

The Intersection of Sustainable Entrepreneurship and Public Service: A Bibliometric Analysis

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ABSTRAK

Pada penelitian ini, kami mengeksplorasi persinggungan antara sustainable entrepreneurship dan pelayanan publik dengan menggunakan analisis bibliometrik dari database Scopus dari tahun 1985 hingga 2023, temuan kami menyoroti perkembangan yang signifikan dalam produktivitas penelitian sejak tahun 2015, yang mencerminkan fokus pada keberlanjutan dan tata kelola. Amerika Serikat dan Cina mendominasi lanskap penelitian, hal ini merupakan kesenjangan penelitian di mana penelitian ini dapat dilakukan di negara lain sebagai penelitian baru. Penelitian ini menyoroti potensi kewirausahaan berkelanjutan untuk meningkatkan pelayanan publik melalui inovasi, tata kelola, dan teknologi. Penelitian ini juga menguraikan arah penelitian di masa depan dan rekomendasi kebijakan untuk mempromosikan praktik-praktik berkelanjutan dalam pelayanan publik. Kebaruan dari makalah ini adalah bahwa makalah ini mengeksplorasi pendekatan interdisipliner, menggunakan alat seperti VOSViewer dan Biblioshiny, untuk memetakan tren penelitian dan mengidentifikasi kesenjangan penelitian dalam literatur. Penelitian ini dapat memberikan rekomendasi untuk penelitian dan pengembangan kebijakan di masa depan yang bertujuan untuk meningkatkan penyediaan layanan publik melalui kewirausahaan yang berkelanjutan.

ABSTRACT

In this study, we explore the intersection of sustainable entrepreneurship and public service using a bibliometric analysis of the Scopus database from 1985 to 2023. Our findings highlight a significant development in research productivity since 2015, reflecting a focus on sustainability and governance. United States and China dominate the research landscape, this is a research gap where this research can be done in other countries as new research. The study highlights the potential for sustainable entrepreneurship to enhance public service delivery through innovation, governance, and technology. It also outlines future research directions and policy recommendations to promote sustainable practices within public services. The novelty of this paper is that it explores an interdisciplinary approach, using tools such as VOSViewer and Biblioshiny, to map research trends and identify research gaps in the literature. This study can provide recommendations for future research and policy development aimed at improving public service delivery through sustainable entrepreneurship.

INTRODUCTION

In recent decades, there has been increasing concern from the world regarding sustainability, particularly since such challenges have intensified over the years in relation to the environment, society, and the economy (Ramdhani & Sugini, 2021). Public services are essential to ensure the provision of basic requirements such as health, education, and physical and social infrastructure (Yanuarita & Katjong, 2019). However, there are often limitations to public services in terms of efficiency, innovation, and resources, which restrict their adaptability to the changing demands of society (Kwilinski et al., 2024).

Conversely, sustainable entrepreneurship can be defined as a business approach that considers not only economic returns but also the social and environmental impact. (Kuckertz et al., 2020).

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The objective of sustainable entrepreneurship is to develop innovative solutions that facilitate long-term sustainability (Byerly, 2014).

The integration of public services with sustainable entrepreneurship is regarded as a potential solution to several of the most significant challenges currently facing society. (Osborne et al., 2014). The concept of sustainable entrepreneurship offers a promising avenue for the development of innovative strategies aimed at optimizing the efficacy of public services, accelerating the adoption of environmentally conscious technologies, and designing business models that promote beneficial social outcomes. (Manning et al., 2012). However, research on the relationship between these two constructs is still quite incomplete, and there seems to be a lack of pertinent literature that examines how this integration is conceived and utilized in discussions (Machfudiyanto et al., 2022).

While there are many possibilities for synergies between public service and sustainable entrepreneurship, academic scholarship on the integration of the two remains scarce (Weber & Wiek, 2021). Several key questions emerged, including 1) How has the field of sustainable entrepreneurship and public service publishing evolved over time? 2) What is the core relationship between sustainable entrepreneurship and public service, as evidenced in the extant literature? 3) What is the geographical scope and institutional coverage of studies on sustainable entrepreneurship and public service? 4) What are the areas that remain to be investigated with respect to sustainable entrepreneurial practices in the context of public service?

The objective of this study is to map the existing literature on the intersection of the concepts of sustainable entrepreneurship and public service using a bibliometric approach. By identifying key trends, contributors and gaps in the literature, this study aims to provide insights into how sustainable entrepreneurship can enhance public service delivery. Furthermore, it can provide recommendations for future research and policy in this emerging interdisciplinary field.

Literature Review

Public Service

The term "public service" is used to describe the performance of the government or an institution that has a responsibility to society, especially in the fields of health, education, transportation, social services, and others. The objective of public service is to improve the general welfare and ensure the equal distribution of essential services to all citizens (Denhardt & Denhardt, 2000). Public service can be explained as a way in which services are provided to the public as part of the governance process, which is an integral part of the state-enforceable provision of welfare, justice and equality for the people. (Andersen, 2005).

In recent years, the focus of public service has increased as the complexity of social needs, resource requirements and technological advances have increased. researchers such as (Osborne et al., 2014) has stated that for a change towards the New Public Governance model, which suggests collaboration between the public sector, private sector and civil society to improve public services, this approach is contrary to the concept of New Public Management where the model emphasized market-based reforms and efficiency measures in government. (O'Flynn, 2007). New Public Governance focuses on the actors in governance, where public services are provided through cooperation with non-governmental organizations, private companies and the public. (Grabs & Ponte, 2019).

The relationship between innovation and public service represents a significant area of concern in previous studies. There is a growing pressure on public institutions to enhance the efficiency of service delivery while simultaneously reducing the utilisation of resources. This can be achieved through the implementation of digital solutions, such as e-governance and smart cities, where technology plays a more fundamental role (Vo et al., 2024). This represents a significant departure from the previous approach, which was characterised by a series of reforms designed to modernise public services in response to a rapidly changing environment. This environment is defined by three key factors: rapid urbanisation, climate change and imbalanced economic development. (Allen et al., 2021).

The concept of co-creation and co-production of public services, along with the new role of communities as designers and providers of public services, has been perceived as a means of improving the delivery of public services (Allen et al., 2021). Therefore, public services should be perceived not only as an activity of the government, but also as an area where people who have the ability and knowledge can be involved in providing solutions (Donahue & Zeckhauser, 2011).

Sustainable Entrepreneurship

Sustainable entrepreneurship is a concept in which there are entrepreneurial activities that not only pay attention to economic goals, but also pay attention to social and environmental interests (Aghelie et al., 2016). This innovation expands the traditional domain of entrepreneurship by integrating sustainability—defined as profit, people, and the planet—into the core of business strategy and decision-making processes (Schaltegger & Wagner, 2011). These entrepreneurs are driven by a clear objective: to achieve profit as a means of economic advancement while minimizing environmental and societal impact.

The concept of sustainable entrepreneurship, like social entrepreneurship, has only recently emerged as a distinct field of study (Dees, 1998). However, it builds upon previous models by incorporating a new dimension: the integration of environmental sustainability as a primary goal. In recent years, a growing awareness of environmental challenges, including the depletion of resources and biodiversity, has led to a surge in scholarly and practitioner attention to entrepreneurial approaches as potential solutions to these problems (Parrish, 2010).

The concept of sustainable entrepreneurship has consistently centered on a three-dimensional value framework, whereby the objective extends beyond mere economic profit to encompass social and environmental considerations (Manning et al., 2012). On the other hand, these entrepreneurs are also concerned with the creation of sustainable ventures that incorporate profitable, socially responsible, and environmentally friendly practices. This has resulted in the emergence of new business models, such as the circular economy, in which products are designed for reuse, repair, or recycling to minimize waste and conserve resources ((Murray et al., 2017).

The literature on sustainable entrepreneurship has identified several drivers and barriers to its adoption. On the one hand, the increasing consumer demand for eco-friendly goods, the presence of green technology, and government support are great positives (York & Venkataraman, 2010). On the other hand, barriers like the resistance of markets, high up-front expenditures, and problems in quantifying social and environmental impacts would frequently prevent such sustainable entrepreneurs from growing their ventures (Hockerts & Wüstenhagen, 2010).

One emerging concept within the field of sustainable entrepreneurship is the social-ecological systems (SES) approach, which seeks to integrate social, economic, and environmental considerations (Folke et al., 2005). Most scholars contend that sustainable entrepreneurship is a field of study concerned with the role of changemakers in complex systems. These individuals are tasked with creating equilibrium and facilitating trade-offs between competing interests in pursuit of sustainable outcomes (Markman et al., 2016).

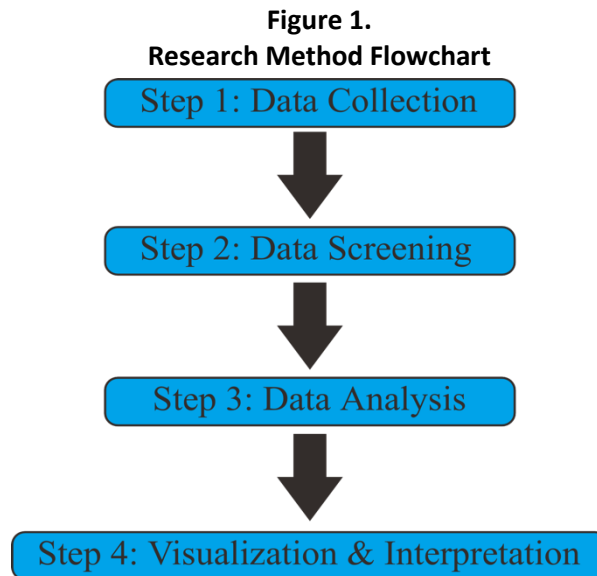
The novelty side of this research is to find out how the integration between public service and sustainable entrepreneurship, which includes the context of digital innovation and community engagement. While previous studies are not too many studies that discuss the integration of these two concepts, but previous studies indirectly pay attention to the potential of sustainable entrepreneurship that can play a role in increasing the efficiency of public services. This approach emphasizes the importance of collaboration between the public, private and community sectors. The adoption of technologies such as e-governance and the application of circular economy principles to sustainable entrepreneurship provides a novel approach to addressing the social and environmental challenges facing public services. Furthermore, concepts such as resilient entrepreneurship and social-ecological systems can contribute by incorporating adaption and resilience to climate change and economic imbalances, which have been little researched in the context of public services.

RESEARCH METHODS

Bibliometric Analysis

This research uses bibliometric analysis by taking data from the Scopus database. Bibliometric analysis is a mixed research method that employs a comprehensive approach to the processing of the entire text and data available in all parts of the scientific literature (Gaviria-Marin et al., 2019; Trabskaia et al., 2023). Particularly, many bibliometric research systematically report and review scientific activities, spanning several decades of research, using abstract and citation databases, for example, Scopus. Also, bibliometric analysis allows to identify the major works, authors and scholarly institutions in specific areas of research (Trabskaia et al., 2023). As for the screening process, this bibliometric analysis is different from others of its kind, in that, it emphasizes field work and research. This analysis excludes conceptual documents, literature reviews, systematic reviews and any other types that fall in the green box.

This research utilizes two software programs were employed for bibliographic mapping across various systematic reviews. To enhance the presentation of descriptive data and make it more visual, the first stage of the analysis used biblioshiny software in the RStudio application. In the second analysis of research in bibliometrics, VOSViewer was used to construct images of networks that contain relationships between components of investigations. The steps of bibliometric mapping are illustrated in the following figure:



Source: processed by researchers

Figure 1 presents a flowchart illustrating the methodological process like the PRISMA model, providing a clear depiction of each step in the analysis (Page et al., 2021). The details of the individual steps are explained as follows:

1) Data Collection

The key string "TITLE-ABS-KEY 'public service' OR (public AND service) AND entrepren* AND sustainab*" was used to obtain comprehensive as well as extensive and relevant data on the scopus database. By focusing on terms such as "public service," "entrepren*" (to capture variations like "entrepreneurship" and "entrepreneurial"), and "sustainab*" (to include terms like "sustainability" or "sustainable"), this key string targets studies that explore the intersection of public service, entrepreneurship, and sustainability. This method was used to capture a broad spectrum of literature on how sustainable entrepreneurship can also intersect with public service, enabling for a robust bibliometric analysis. A total of 450 documents were obtained based on the initial keyword search. The subsequent inclusion and exclusion process was conducted in accordance with the following procedure:

2) Data Screening

Inclusion Criteria:

- Language: only documents in English are included to ensure that the article can be read by researchers.
- Document Type: only published journal articles have been reviewed to ensure high academic standards.
- Focus on Public Service and Sustainability: The content of the article must be directly related to public service and sustainable entrepreneurship.
- Research Area: articles focusing on business, management and social sciences and the environment are included.

Exclusion Criteria:

- **Non-English Language Documents:** articles that use languages other than English are excluded because they will not be read by researchers.
- **Irrelevant Topics:** articles that only mention keywords but are not related to the concept of public service and sustainable entrepreneurship are excluded.
- **Duplicates:** every article that is indicated as duplication is removed.

The screening process of the Scopus database aims to ensure that the data analyzed is relevant and of good quality. Foreign language documents were excluded to maintain a proper understanding of the content and ensure relevance in the context of this study. The documents in this study were selected through a screening process that ensured relevance to the concepts of public service and sustainable entrepreneurship. After screening, a total of 144 documents were reviewed using the biblioshiny application in RStudio to obtain descriptive analysis results. Before conducting network visualization using VOSViewer, the data in .csv format retrieved from the Scopus database was verified and adjusted, considering several important factors, such as:

- Country or region names were not included in the index nor author keywords to maintain the focus of the research and reduce bias in the bibliometric analysis results.
- Keywords were added to the index based on document review.
- Some keywords that had synonyms (start-up, startup, and Startup) were adjusted into one term, namely "start-up."

After data verification and adjustment using Microsoft Excel, the database was in .csv format and data adjustment using Notepad+ for .bib (bibtex) format. The .csv data was then analyzed using VOSViewer to visualize the network analysis, while the .bib (bibtex) data was analyzed using biblioshiny in RStudio.

3) Data Analysis

This research applies two methods of analysis, namely descriptive analysis and network analysis, by utilizing the biblioshiny application and VOSViewer software in RStudio. Descriptive analysis through biblioshiny produces visualizations that cover various aspects such as the number of scientific publications per year, publications based on country affiliation, publisher affiliation, author affiliation, and publishing source. On the other hand, VOSViewer was used to generate data related to network analysis, co-citation analysis, bibliographic coupling, and authorship networks.

4) Visualization and Interpretation

At this stage, network analysis and descriptive statistics were used to visualize research trends and the geographical distribution of publications related to sustainable entrepreneurship and public service. Network analysis allowed us to identify relationships between key concepts, authors, and institutions involved in the research, providing a clearer picture of active research centers and the most frequently discussed topics. The VOSViewer software was used to visualize the collaboration networks between researchers and institutions, helping to understand the patterns of collaboration that exist within this scientific community.

RESULTS AND DISCUSSIONS

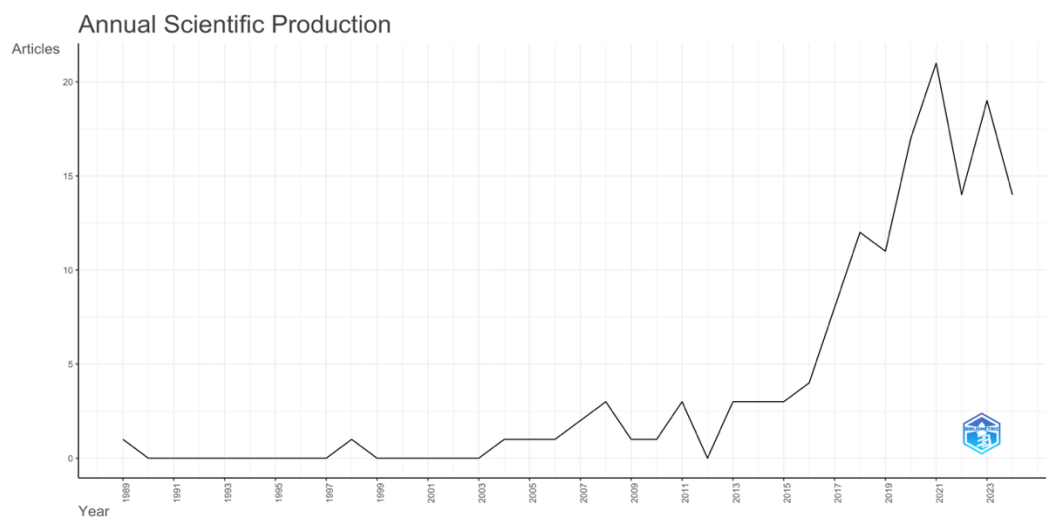
Descriptive Analysis

This research evaluates the position of sustainable entrepreneurship studies in Scopus-listed publications through descriptive analysis. This approach allows the identification of the extent to which keywords in the field are widely used. The time span analyzed covers from 1997 to 2023, the period in which the first publications on sustainable entrepreneurship were recorded in Scopus.

a) Annual Scientific Production

Figure 1 illustrates the annual scholarly production for research on “public service,” “entrepreneurship,” and “sustainability,” generated using biblioshiny in RStudio.

Figure 2.
Annual Scientific Production 1989 – 2024 Related to Sustainable Entrepreneurship and Public Service



Source: processed by researchers using the biblioshiny application in RStudio software (2024)

The following is an analysis of the trends.

1. **Slow Growth (1989-2010):** The research output in these fields remained minimal from 1989 to 2010, with very few publications during this period. This suggests that the topic may not have gained significant academic attention in its early years.
2. **Initial Rise (2011-2015):** Starting around 2011, there is a noticeable increase in publications, though it remains modest. This could indicate growing interest in the intersections of public service, entrepreneurship, and sustainability.
3. **Significant Growth (2016-2020):** The most dramatic rise in research occurs between 2016 and 2020. The number of publications spikes significantly, likely reflecting increasing global attention on sustainability issues and the role of entrepreneurship in public service delivery.
4. **Peak and Fluctuation (2020-2023):** The highest peak occurs around 2020, followed by some fluctuations in the following years. This could be due to various factors, such as the global focus on sustainability considering climate challenges and possibly the impact of the COVID-19 pandemic on public service discussions.

5. Recent Slight Decline (2023): In the last year or two, the number of publications appears to slightly decrease. However, the overall trend remains positive, indicating continued strong interest in the field.

As a first observation, research on public service, entrepreneurship and sustainability has seen a significant increase in the last decade, especially after 2015. This trend shows the increasing attention to these topics in academic discussions and is in line with global sustainability goals.

b) The Most Cited Publication

Table 1.
The Most Cited Publications in the period 1997-2023

Author	Title	Journal	Total Citations	TC per Year
Chen J.; Chen L.; Chen J.; Xie K. (2018)	Mechanism and policy combination of technical sustainable entrepreneurship crowdfunding in China: A system dynamics analysis	Journal of Cleaner Production	66	9,429
Chandra Y. (2017)	Social Entrepreneurship as Institutional-Change Work: A Corpus Linguistics Analysis	Journal of Social Entrepreneurship	37	4,625
Chandra Y.; Man Lee E.K.; Tjiptono F. (2021)	Public versus private interest in social entrepreneurship: Can one serve two masters?	Journal of Cleaner Production	21	5,25
Albrecht S.; Wiek A. (2021)	Food forests: Their services and sustainability	Journal of Agriculture, Food Systems, and Community Development	20	5
Albrecht S.; Wiek A. (2021)	Implementing sustainable food forests: Extracting success factors through a cross-case comparison	Journal of Agriculture, Food Systems, and Community Development	20	5
Adeola O.; Gyimah P.; Appiah K.O.; Lussier R.N. (2021)	Can critical success factors of small businesses in emerging markets advance UN Sustainable Development Goals?	World Journal of Entrepreneurship, Management and Sustainable Development	19	4,75
Annibal I.; Liddle J.; McElwee G. (2013)	Animating "bottom-up" sustainable strategies in village settings	International Journal of Sociology and Social Policy	18	1,5
Foley R.W.; Wiek A. (2014)	Scenarios of nanotechnology innovation vis-à-vis sustainability challenges	Futures	14	1,273
Owusu-Ansah P.; Obiri-Yeboah A.A.; Abdul-Aziz A.R.; Woangbah S.K.; Nyantakyi E.K.; Asamoah J.N. (2022)	Auto-Rickshaw Repair, Servicing and Maintenance for Youth-in-Entrepreneurship in Kumasi	Sustainability (Switzerland)	2	0,667
Ademola A.H.; Olajide O.P.; Ayodele A.Y.; Olusola A.J. (2019)	An examination of financing practices of social entrepreneurs in Nigeria: A study of selected non-governmental organisations	Academy of Entrepreneurship Journal	2	0,333

Source: processed by researchers using the biblioshiny application in RStudio software (2024)

Table 1 presents the most cited publications related to sustainable entrepreneurship and public service between 1997 and 2023, generated using biblioshiny in RStudio. The following is an analysis of the key points:

1. Top Cited Works:

The most cited paper is by Chen et al. (2018), with a total of 66 citations and an impressive 9.429 citations per year. The article, published in the Journal of Cleaner Production, on sustainable entrepreneurship crowdfunding mechanisms in China is a highly influential piece of research. Chandra (2017) published an article on social entrepreneurship and institutional change in second place with 37 citations and 4,625 citations per year. This shows an increasing interest in how social entrepreneurship can affect institutional change.

2. Recent Publications:

(Chandra et al., 2021) and (Albrecht & Wiek, 2021) The authors have published articles in the Journal of Cleaner Production, which has 21 and 20 citations, respectively. Their research focuses on the sustainable entrepreneurship process model, which discusses food forests and sustainability. This indicates an emerging focus on sustainable practices in agriculture.

3. Lower Citation Counts for Newer Articles:

Articles published in 2021 and 2022 have lower citations, such as articles written by (Owusu-Ansah et al., 2022) on auto-rickshaw repair and maintenance in entrepreneurship, which received 2 citations. However, articles on this topic are likely to receive more attention in the coming years.

4. Journal of Cleaner Production:

The Journal of Cleaner Production is the journal that produces the most topics on sustainable entrepreneurship. This shows that this publisher has a big impact on the development of research on the concept of sustainable entrepreneurship.

5. Emerging Markets and UN SDGs:

Adeola et al., (2021) in his journal examines how the success factors of a small business can support the Sustainable Development Goals. this is shown by the citations obtained, which are 19 citations and 4.75 citations per year. this confirms the relationship between entrepreneurship and sustainability goals.

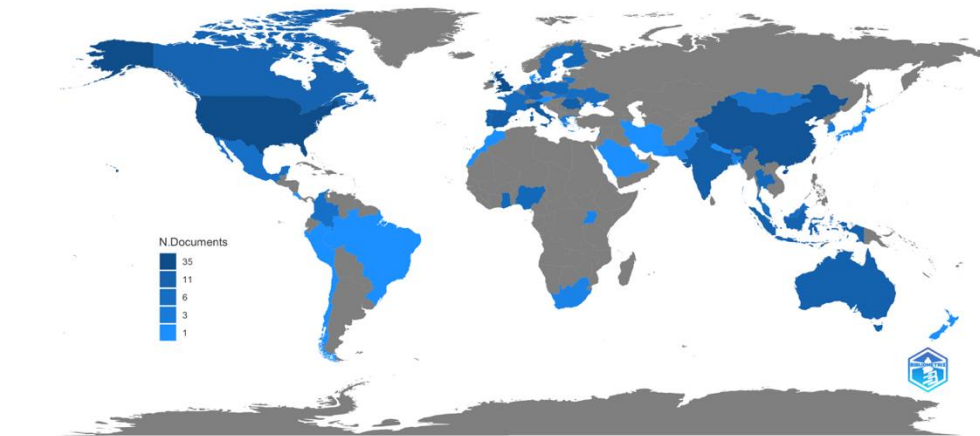
In general, Table 1 shows the various topic variants of sustainable entrepreneurship and public service, with the scope of articles in the fields of engineering, social and agricultur. The high citation rate of some key papers indicates their significant influence on future research, while more recent works indicate the potential for future growth in recognition.

c) Country Scientific Production

A geographic analysis of research on public service and sustainable entrepreneurship entails an assessment of the evolution of this research in relation to the countries where it is published. An examination of the geographical distribution of its publications may also facilitate the identification of regional "hot spots" of research activity in this area, or countries that may still be underdeveloped in this respect.

Figure 3.
Country Scientific Production

Country Scientific Production



Source: processed by researchers using the biblioshiny application in RStudio software (2024)

Figure 2 illustrates the Country Scientific Production based on the keywords related to public service, entrepreneurship, and sustainability, generated using biblioshiny in RStudio. The darker blue regions represent countries with higher scientific output in these fields, while the gray regions indicate no scientific output in this area. The following data analysis is presented in the figure:

1. High Output Countries (Dark Blue):

Countries like the United States, China, and potentially the United Kingdom show the darkest shades of blue, indicating they have produced the most publications related to public service, entrepreneurship, and sustainability. These countries likely have strong research institutions, significant funding for sustainability initiatives, and a high level of academic output in these areas.

2. Moderate Output (Lighter Blue)

Countries such as India, Brazil, Germany, and several European nations (like France and Spain) appear in lighter blue shades. This suggests that while their output is not as high as the leading nations, they still contribute significantly to the field.

3. Low Output (Light Blue):

It is notable that a few countries in South Asia, South Africa, and select regions of Latin America have demonstrated a relatively lower output of articles in this field. However, their continued presence in Figure 2 indicates that they remain engaged with research related to sustainable entrepreneurship and public service, where there are still opportunities for growth.

4. No Output (Gray Areas):

Some parts of the country especially in Africa and Central Asia and some parts in South America, show no output of publications. It is expected that in these regions also in the

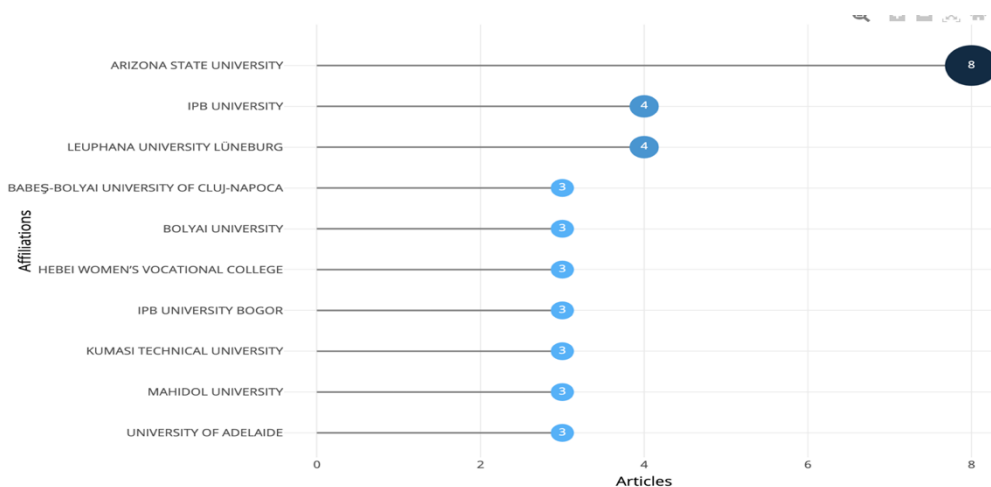
coming years there will be publications on the concept of sustainable entrepreneurship related to public service.

In general, Figure 2 shows that the topic of sustainable entrepreneurship and public service has attracted global attention. There is a significant output of publications spread across different regions of the world, given the importance of this topic. However, there remains a stark contrast in the distribution of research output between developed nations and less research-intensive regions. Country Scientific Production Related to Sustainable Entrepreneurship and Public Service (figure 2) highlights the uneven distribution of scientific output, with developed countries leading the research. This indicates that there is an opportunity for collaboration for some countries that have low publication output to be able to develop knowledge from countries that have high publication output.

d. Publication Production by A

In bibliometric analysis, the participation of institutions or academic networks in producing literature provides insight into the leading institutions in each subject area. Academic or affiliated institutes, such as universities and research facilities, play a crucial role in the transfer and creation of knowledge in the fields of sustainable entrepreneurship and public administration. By analyzing publications with respect to their producing affiliation, it is possible to identify the most prominent research institutions in each area and potential scenarios for academic collaboration.

Figure 4.
Publication Production



Source: processed by researchers using the biblioshiny application in RStudio software (2024)

Figure 3 displays the Publication Production by Affiliation related to sustainable entrepreneurship and public service, generated using biblioshiny in RStudio. The following data analysis is presented in the figure:

1. Top Contributors:

Arizona State University and IPB University lead the chart with the most publications (8 and 4 articles, respectively). This suggests that these institutions are highly engaged in research on sustainable entrepreneurship and public service, contributing significantly to the academic discourse.

2. Other Notable Institutions:

Leuphana University of Lüneburg and Babes Bolyai University of Cluj Napoca both produced 3 articles each. These universities are likely focusing on sustainability and entrepreneurship-related research in Europe, showing regional interest in these topics.

3. Diverse Geographic Representation:

The affiliations on this list represent universities from different regions of the world, including Europe (Leuphana University), North America (Arizona State University), and Asia (IPB University, Mahidol University). This geographic diversity highlights the global nature of research on sustainable entrepreneurship and public service.

4. Collaborative Research:

Many of these institutions are likely collaborating with other universities or scholars from different countries, as is common in sustainability research. This could explain the high number of publications from specific institutions, especially those that engage in international partnerships.

5. Presence of Technical Universities:

Institutions like Kumasi Technical University and IPB University Bogor show that technical and vocational institutions are also contributing to this research. This indicates that sustainable entrepreneurship is not only a theoretical subject but also a practical one with applications in technical fields.

6. Low Output from Other Institutions:

Universities like University of Adelaide, Mahidol University, and Hebei Women's Vocational College are at the lower end of the chart with 2 publications. While they have made contributions, their output is comparatively lower than the leading institutions. This could be due to different research focuses or smaller academic communities involved in this field.

Publication Production by Author Related to Sustainable Entrepreneurship and Public Service (figure 3) shows that research on sustainable entrepreneurship and public service is being conducted by a diverse range of institutions globally. The presence of both technical and traditional universities highlights the interdisciplinary nature of this research area, involving both practical and theoretical approaches. However, the concentration of research in a few key institutions suggests opportunities for wider global participation and collaboration in these fields. This analysis reflects the institutional contributions to academic discussions on sustainability and entrepreneurship, indicating the important role of certain universities in advancing knowledge in these areas.

e) Publication Production by Publisher

It is essential to conduct an analysis of the publications by a specific publisher to ascertain the primary outlets for research on sustainable entrepreneurship and public administration. Some publishers and journals are frequently the source of questionable research practices within a discipline. However, they can be useful for understanding the primary sources of scholarly literature. Many scholars consider the published literature from international journals in a particular area, which often has a high volume of publications in that area, to be a valuable resource for identifying patterns of knowledge dissemination and key players driving the growth of literature in each domain.

Figure 5.
Publication Production



Source: processed by researchers using the biblioshiny application in RStudio software (2024)

Figure 4 illustrates the publication production by journal sources about sustainable entrepreneurship and public administration, as presented in biblioshiny by R. The key findings of the analysis are as follows:

1. Leading Journal:

Sustainability (Switzerland) dominates the list with 24 publications, making it the most frequently used journal for research in sustainable entrepreneurship and public service. This reflects the journal's strong focus on sustainability issues and its broad reach in related fields such as entrepreneurship and public services.

2. Other Significant Journals:

Journal of Cleaner Production ranks second with 9 publications. This journal has a well-established reputation for publishing research on sustainability practices, including sustainable entrepreneurship and environmental aspects of production processes. Journal of Rural Studies and Entrepreneurship and Sustainability Issues both have 5 publications each, indicating their role in fostering research that links rural development, entrepreneurship, and sustainability.

3. Smaller Contribution from Other Journals:

Journals such as Futures and Global Journal of Flexible Systems Management contributed 4 publications each. These journals may focus on future trends in entrepreneurship and flexible management systems, aligning with the evolving landscape of sustainable business practices. Journal of Agriculture, Food Systems, and Community Development, World Development, and Academy of Entrepreneurship Journal each contributed 3 publications. These sources highlight a blend of topics from agricultural sustainability to community development and global entrepreneurship.

4. Diversity in Journal Focus:

The diversity of the journals in this list—from agriculture and rural studies to management and future studies—illustrates that research on sustainable entrepreneurship and public service

spans various disciplines. This interdisciplinary nature is critical as sustainability issues require integration of knowledge from different sectors.

5. Niche Journals:

Some journals, like the Academy of Management Journal, are known for management and organizational studies but have contributed fewer publications in this specific field, suggesting that sustainable entrepreneurship is still a growing niche in traditional management research.

The dominance of Sustainability (Switzerland) and Journal of Cleaner Production indicates that journals specifically dedicated to sustainability are the primary platforms for publishing research in sustainable entrepreneurship and public service. However, the presence of journals from other areas like rural studies, agriculture, and management reflects the broad interdisciplinary interest in these topics. This analysis shows that while sustainability-focused journals lead in terms of output, there is also substantial interest in this field from more specialized journals, highlighting the importance of understanding sustainability through multiple lenses—be it environmental, rural, or entrepreneurial. This is likely to increase as sustainability remains a critical issue globally.

Network Analysis

In addition to conducting descriptive analysis using the biblioshiny application in RStudio, we also complemented this study with semantic analysis using the VOSViewer application for data retrieved from Scopus.

a) Network Visualization

Network visualization is a tool that can provide insight into the connectivity and relationships between variations of concepts, authors or keywords in a particular field of science. In addition, this visualization provides insight beyond mere connections that allow analysis of the relationship of authors or institutions and the formation of these relationships and provides insight for researchers on research topics that have high interest due to their multifaceted approach.

Figure 6.
Network Visualization

Figure 4 maps the network visualization into clusters, which are represented by 4 colors that show a direct relationship to a theme focus. The following is an analysis of some of the clusters:

1. Yellow Cluster (Upper Left): Sustainability and Economic Development

Yellow cluster shows the role of sustainability in economic development, highlighting the importance of governance, rural economies and transportation systems. research in yellow cluster focuses on how sustainable practices can drive economic growth specifically in a region that relies on strong governance structures. technological development and social innovation are important elements here that show the push towards integrating sustainability in regional economies and third-sector services, including those focused on low-income populations.

2. Red Cluster (Lower Left): Entrepreneurship and Sustainable Development

The red cluster indicates that the discussion is centered on the nexus of entrepreneurship and sustainable development. This indicates a pronounced emphasis on the potential of entrepreneurial activities to facilitate sustainable growth. The concepts of public service, urbaniasai, and business development suggest that entrepreneurship can be regarded as a pivotal concept, not only in the context of economic development but also in the sphere of public service. In instances where public service is represented within this cluster, it serves as a defining feature of an entrepreneurial strategy that highlights business growth and sustainability within the context of public goods and services.

3. Blue Cluster (Upper Right): Innovation and Education

The blue cluster represents a forward-looking focus on innovation and education, both topics that are critical to enabling sustainable entrepreneurship. Research in this cluster talks a lot about how innovation, both technological and social, can improve the effectiveness of public services and small medium-sized enterprises. The emergence of the topics of education, public health and resilience shows the important point between human capital development and the ability to apply innovation to face global challenges such as climate change and the covid-19 pandemic that has occurred. this yellow cluster focuses on the importance of education in empowering individuals and organizations to innovate in ways that can contribute to sustainable development.t.

4. Green Cluster (Lower Right): Social Entrepreneurship and Social Enterprises

The Blue Cluster shows the theme's focus on social entrepreneurship and social enterprises, which highlights the role of organizations that address social challenges through business models that prioritize social impact and sustainability. This cluster also shows the relationship between government policies, stakeholders, and environmental sustainability, indicating that research very often discusses how policies can support social enterprises in contributing to sustainable economic and environmental solutions. Sustainable entrepreneurship also appears in this cluster, although it is only a supporting concept and not the center of this theme, but it can strengthen the idea of social impact and community-driven initiatives are quite important in this discourse.

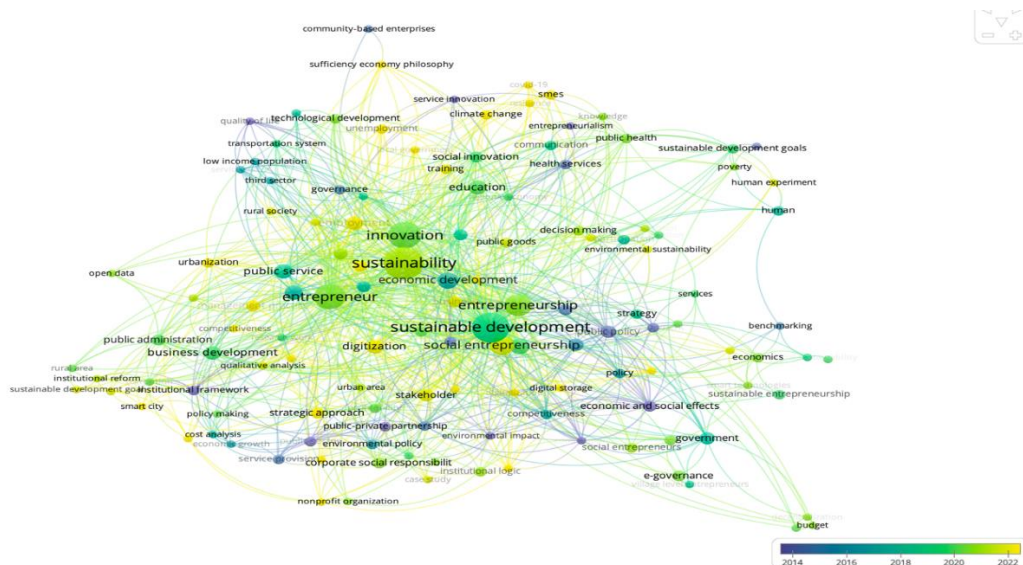
The clusters in Figure 5 show that sustainable entrepreneurship and public service is a multi-faceted field that relies heavily on innovation, education, policy support and social impact to be meaningful. Each cluster reflects different approaches that together form a cohesive picture of the research landscape that aims to create a sustainable future through entrepreneurship and public service transformation.

In addition, the visual results of the network visualization in this study can facilitate the identification of the themes of sustainability, innovation and public service. This dynamic shows the emergence of an interdisciplinary approach to the concept of entrepreneurship in the context of sustainability. There is still much room, however, for the integration of other concepts, such as public administration, economics and environmental science, to improve the understanding of sustainable entrepreneurship in public services.

b) Overlay Visualization

Overlay visualization is a visualization of the process results from VOSViewer that can show the evolution of a concept and field within a given research domain over time. By looking at the overlay visualization, it is possible to gain insight into the emergence of a particular topic and track the historical development of research on sustainable entrepreneurship related to public service.

Figure 7.
Overlay Visualization



Source: processed by researchers using the VOSViewer Software (2024)

The colors in the overlay visualization (Figure 6) show the period of a particular concept more visually. Darker colors show earlier or past years around 2014 and brighter colors show younger or updated years around 2022.

1. Emerging and Recent Themes (Lighter Colors - 2020-2023):

- Sustainable Development Goals (SDGs) and COVID-19: These concepts are relatively new with brighter colors indicating that these concepts have received attention in recent years, especially the issue of sustainability which has become a hot topic in the global world currently.
- Digitalization and E-governance: These topics appear in light green, indicating that recent research focuses on how digital technologies and governance practices are being adapted to improve public service and sustainable entrepreneurship.

- Social Entrepreneurship: Research on social entrepreneurship continues to gain attention, with the bright colors indicating a global interest in how entrepreneurship can contribute to both social and environmental goals.

2. Established Themes (Mid-range Colors - 2016-2018):

- Innovation, Sustainability, and Entrepreneurship: these topics become central themes in the midrange color, indicating that research on these topics has been well-established for several years. innovation, in the context of sustainable development and entrepreneurship, remains the basis of these concepts in the broader research landscape.
- Education and Governance: these topics also appear in the mid-range, indicating that research on the role of education in promoting sustainability and entrepreneurship is steadily growing. governance structures, especially in the field of sustainability, are also still an important focus in these periods.

3. Earlier Themes (Darker Colors - 2014-2016):

- Economic Development, Corporate Social Responsibility (CSR), and Public Administration: These topics appear in darker colors, indicating that they were more prevalent in early research. This suggests that early research focused heavily on how sustainability and entrepreneurship can drive economic development with an emphasis on CSR and public administration.
- Urbanization and Business Development: These topics are also very important in early research, which is likely driven by urban growth trends and the need for sustainable models to support this development.

The overlay visualization shows that research on sustainable entrepreneurship and public service has evolved significantly over the decades, with emerging trends focusing on digital transformation, governance and social entrepreneurship. Earlier research was more focused on economic development, urbanization and CSR, while recent studies are increasingly emphasizing global challenges such as the SDGs and the Covid-19 pandemic. This evolving landscape highlights the natural dynamism of sustainability research and its critical role in shaping future policies and business models.

c) Density Visualization

Density visualization is a visualization processed through VOSViewer analysis that provides an overview of the concentration of keywords and themes which in this research focuses on sustainable entrepreneurship and public service. This density visualization shows the most prevalent and most interconnected topics, using brighter colors (yellow and green) to signify the high-density of a research area and darker colors (blue) for less frequent topics.

CONCLUSIONS

This study employs bibliometric analysis to examine the nexus between sustainable entrepreneurship and public service. The objective of this study is to define the evolution of these two domains and their recent changes in trend.

By providing a comprehensive bibliometric analysis, this study contributes to the growing body of literature on sustainable entrepreneurship and public service. The findings highlight the significant increase in research since 2015, driven by global sustainability initiatives. While the United States and China lead research contributions, the underrepresentation of regions such as Southern Africa and parts of Asia highlights the need for more geographically diverse studies. In addition, this paper introduces an interdisciplinary approach, integrating fields such as governance, sustainability, and entrepreneurship to provide a deeper understanding of their intersections. The main contribution of the study is the identification of emerging themes and gaps in the literature, providing a basis for future research and practical applications in public service innovation through sustainable entrepreneurship.

The application of network visualization in this study facilitated the identification of the key themes of sustainability, innovation, and public service. These dynamics indicate the emergence of an interdisciplinary approach to entrepreneurship in the context of sustainability issues. The study also underscores the necessity for further investigation into the sustainable entrepreneurship practices associated with the provision of public services, including those areas that have likely been less studied.

While sustainable entrepreneurship can provide solutions for improving public services, it can encounter barriers in practice such as resistance to change, limited resources and unsupportive policies. public institutions may lack the financial strength and technological infrastructure needed for a sustainable initiative. overcoming these barriers requires a multifaceted approach, including policy change, capacity building and stakeholder engagement to create an enabling environment for sustainable entrepreneurship in the context of public services.

In summary, this study aims to conduct a comprehensive review of the literature on public service through the lens of sustainable entrepreneurship, situating the two fields together and suggesting novel and innovative applications of research in that cross-disciplinary space.

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