a prominent node, suggesting this author has many collaborations within this cluster.
2. Some authors are isolated (like "mair, j" in purple), indicating that they might not share collaborations with the other authors shown or that their collaborations are outside the scope of this specific network.
3. The network does not show many inter-cluster collaborations, as we do not see many lines connecting authors of different colors. This could mean that authors tend to collaborate within their own research group or institution.

4.6 Density Visualization

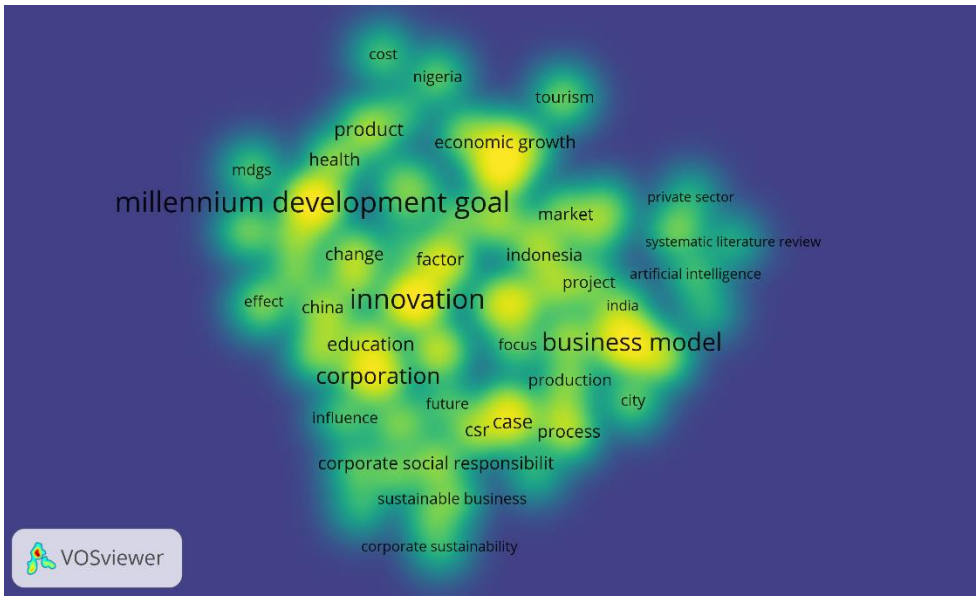

Figure 4. Density Visualization
Source: Data Analysis Result, 2024

This visualization presents a network of interconnected research topics. Unlike the previously analyzed figures, this one does not have an explicit time dimension or color clusters. Instead, it appears to use a heat map overlay, where colors may represent the density or centrality of topics within the network. In identifying future potential research topics, one can look for areas that are currently less dense but connected to highly dense areas. These represent emerging topics that are connected to well-established research areas and may be ripe for exploration.

The center of the visualization, with terms like "innovation," "education," "corporation," and "millennium development goal," shows a high density, indicating that these are well-established and central themes in the research network. Around this dense center, there are cooler areas with terms like "csr" (corporate social responsibility), "sustainable business," and "corporate sustainability." While they are not as central as "innovation," their connection to this key node suggests they are established but still developing fields. The edges of the network show the least density, with terms like "health," "economic growth," and "tourism" appearing in cooler colors, indicating they are less central or developed in this context.

Potential future research topics could combine aspects of the established central themes with those from the periphery. For instance, integrating "corporate sustainability" with "innovation" could lead to research on sustainable innovation in business. Similarly, connecting "education" with "economic growth" might yield studies on the impact of educational improvements on economic

development. Furthermore, some topics like "artificial intelligence," though not at the very center, are connected to several dense nodes, suggesting a multidisciplinary interest that could be expanded upon in future research.

CONCLUSION

From the bibliometric analysis, we discerned a robust and enduring focus on themes like "millennium development goals," "innovation," and "business models." These areas appear as densely connected nodes, indicating their centrality and significance in the dataset. The temporal overlay revealed an evolving research landscape, with sustainability topics gaining prominence in recent years, showcasing a shift in academic focus towards "corporate sustainability" and "corporate social responsibility". The author collaboration network highlighted the relational dynamics among researchers, with certain authors demonstrating significant collaborative activity, and others remaining less connected, potentially indicating opportunities for new partnerships or cross-disciplinary ventures. Lastly, considering potential future research directions, there is an evident path leading from well-established domains towards emerging areas of interest. The interplay between central and peripheral topics suggests new research avenues that could bridge established and developing fields, such as the integration of AI within sustainable business practices or the role of education in fostering economic growth, particularly within the context of achieving sustainable development goals.

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