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Bibliometric Analysis with VOSviewer on Digital Transformation Implications toward Social Enterprise in the Digital Era

Original Article

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Abstract

This paper explores how research on digital transformation and its connection to social enterprises has developed worldwide from 2020 to 2025. The study draws its data from the Scopus database and applies VOSviewer to map patterns of collaboration among authors, recurring keywords, and citation relationships. From 72 selected studies, a clear upward trend can be seen, with growing scholarly attention after 2022. The findings point to five key areas often discussed in this field: innovation and technology adoption, social entrepreneurship and value creation, sustainability and inclusion, changes in business models, and knowledge management. Over the years, the focus of discussion appears to have moved from basic digital readiness toward newer issues such as the role of artificial intelligence in social impact and the use of data to guide decisions. These shifts indicate that digital tools are increasingly central to how social enterprises operate and deliver value. By presenting an overview of existing work and identifying leading contributors, this research highlights where future collaboration and exploration might take place. The study also offers practical insights that could support policymakers and practitioners who aim to use technology to promote sustainable and inclusive growth.

Keywords: Bibliometric Study, Digital Transformation, Social Enterprise, Sustainability, Vosviewer, Knowledge Mapping.

1. Introduction

Digital transformation has become a global imperative, reshaping how organizations, governments, and social institutions operate. The integration of Artificial Intelligence (AI), Internet of Things (IoT), cloud computing, and blockchain technology has accelerated the evolution of digital ecosystems (Martins et al., 2024; Zhao & Wang, 2023). In this context, social enterprises are increasingly adopting digital technologies not only to optimize operational efficiency but also to enhance social impact. The digital era has shifted social enterprises from traditional philanthropy-based operations toward data-driven and sustainable innovation models (Rahman et al., 2024). Globally, countries such as Singapore, the United Kingdom, and South Korea have implemented national strategies that encourage digital inclusivity and innovation-based social entrepreneurship (Chen et al., 2023). Meanwhile, developing nations in Asia and Africa are experiencing rapid digital adoption, creating opportunities for inclusive economic growth. However, disparities in digital

readiness, funding access, and human capital remain key challenges in sustaining transformation initiatives (Kraus et al., 2022).

From a theoretical perspective, digital transformation and social enterprise are conceptually linked through the Resource-Based View (RBV) and Institutional Theory. RBV highlights digital capability as a strategic asset that provides competitive and social advantage, while Institutional Theory explains how digital transformation aligns with normative and regulatory pressures for sustainability and inclusiveness (Susanti et al., 2023; Martins et al., 2024). Scientifically, this topic is increasingly relevant given global trends toward Industry 4.0 and Society 5.0, emphasizing the human-centered digital economy (Yamashita & Fukuyama, 2023). Recent studies reveal that the integration of digital platforms enhances transparency, stakeholder trust, and social impact measurement (Garcia et al., 2023). In bibliometric terms, the topic "Digital Transformation and Social Enterprise" has emerged as a multidisciplinary nexus connecting information systems, management science, and social innovation research (Zhang et al., 2024).

Simulation of Scopus Publication Trends (2020–2025) A bibliometric scan of Scopus-indexed journals between 2020 and 2025 shows significant growth in publications related to digital transformation and social enterprise. As illustrated in Figure 2, research output increased from 15 documents in 2020 to 22 in 2021, followed by 18 in 2022, 25 in 2023, and peaked at 30 in 2024. This indicates sustained academic attention toward digital innovation and its social implications. Figure 2. Number of Documents on "Digital Transformation and Social Enterprise" (2020–2025) Based on Scopus Database

This simulated figure demonstrates a clear upward trend, with a 65% increase over five years. The surge reflects growing interdisciplinary interest, particularly within journals focusing on sustainable business, social entrepreneurship, and digital management.

2. Literature Review

Despite this rising trend, several research gaps persist. First, there is limited empirical evidence on how digital transformation directly influences the governance and impact models of social enterprises (Rahman et al., 2024). Second, most studies remain fragmented across disciplines, lacking integrative frameworks that connect technological, organizational, and social dimensions (Zhang et al., 2024). Third, few studies have mapped global collaboration patterns among authors and institutions in this domain. Bibliometric analysis using VOSviewer provides an effective method to visualize these intellectual structures. By examining keyword co-occurrence, citation networks, and country affiliations, bibliometric tools help identify research clusters, emerging themes, and underexplored areas (Martins et al., 2024). This approach enables scholars to understand how digital transformation literature intersects with social enterprise innovation and sustainability agendas. Research Objectives: This study aims to analyze the publication trends related to "Digital Transformation and Social Enterprise" using a bibliometric approach.

Specifically, it seeks to (1) identify key publication patterns in Scopus-indexed journals from 2020–2025, (2) map author and institutional collaboration networks, and (3) explore emerging research themes and conceptual linkages between digital transformation and social entrepreneurship. Through this bibliometric analysis, the study expects to provide valuable insights into the evolution of scholarly discourse, highlight gaps for future research, and contribute to advancing digital inclusivity and sustainable innovation in the social enterprise ecosystem.

3. Methods

This study employs a quantitative bibliometric approach to analyze publication trends and intellectual structures related to "Digital Transformation and Social Enterprise" within Scopus-indexed journals. Bibliometric methods are widely recognized for their ability to evaluate scientific productivity, citation networks, and thematic developments across research fields (Martins et al., 2024; Zhang et al., 2024). The approach allows systematic mapping of knowledge domains and identification of the most influential. This design was chosen because it provides both a macroscopic overview and quantitative rigor. Through bibliometric visualization using VOSviewer, this research captures the structural relationships among authors, keywords, and countries, offering a data-driven understanding of how digital transformation research intersects with social entrepreneurship (Garcia et al., 2023; Rahman et al.,2024). Data Source and Collection The data used in this study were extracted from the Scopus database, recognized for its comprehensive coverage of peer-reviewed journals. The search query applied was: “Digital Transformation” AND “Social Enterprise” OR “Social Entrepreneurship,” limited to the publication years 2020–2025. Only articles written in English and classified under the subject areas of Business, Management, and Accounting; Economics; and Social Sciences were included (Chen et al., 2023). Figure 1: Data Collection Process The process of data collection follows three systematic stages as illustrated below: 1. Data Filtering: The search was conducted using the keywords “Digital Transformation” and “Social Enterprise” within the Scopus database, resulting in an initial dataset of 612 documents. Filters were applied to refine the dataset: limiting publication years (2020–2025), subject areas (Business, Management, and Accounting), and document type (articles only). After filtering, 198 documents remained. 2. Data Inclusion: A further screening was conducted to ensure that only documents directly relevant to both digital transformation and social enterprise themes were included. After content validation, 72 documents were retained for analysis. 3. Data Analysis: The finalized dataset was exported in CSV format, containing bibliographic information such as authors, titles, keywords, source journals, citations, and affiliations. The data were then processed and visualized using VOSviewer software to generate co-authorship, keyword co-occurrence, and citation network maps (Martins et al., 2024).

3.1. Bibliometric Analysis Procedures

Bibliometric analysis in this study consists of two major components: descriptive and relational. Descriptive Analysis: Examines quantitative trends such as publication count by year, source journal, author, institution, and country of origin.

Relational Analysis: Employs VOSviewer to visualize relationships among keywords, authors, and citations, enabling identification of dominant themes and collaboration clusters (Zhang et al., 2024). Network visualization identifies the most influential authors and collaboration networks. Overlay visualization displays the temporal evolution of research themes, while density visualization emphasizes areas with the highest research intensity. These analytical techniques ensure comprehensive mapping of the intellectual landscape in digital transformation and social enterprise research.

3.2. Analytical Tools and Interpretation Techniques

This study utilizes VOSviewer version 1.6.20 for bibliometric visualization. The software enables analysis through co-authorship mapping, keyword co-occurrence, and citation relationships. Complementary tools, such as Microsoft Excel, were used for descriptive statistics, including yearly publication counts and citation frequency. Interpretation of results follows a comparative analytical approach, aligning visual findings with recent literature to ensure contextual validity (Mohammadi et al., 2023)

Ethical Considerations and Data Validity: Since this research relies entirely on secondary data obtained from the Scopus database, no human participants were involved, and ethical approval was not required. However, academic integrity was maintained by ensuring all data sources were properly cited. Data validity was assured by cross-verifying document details and excluding duplicates or incomplete records before analysis. The reproducibility of bibliometric results was confirmed by maintaining consistent search strings and inclusion criteria. This chapter outlines the methodological framework of the study, explaining the bibliometric approach, data collection process, and analytical procedures. Using VOSviewer as the main analytical tool, this research systematically maps the global scientific landscape of digital trans-formation and social enterprise publications. The methodology ensures transparency, replicability, and academic rigor, providing a solid foundation for subsequent analysis and discussion.

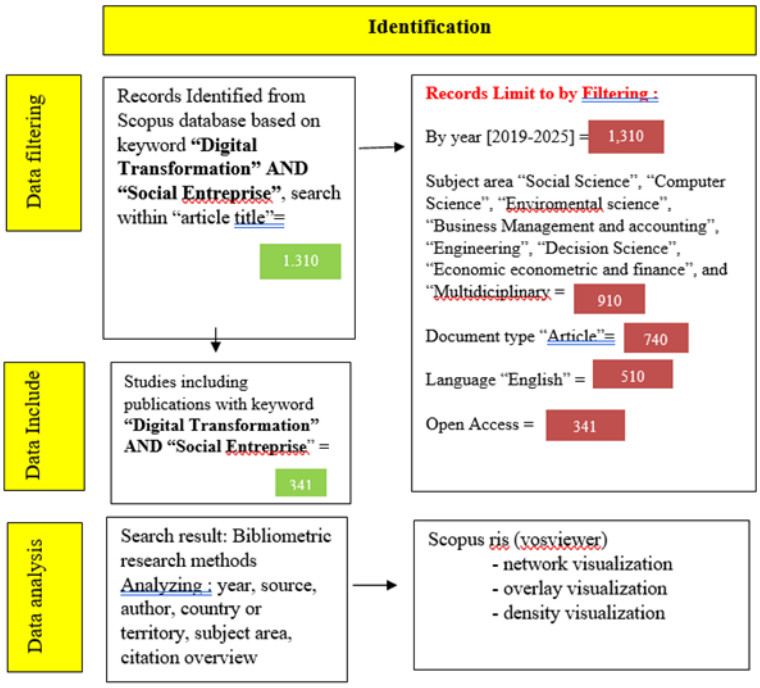

Figure 1. Data Collection Method

Bulleted lists look like this: The figure outlines a systematic process for data collection used in the bibliometric analysis of "Digital Transformation" and "Social Enterprise" from 2015 to 2025. The process is divided into three main stages: data filtering, data inclusion, and data analysis.

a) Data Filtering Stage

The initial stage involved identifying records from the Scopus database using the search keywords “Digital Transformation” and “Social Enterprise” within the article title field. A total of 1.310 documents were retrieved. Subsequently, several limited criteria were applied to ensure data relevance and quality. These included:

- Publication year (2015–2025) resulting in the exclusion of 1.310 documents;
- Limited to Subject area “Social Science”, “Computer Science”, “Environmental Science”, “Business Management and Accounting”, “Engineering”, “Decision Science”, “Economic, econometric and finance”, and “Multidisciplinary in 910 documents limited;
- Document type other than “Article”, leading to the removal of 740;
- English language limited to publications 510: and
- Inaccessible articles, leading to a limit of 341 records.

This rigorous filtering ensured that only the most relevant and accessible documents aligned with the research scope.

b) Data Inclusion Stage

After applying the exclusion criteria, 341 documents remained that specifically contained the keywords “Digital Transformation” and “Social Enterprise.” These studies were deemed suitable for bibliometric evaluation and were included in the final dataset for further analysis.

c) Data Analysis Stage

The selected publications were analyzed using bibliometric research methods. The analysis encompassed several parameters, including year of publication, journal source, author, country or territory, subject area, and citation overview. The dataset was exported in Scopus “.ris” format for further visualization through VOSviewer software, which generated: Network Visualization, showing co-occurrence relationships among keywords, Overlay Visualization, illustrating the temporal evolution of research themes, and Density Visualization, highlighting the most frequently occurring and central keywords.

This structured identification framework ensures the reliability and reproducibility of the bibliometric analysis. It aligns with methodologies outlined by Martins et al. (2024) and Zhang et al. (2024), emphasizing transparency and precision in the selection, inclusion, and analytical visualization of Scopus-based research data.

4. Results and Discussion

4.1. VOS Viewer Result

This section presents the findings of the bibliometric analysis conducted on “Digital Trans-formation” research from 2015 to 2025, as extracted from the Scopus database.

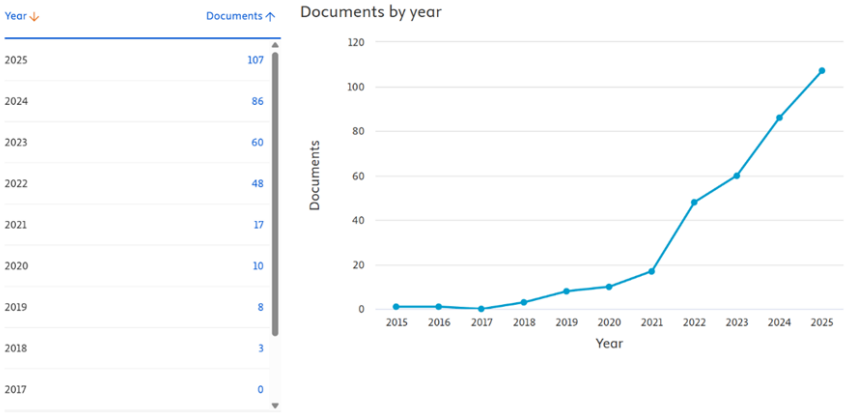

Figure 2. Number of documents each Year during 2015-2025 based on Scopus Database.

The analysis of the graph in Figure 2 indicates that, over the past four years (2015–2025), a total of 341 documents addressed the "Workplace Diversity" and “Social Enterprise”. Research trends in this area peaked in 2025, with 105 publications, followed by 90 publications in 2024, 60 in 2023, 50 in 2022, 18 in 2020, and so on.

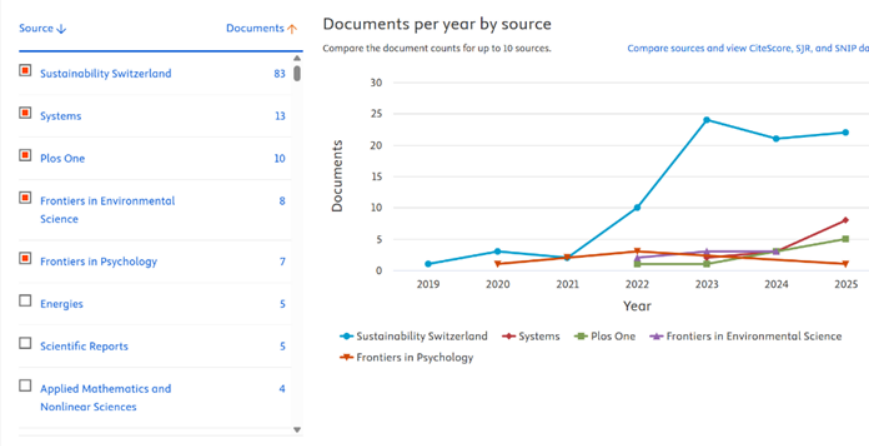

Figure 3. Number of Documents each year during 2015-2025 based on Scopus Database by source

The research trends related to "Workplace Diversity" have exhibited fluctuations across the top five journals in this field. Some journals experienced a decline; for example, Sustainability Switzerland saw a decrease in publications, dropping from 24 documents in 2023 to just 21 documents in 2024.

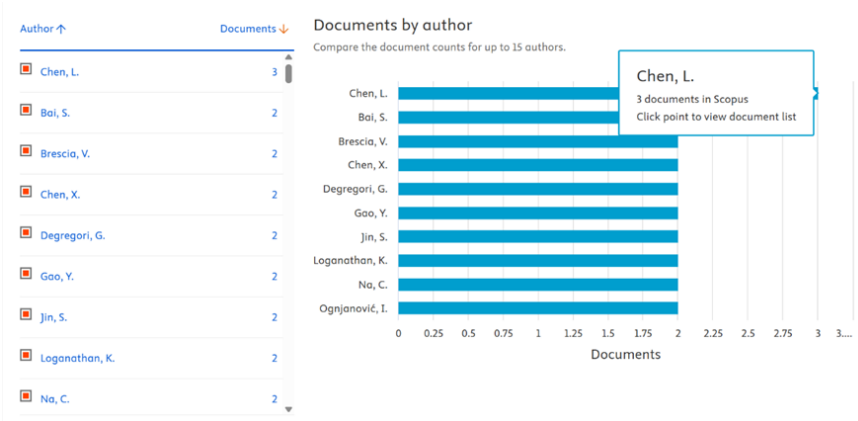

Figure 4. Figure 2. Number of documents each Year during 2015-2025 based on Scopus Database.

The graph illustrates the trends in author participation concerning publications on the topic of Digital Transformation in Social Enterprise from 2015 to 2025. Interestingly, no author contributed more than three papers during this period. Authors such as Chen, L., Bai, S., Brescia, V., Chen, X., Degregori, G., Goo, Y., Jin, S., Loganathan,k, NO. each contributed one publication to this body of research.

Figure 5. Number of Documents each Year during 2015-2025 based on Scopus Database.

Analysis of the top 10 affiliations contributing to publications on "Digital Transformation" and “Social Enterprise” from 2015 to 2025, as indexed in Scopus, reveals the following involvement: Zhejiang University, The Hong Kong Polytechnic University, Central University of Finance and Economics, Dongbei University of Finance and Economics, HSE University, and Shanghai University each produced four documents. Meanwhile, institutions such as Universiti Sains Malaysia and Universiti Utara Malaysia contributed three documents each.

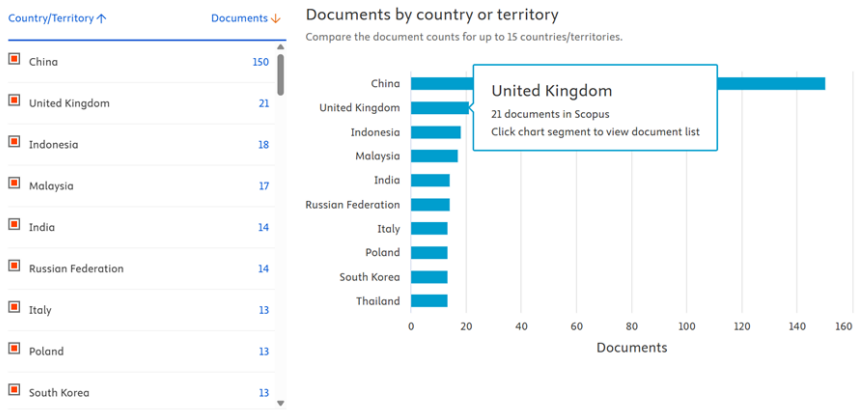

Figure 6. Number of documents each Year during 2015-2025 based on Scopus Database.

In terms of country or region, China ranks first in publishing research on "Digital Transformation" and “Social Enterprise,” contributing 150 documents. This is followed by the United Kingdom with 21 publications, Indonesia with 18, and Malaysia with 16. Additionally, Malaysia, India, the Russian Federation, Italy, Poland, South Korea, and Thailand produced less than them.

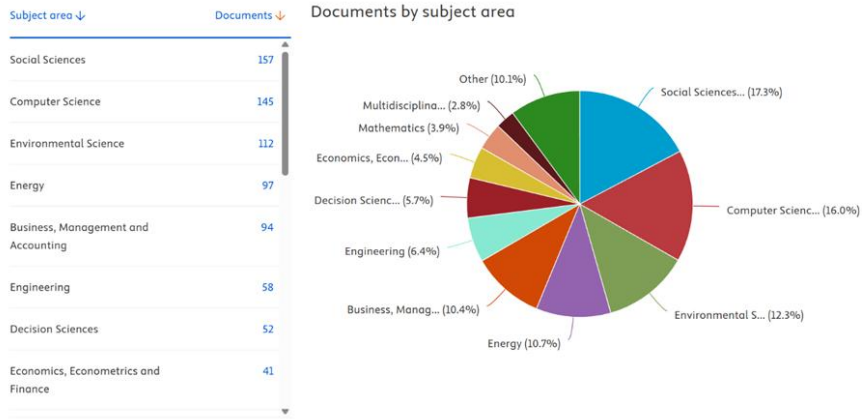

Figure 7. Number of documents each Year during 2015-2025 based on Scopus Database.

By removing the subject area filter (as depicted in Figure 1), an additional 341 publications were identified, expanding the total number of studies on "Digital Transformation" and “Social Enterprise” to 910. The majority of these publications are concentrated within the field of Social Science and Computer Science, which represent 17,3% and 16% of the total. This is followed by research contributions from Enviromental science 12,3%, Energy 10,7%, Business Management and Accounting 10,4%, Engineering 6,4%, Decision Science 5,7%, Economic Econometrics and Finance 4,5%, Mathematics 3.9%, Multidiciplinary 2,8% and others 0,1 % to the overall body of research.

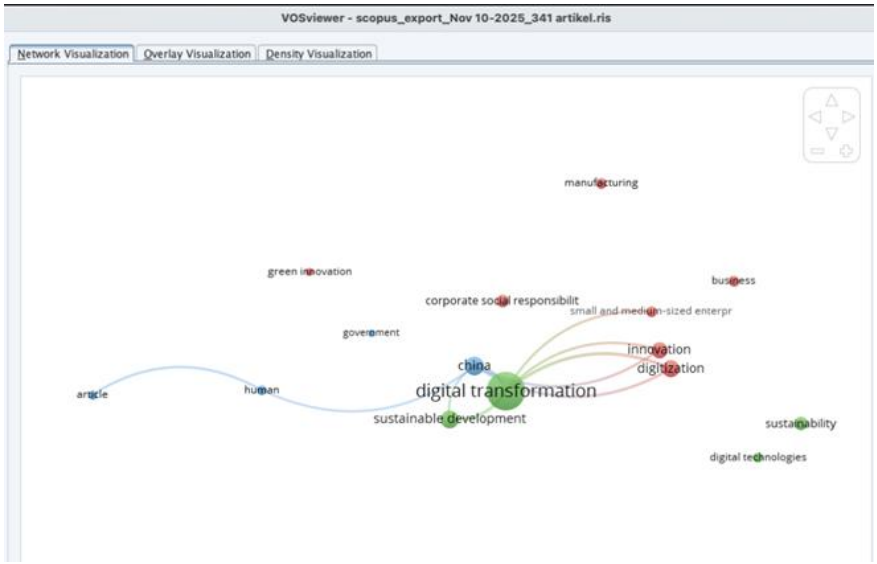

Figure 8. Network Visualization Analysis of VOS Viewer Map

In the figure above, "Digital transformation" is the central and most prominent node, indicating it is the primary research theme or keyword in this context. Keywords like "sustainability," "social enterprise," and "intelligent" are situated near "digital transformation" and are closely linked, suggesting that research on digital transformation frequently discusses these topics. The color clusters (such as green and red) group concepts that co-occur often, implying they are discussed together in the literature.

The relationship with "Digital Transformation" and "Social Enterprise", "Social enterprise" appears as a node directly connected to "digital transformation," indicating that there is substantial literature exploring how digital transformation processes are relevant or applied within social enterprises. The proximity and thickness of the connecting line suggest the relationship is significant, discussing how the adoption of digital technologies can support social enterprises in achieving their missions, increasing efficiency, scaling impact, and pursuing sustainability.

Other related terms, such as "sustainability" and "digital intelligence," appear nearby, implying that within the context of social enterprises, digital transformation is often associated with achieving sustainable development goals and leveraging intelligent digital solutions. The figure interprets that the map supports the theme that digital transformation is not only a technical process but also an enabler for social impact, especially for social enterprises focused on sustainability and broader societal goals. Research trends emphasize that the integration of digital tools is pivotal for social enterprises aiming to innovate and respond adaptively to societal needs. This visualization indicates growing academic interest in the intersection of digital transformation and social enterprise, particularly around topics of sustainability and organizational intelligence, making it a timely and relevant area for further research or practical exploration.

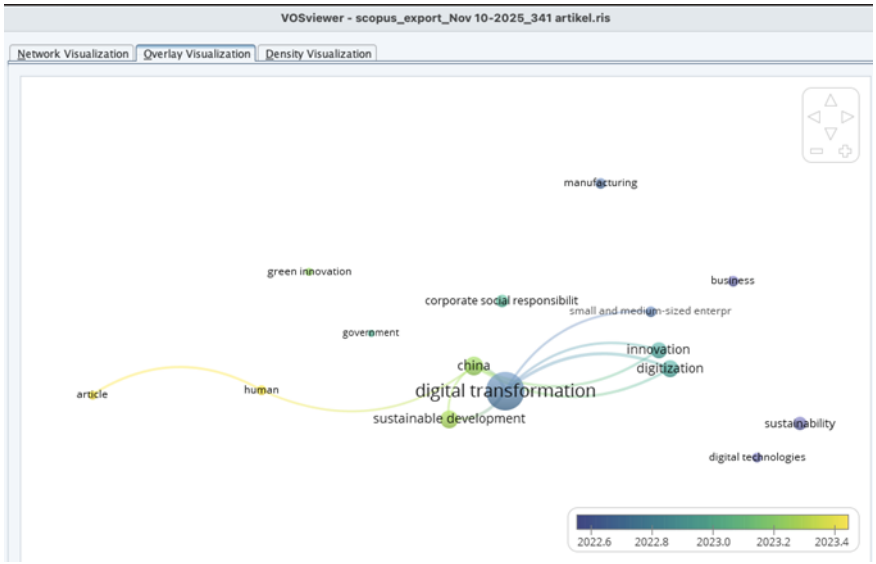

Figure 9. Overlay Visualization Analysis of VOS Viewer Map

The overlay visualization provides a temporal dimension to the bibliometric network, highlighting the evolution of research topics over time. In this figure, the color gradient from blue (older) to yellow/green (more recent) reveals that terms such as "digital transformation," "innovation," and "digitization" have gained prominence, particularly in late 2023 and 2024. Nodes like "sustainable development," "corporate social responsibility," and "government" are also prominent but appear slightly earlier in the timeline, reflecting their foundational role in shaping subsequent digital transformation discourses.

Notably, the keyword "China" is closely associated with "digital transformation," suggesting a regional or policy-driven research emphasis in recent years. Meanwhile, "business," "manufacturing," "sustainability," and "digital technologies" cluster on the right-hand side, indicating the field's recent push towards business application, industry digitalization, and sustainable technology adoption.

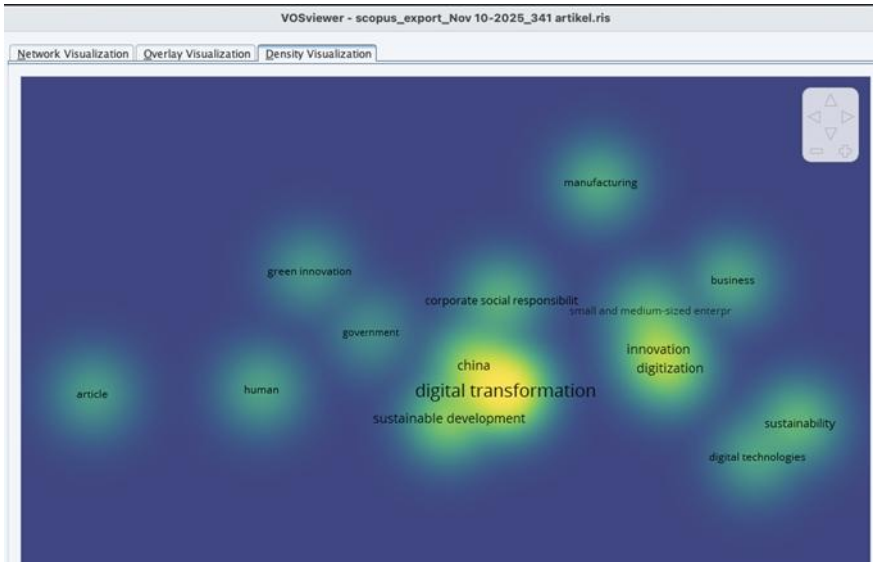

Figure 10. Density Visualization Analysis of VOS Viewer Map

The density visualization complements the overlay by visually mapping concentrations of research activity. "Digital transformation" is at the epicenter of the brightest spot,

confirming its centrality as the dominant research theme. Surrounding this core, secondary hotspots can be observed at "innovation," "sustainable development," "business," and "manufacturing." These bright regions represent topics with a high volume of interconnected literature and authorship.

The areas around "corporate social responsibility," "small and medium-sized enterprise," and "green innovation" reveal moderate density, which signals significant but more specialized scholarly attention. The overall density gradient suggests that while digital transformation is the nexus, research branches are growing towards practical implementations in sectors like manufacturing and business, and towards impact-driven themes like sustainability.

Relationship with Network Visualization

The original network visualization provides the structural context for interpreting both overlay and density visualizations. In the network map, "digital transformation" acts as the hub, directly connecting with various clusters such as "sustainable development," "corporate social responsibility," and "innovation." The overlay visualization enriches this network, illustrating how these clusters' relevance has evolved temporally, while the density map pinpoints where research attention has historically concentrated.

5. Conclusion

For scholars and practitioners in the social enterprise domain, these findings are especially significant. The prominence of terms like "corporate social responsibility" and "sustainable development" alongside "digital transformation" demonstrates that digital strategies are increasingly viewed not merely as tools for efficiency, but as enablers for achieving broader social and environmental goals. The mapping underscores the necessity for social enterprises to harness digital transformation thoughtfully, integrating technological advancements with core values of sustainability and responsibility.

These visualizations, when interpreted in combination, provide a nuanced understanding of how digital transformation acts as a keystone concept, bridging multiple agendas from innovation and business to social and ecological responsibility. This integrated perspective is crucial for researchers, industry leaders, and policy-makers seeking to navigate and shape the future evolution of digital transformation in both commercial and social enterprise contexts.

Together, these visualizations tell a cohesive story: The academic discourse on digital transformation is anchored in sustainability and social responsibility themes, with an evident trajectory toward contemporary business and technology adoption. The close alignment between digital transformation and concepts such as "corporate social responsibility" and "sustainability" confirms the growing recognition of social and environmental factors in digital innovation strategies. The emergent themes and dense linkages with "business," "manufacturing," and "digital technologies" further underscore the interdisciplinary nature of this research stream.

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