Mapping The Nexus: A Bibliometric Study on the impact of Entrepreneurship Education on Sustainable Development Goals (SDG 1) in Nigeria

Sophia Essahmed [1]
sophia.essahmed@aun.edu.ng[1]

School of Business Entrepreneurship, American University of Nigeria [1],

Abstract
This paper is a bibliometric study to extrapolate the richness of scholarly publications in recognising the interconnectedness of entrepreneurship education and poverty alleviation in attaining Sustainable Development Goal 1 (SDG 1) in Nigeria. It examines various academic publications to highlight thematic clusters, identify key contributors, and map the intellectual dynamics in this field in Nigeria. The study assesses intellectual structures that include the number of publications, identified trends and the most prolific authors that contribute to the field. Through citation analysis, the study determines highly cited and influential publications in these fields to examine their content and contribution to scholarship. Keyword analysis was used to identify evolving themes and research topics within entrepreneurship education and SDG 1 to map their development in the last five years. The study finds strong research collaborations and recommends more collaboration between scholars from the global West and Nigeria for greater achievement of SDG.

Keywords: entrepreneurship education, SDG 1, bibliometry, poverty

1 INTRODUCTION

As we advance through the 21st century, the dynamism of research cannot be underrated. Research is seen as a light beam that directs national development through nurturing intellectual capacities across different branches of society. The United Nations Sustainable Development Goals (UN-SDG) is at the heart of this transformative endeavour. This is a set of 17 interconnected objectives that seek to foster prosperity, protect the planet and ensure the well- being of people by 2050.

The world today recognises education's critical role in driving the sustainable development of all facets of life. Among these goals, sustainable development goal 1 (SDG1) – to end poverty in all its forms and dimensions – stands out as a fundamental aspiration. To accomplish such an ambitious and multifaceted goal requires a comprehensive approach encompassing economic, social and educational dimensions. The central task of sustainable development is to eradicate poverty in all dimensions (Sustainable Development Solution Network, 2012) as the current narrative of the sustainable development goal is pursued in the context of a set of interlinked global "crises" of climate, economy and persistent poverty (Sustainable Development Solution Network 2012). Sustainable development has become a significant issue for all well-meaning administrators of countries across the globe (Laurie et al., 2016).

Many of the core dilemmas in sustainable development are seen to be long-standing, including the resource-dependent nature of developing countries, persistent poverty and rising inequality from severely restricted access to opportunities and environmental improvements.

Poverty is seen as a hindrance to millions of people who cannot access basic amenities and decent livelihoods. It is a common reality for many urban residents of the developing world. One of the most visible patterns of urban poverty in developing worlds is the prevalence of slums and large concentrations of low-income housing seen on the fringes of many cities. Understanding when poverty has become even more prevalent in recent years is important, as the public sector no longer provides many basic services.

Unemployment is closely related to poverty and, in turn, to hazardous and deteriorating living and working conditions (Sustainable Development Solution Network, 2012). Inexistent employment opportunities in the formal sector make many urban residents in the developing world look to a wide variety of both legitimate and illegitimate income opportunities. Yet, it is vital for societies to

acknowledge that the greatest potential they have is their people. Therefore, the need to develop these people should be paramount. Nigeria accounts for 15% of the African population, constitutes 11% of Africa's total output and 16% of its foreign reserves, and accounts for half of the population of Africa and modern two-thirds of the capital output of the West African sub-region. Human capital development through avenues such as entrepreneurship education is paramount in ensuring the country develops sustainably.

The recent spotlight on entrepreneurship as an essential tool in the economy of any society has created the need for entrepreneurship education as a stimulant for national development. Entrepreneurship Education offers a practical approach, enables and equips with the necessary skills to become self-reliant and self-employed (Onyido and Dou, 2019).

The need to emphasise entrepreneurship education cannot be overestimated as it represents a multifaceted endeavour that resonates across global, regional and local contexts, shaping the entrepreneurial landscapes in diverse and profound ways (Gem 2020/2021 global report).

Entrepreneurship is key to sustainable socioeconomic empowerment that will fight unemployment and inequality, but it is hard to achieve this "without education that employs the proper methods, tools and objectives" (Rashid, 2019). As illustrated by the World Economic Forum's global education initiative, there is a need for multi-stakeholder partnerships for education and even more for entrepreneurship education (Idowu, F).

This paper sets out on a bibliometric exploration of the effects of entrepreneurship education on sustainable development goal 1(SDG 1) in Nigeria. Sustainable development has become a ubiquitous development paradigm, a watchword for international aid agencies and development planners, and a mantel of conferences and academic papers (Ukaga, Maser and Reichenbach, 2011). A bibliometric analysis examines various academic literature to highlight thematic clusters, identify key contributors and map the intellectual dynamism of entrepreneurship education and sustainable development with particular emphasis on poverty.

2 LITERATURE REVIEW

In an era of expanding scholarly output and rapidly evolving research, the quest for robust tools and methodologies to address and comprehend a vast corpus of literature has never been in greater demand, as this aligns with the overarching theme of this conference, "Research: A tool for National Development and Innovation in the 21st century."

Examining the extent to which entrepreneurship education contributes to the realisation of SDG1 through rigorous research is still very important, especially in the Nigerian context. Yatu et al. (2018) called the attention to a dearth of rigorous research that explores entrepreneurship education in Nigeria, encouraging rigorous research in the field. Other researchers, like Liv et al. (2019) and San-Martin et al. (2019), have called for research into the impact of entrepreneurship education with a specific focus on contextual uniqueness and how entrepreneurship education could be more effective in delivering its expected outcomes.

The findings from such research will lay the foundation for employing the transformative ability of entrepreneurship education to address the multi-dimensional challenges of poverty in Nigeria as it aligns with sustainable development goals. It is not a fad but rather a reflection of its utility in handling large volumes of scientific data as well as producing high-impact research.

This literature reviews existing scholarly insights as well as identifies research gaps while illuminating future recommendations in presenting the effect of entrepreneurship education on SDG1. The subsequent sections of this literature will comb through current research and disclose the dynamics of entrepreneurship education's impact on SDG1 in Nigeria.

It further highlights the limited bibliometric studies on this topic in the Nigerian context, collating the level of regional disparities in the current state of bibliometric analysis and the effect of entrepreneurship education in SDG1.

In assessing this interconnection between achieving economic empowerment and inclusive growth as it aligns with the sustainable development goals, we will create a comprehensive bibliometric map that visually illustrates how entrepreneurship education research intersects with the objectives of SDG1. This will facilitate cross-disciplinary collaboration among policymakers in the field of sustainable development, entrepreneurship education and poverty eradication through knowledge sharing and dialogue.

Nwangwo (2019) opined that the failure of tertiary education to inculcate students' functional skills has led to wastage in terms of both human and natural resources. Entrepreneurship education could be defined as the willingness and ability of an individual to acquire educational skills to explore and exploit investment opportunities to establish and manage a successful business enterprise.

According to Paul (2015), entrepreneurship education is structured to achieve the following objectives:

- to offer functional education that will increase self-employment and self-reliance;
- provides graduate youth with ample training for innovativeness in identifying & solving problems in exchange for income;
- to spur economic growth and development;
- offer adequate training in risk management to graduates to make entrepreneurship skills realistic;
- to reduce high level of poverty;
- to reduce rural-urban migration.

Entrepreneurship education is a viable instrument for reducing unemployment through university education in Nigeria. Nigeria is still grasping with the problems of unemployment, poverty and corruption. The solution lies partly in improving the people through entrepreneurship education. The university curriculum was in the past directed towards the production of graduates suitable only for white-colour jobs, graduates become job seekers instead of job creators. Universities should work closely with willing employers to design curricula and programmes that are relevant to the skills needed in their sectors.

Lack of entrepreneurship education, which creates a self-reliant ideology in people, will lead to gross unemployment, which results in poverty in all its facets. These, in turn, create survival instincts in individuals and then brings about discrimination among the people. Entrepreneurship education will lead to increased employment, reduce poverty level and bring about entrepreneurs working together for the common good and establishing a stronger economy than the present Nigeria economy.

Pervasive poverty points to further issues than a simple lack of income or the productive resources to ensure sustainable livelihood. It includes the experience and results of hunger, health issues, restricted access to education and inadequate social services, discrimination and social exclusion.

Some social groups have to deal with a heavier burden of poverty. "The Nigeria Multidimensional Poverty Index (MPI) 2022 shows that poor people in Nigeria experience over one quarter of all possible deprivations. Sixty-five percent of multidimensionally poor people- 86.1 million live in the north, while 35% - nearly 47 million live in the south" (Nigeria Poverty Map, 2023). Based on the most recent official household survey data from Nigeria Bureau of Statistics (2023), 30.9% of Nigerians lived below the International extreme poverty line of $2.15 per person per day in 2018/19 before the COVID-19 pandemic. The poverty rate in the northern geopolitical zones was 46.5% in 2018/19, compared with 13.5% for southern regions. By the end of 2023 about 37.5% of Nigerians are expected to live below the International poverty line.

As many as 62.9% people in Nigeria are multidimensionally poor, they experience deprivations in more than one dimension. NPM (2023) points out that there are four dimensions to poverty – health, education, living standards, and work & shock dimensions. These help us see that poverty is a deep and multifaceted problem. It affects individuals and communities globally in different ways, and to different outcomes. Poverty occurs unevenly in society, as particular factors make the subsets of the society more prone to heavier poverty burdens, and some find it harder to escape. The unequal yoke

is mostly due to "historical, structural and systematic factors" that enforce the negative pattern. The factors responsible for the heavier poverty burdens point to the need for highly-specific policies and interventions that will address the root of poverty on the journey to building a fairer world.

Employment generation is a means of assuaging poverty and growing the level of economic activities, which translates into economic growth. Although the Nigerian government puts in place policies and programs that are meant to combat this menace, but due to inadequacies of implementation, these programs have not made much impact.

According to the Northern Illinois University, Outreach (NIU, 2005), higher education has historically included economic development as part of its core mission. As reiterated by Araba (2012), higher education in Nigeria is gradually becoming an increasingly important enterprise, judging by the rise of new private institutions being licensed. He further asserted that the impact of education on the rise in unemployment is negligible, else unemployment should be on the decrease in the country. Institutions of higher learning should create environments that nurture the entrepreneurial mindset, skills, and behaviours across their organizations. Therefore, a shift from classical models of teaching to experiential learning approaches is vital. All around the world, necessary attention is being paid to the potential of university education to facilitate high-growth enterprises. Research carried out in Germany has shown that enterprises started by individuals with university degrees tend to grow faster than enterprises founded by non-academics (Egeln, 2000).

The strength of entrepreneurship education, however, is to influence people's attention towards entrepreneurship and the prospects and possibility of becoming a growth entrepreneur.

2.1 Theoretical Framework

This study will be guided by the premise of dynamism, where innovation and transformation based on the Triple Helix model will form a conceptual structure. This will provide a foundation to help make sense of the data extrapolated for the study. Which, in this case, will be the intersection between entrepreneurship education and SDG1.

The triple helix model was first offered by Henry Etzkowtz and Loet Leydesdoff as a theoretical framework that explores dynamics of innovation, particularly among academia, industry and government to ensure economic and social development, just as described in ideas such as the knowledge economy (Galvao et al., 2019).

The framework identified as the academic, which represents the university and research institution, could symbolise the entrepreneurship education sector. As the study examines the research trends, contributions by researchers and institutions are adopting the knowledge of entrepreneurship education to address poverty (SDG1).

The policy element of the triple helix model signifies policies, initiatives, and government regulation. This study involves the sustainable development goals created by the United Nations (sdgs.un.org, 2015) as part of the Post-2015 development agenda. The industry component symbolises the business sector, including start-ups, entrepreneurs and businesses. This represents how the entrepreneurial ecosystem relates to entrepreneurship education in curbing the multi-dimensional poverty in Nigeria. The adoption of the triple helix model serves as a guide to exploring the relationship between entrepreneurship education and poverty reduction (SDG1). This will contribute further knowledge relevant to the field of sustainable development, education and entrepreneurship while augmenting global policies and initiatives.

This will further guide the research question, encompassing citation analysis, science mapping and research trends; identify and examine research gaps associated with the intersection of entrepreneurship education and the attainment of SDG1.

2.2 Research Questions

- How can bibliometric analysis extrapolate research gaps in the field of entrepreneurship education and its connection to the realisation of Sustainable Development Goal 1(SDG1) in the Nigerian context?

2.3 What is Entrepreneurship and Why does it Matter?

One way to conceptualise entrepreneurship as a scholarly concept is to view it by taking primary approaches to defining entrepreneurship, as Landotram et al. (2012) suggested. These include:

- entrepreneurship as a function of the market
- the entrepreneurship as an individual
- entrepreneurship as a process.

As Landotram et al. (2021) reiterates, today's view of entrepreneurship is mainly grounded in management theories, viewing entrepreneurship as a process. While in Steyert and Hjarth's (2003) views suggest that entrepreneurs should no longer be described as one entrepreneurship but in many terms such as focus, definitions, scope and paradigms.

They further asserted that to view entrepreneurship solely through an economic lens is to reduce entrepreneurs to mere capitalists when the reality is that they do so much more. There seems to be a "widespread recognition that entrepreneurship is the engine driving the economy and society of most nations" (Brock & Evans, 1989; Acs, 1992).

In Gibb's (2005) view, he opined that when entrepreneurship is no longer limited to the business sector, i t needs to be understood in ways that go beyond its economic or business functions. In the words of Bahader (2012), developing a culture of entrepreneurship thinking within the communities in which we live and work has become the focus of governments and societies worldwide. He further reiterated that the building of entrepreneurship ecosystems has become the policy of many governments, in which the role of education has long been recognised as the cornerstone of any policy. Education needs to address the development of skills required to create an entrepreneurial mindset as well as prepare future leaders for complex, interlinked and fast-changing issues. There is a need for societies, organisations and individuals to improve their capacity to cope with an increasingly competitive, uncertain and complex world through innovation and knowledge building (Gibb, 2012). This is parallel to the evolution of the field of entrepreneurship that can increase interest in developing educational programs to encourage and foster entrepreneurship (Solomon et al., 2002).

2.4 The Emergence of Entrepreneurship Programs

The field of entrepreneurship development research has, since the start of the 21st century, become more theory-driven (Wikland et al., 2011), whereas this is not so in entrepreneurship education (Fayolle, 2013). The theoretical fragmentation within the field can, however, be viewed as a positive development as it allows for the continuous development of new perspectives and approaches (Kiwatko, 2005).

Entrepreneurship education (EE) developed from a niche phenomenon (Hills, 1988) to a flourishing field in both practice and research (Katz, 2003). Interest in entrepreneurship grew rapidly in the late 50s and early 60s when some of the most well-known studies of entrepreneurship, like McClelland's 'The Achieving Society' (1961), was written (Lee & Wong, 2014).

Entrepreneurship education was pioneered by Shigua Fijii, who started teaching it in 1938 at Kobe University in Japan (Alberti et al. 2004). Until the 1980s, much confusion was made between entrepreneurship education and small business, mainly because of an overlap between the two respective fields of research (Waston, 2001). Small business education was first established in the 1940s (Sexton & Bowman, 1982) to deal with the managing and operation of small established companies, while entrepreneurship education courses first appeared in the 1960s and focused on the activities involved in originating and developing new and growing ventures (Alberti et al., 2001).

Over time, as the understanding of entrepreneurship expanded, this led to a shift to a broader view of entrepreneurship education (Shapero, 1975). As the demand for entrepreneurial skills grew, educational institutions began to formalise entrepreneurship education by offering specialised courses and degrees, formally recognising entrepreneurship education as a distinct field (Katz, 2003).

Then, entrepreneurship education began to incorporate innovations, social entrepreneurship and social impact that aligned with a comprehensive understanding of the role of entrepreneurship education in development (Austin et al., 2006).

McMullen and Long (1987) argued that, unlike other university degrees, the success of entrepreneurship programs could not be evaluated by the number of students that graduated, but it could only be more appropriately measured by the socio-economic impact they produce in the business they create.

Nigeria introduced an action blueprint to promote entrepreneurship education with the aim of promoting innovation and entrepreneurial skills, to inspire more youths to set up their own enterprises and be self-employed with an overall effect of removing unemployment and the scourge of poverty (Kasgak et al., 2022). The human capital model of Robert (1991) advocated the view of education as an instrument for improving human capital, stimulating labour yield, and boosting the level of technology across the globe (Raimi, nd).

Research outcomes have often linked entrepreneurship in developing nations with "informality and the necessity-driven type of entrepreneurship," which contrasts with the formality and opportunity-driven type in developed nations (Yatu, 2021). For Nigeria to accelerate its socio-economic development, there is the need to deliberatelyfocus attention on human capital development through regular capital planners, seeing employers as builders of human capital to facilitate meaningful national development (Aropegba, 2001).

Olutunse et al. (2020), in their model of stimulating and developing entrepreneurship skills through entrepreneurship education in Africa, established that optimising the yield of the required outcome in entrepreneurship education will necessitate an entrepreneurship education that rightly aligns with contextual peculiarities of the society of focus.

For Nigeria, this can include the economic landscape, where income inequality, underemployment, a large informal sector, huge disparities in access to quality education and entrepreneurship training, insecurity and other deficiencies that can affect the extent to which entrepreneurship education can address poverty are the norm.

2.5 The Global Context of Entrepreneurship Education and its Alignment with the SDGs

Starting with the Bayh-Dole Act of 1980 in the U.S., which is to ensure closer ties and utilise resources in driving economic development, governments around the world are taking proactive measures, such as bringing universities to understand that economic contributions alone are not sufficient for mobilising sustainable development (Mowery et al. 2005).

Building the capacities of universities to respond to the challenges of sustainable development would require a rethink. In realisation of the importance of economic empowerment to achieve the SDGs, the United Nations has been focusing on entrepreneurship interventions to support ambitious youths to start their own businesses and to generate employment opportunities, particularly in the context of "fragility and poverty, where unskilled entrepreneurs predominate, and small business activities are mostly of a low-growth, survivalist nature" (Rashid, 2019).

Many of the world's government think tanks, NGOs and international organisations look to entrepreneurship as a solution to poverty and social inequality while implementing business solutions for a more vibrant global society.

To achieve these sustainable development goals, governments, higher education institutions, and universities must ensure that entrepreneurship education curricula explicitly target and enable young people to be successful.

Entrepreneurship education will bridge the gap that currently exists between students' learning outcomes and the vision of the National Education Policy; this will prepare students for more meaningful and satisfying lives, with an overall effect on the economic, social and cultural values of society (Mukhtar et al., 2021).

2.6 Sustainable Development Goal 1: Eradicating Poverty

The 2030 Agenda for Sustainable Development was publicised in 2015 by the United Nations after two years of global consultations with civil society organisations, scientists, academics and citizens from across the world. It proposed 17 SDGs, along with 169 targets and 231 indicators (sdgs.un.org, 2015).

Central to this agenda is SDG 1 – which is committed to eradicating poverty in all forms and dimensions. The critical problem of sustainable development in each country, as well as globally, is eradicating extreme poverty, as it stands in the way of achieving most goals of development.

To translate this ambitious goal into action, SDG1 is underpinned by a set of ten specific targets. These targets address the complexities of poverty reduction and the need for a comprehensive approach. They include halving the percentage of people living in poverty, ensuring social protection, promoting equal rights, and providing access to essential services (United Nations, n.d).

Eradicating poverty is fundamental for nations worldwide, especially in South Asia and Sub-Saharan Africa, which have most of the world's poorest. Extreme poverty remains stubbornly high in low-income countries of Sub-Saharan with almost half of its population living below the poverty line of $1.90 per day (unstats.un.org 2023). To give room for international comparisons, the World Bank established an international poverty line of $1.90 daily per person; this has been updated to $2.15 per person per day (worldbank.org 2022).

The task of eradicating poverty has enormous complexities, as poverty is a multi-dimensional, deeply entrenched phenomenon. To be able to understand and address the complexities of poverty, it is important to take effective poverty reduction strategies that will not just solve the immediate crises but will have a long-term effect on national development; that will foster economic growth, human capital development, social inclusion and the overall well-being of humanity.

2.7 Entrepreneurship Education and SDG1

Sustainable development, according to a World Bank study, is "a process of managing a portfolio of assets to preserve and enhance the opportunities people face" (worldbank.org n.d).

Parallel to the evolution of the field of entrepreneurship (Solomon et al., 2002) is the realisation that entrepreneurship education nurtures entrepreneurship, which in turn acts as a catalyst for poverty reduction through varied interconnected pathways, resulting in job creation, economic empowerment and the general well-being of humanity. Hytti & Kuopusjarvi (2004) highlighted on increased policymakers' awareness of entrepreneurship's relevance as a mainstay of economic development. Von Graevenitz et al. (2010) suggest that though entrepreneurship education ranks very high on the policy agenda of most economies of the world, there still exists a dearth of research that delves into assessments of the impact of entrepreneurship education.

Nabi & Linan (2011) further supported that while entrepreneurship education received high recommendations in developed nations in terms of policy formation and implementation, this is not the same in most developing nations, where a high level of migration and brain drain is the norm. This shows how critical the need to lift people out of poverty and empower them to self-reliance has become, but economic growth alone is not enough. Lifelong learning through education and training is necessary for the new job market, characterised by the knowledge economy (Soubbotin, 2004).

2.8 Methodological Views

In the realm of academic research, various methodologies can be applied to help explain or investigate the relationship between entrepreneurship education and SDG1 in Nigeria.

To fully comprehend existing knowledge and identify research gaps in this study, literature reviews that researchers and practitioners engage to provide a transparent audit trail in legitimising articles that update the field of entrepreneurship education as it impacts SDG1 are important.

Relative to traditional literature review methods, where renowned scholars like Mwasalwiba (2010), Nabi, Fayolle, Krueger, Linan & Walmsley (2017) were particularly interesting in their extensive views on entrepreneurship education, bibliometric analysis method provides objective criteria that can assess the research development in the field while providing a valuable tool in assessing the productivity and quantity of the research (Cobo et al., 2015).

Bibliometrics serves as a compass, guiding us through vast spheres of academic literature to reveal insights, patterns and trends. According to Zopic & Cater (2015), bibliometry introduces a systematic, transparent and reproducible review process, which permits a better description, evaluation and monitoring of published research, hence bringing a new perspective to the field of entrepreneurship education as it complements other research.

Bibliometric analysis holds particular relevance in this study as it enables the mapping between entrepreneurship education and sustainable development goal 1 in Nigeria by discerning influential research papers, authors and research clusters. Bibliometrics is part of scientometrics, which utilises mathematical and statistical approaches to analyse scientific activities in a field of research (Lopez-Fernandez et al., 2016). It also unveils the evolutionary trajectory of this interdisciplinary domain, shedding light on emerging research themes and knowledge gaps.

The overall objective is to arrive at actionable insights that can augment academic discourses, inform policy decisions and nurture unified responsibilities in achieving SDG1 across the globe, with particular emphasis on poorer nations.

It is important to note that an authoritative guide to bibliometric analysis in business research remains elusive. Hence, one can assume an important challenge for business scholars. Likewise, the popularity of bibliometric analysis in business research is not a fad but a reflection of its utility, which includes:

    i)   handling large volumes of scientific data
    ii) producing high research impact (Donthu et al., 2021).

2.9 Research Gaps and Opportunities for Future Research

Based on a broad literature overview of the relationship between entrepreneurship education and SDG1 in Nigeria, there are several research gaps and opportunities for future research. Yatu et al. (2018) stressed a dearth of thorough research that explores Nigeria's entrepreneurship education.

Additionally, a series of other studies exist whose findings and conclusions call for research investigations into the entrepreneurship education process so that stakeholders can contribute to shaping the entrepreneurship education process from multifaceted angles (Graniodes & Meck, 2019). Many studies within this domain remain within the confines of entrepreneurship and educational research. To comprehensively address the complexity of SDG1, there is a need for interdisciplinary research that integrates insights from fields such as economics, sociology and public policy. Future research can embrace an interdisciplinary perspective to explore the multifaceted relationship between entrepreneurship education and poverty reduction. This approach can offer a more holistic understanding of the challenges and opportunities in achieving SDG1 (Studer & Teixeira, 2020).

3 METHODOLOGY

The new knowledge created by researchers is embedded in the research literature. By measuring scientific literature, we measure knowledge and how it was produced (Grant, 2015). The methodology section of this study serves as the blueprint to assess the impact of entrepreneurship education in the attainment of Sustainable Development Goal 1(SDG1) in Nigeria, which focuses on

indicating poverty and exploring the dynamic relationship among academics, government and other stakeholders such as non-governmental organisations and businesses.

Bibliometrics are quantitative analyses of academic publications. It uses academic publications as a data source to provide a better understanding of how research is produced, organised and interrelated. It is a quantitative technique that uses relational, evaluative and descriptive methods to assess the quantity and quality of publications.

- Descriptive methods are simple descriptions of bibliometric information.
- Evaluative methods are used to assess and interpret the impact of publication.
- Relational techniques are applied to explore the relationship among units such as authors, documents, sources, organisation and countries.

When done well, bibliometric analysis can build firm foundations for advancing a field in novel and meaningful ways. It enables and empowers scholars to:

- Get a one-step overview
- Identify knowledge gaps
- Drive novel ideas for investigation
- Position their intended contributions to the field (Donthu, 2015).
- The main techniques for bibliometric analysis manifest in the following ways:
  - Performance analysis - accounting for the contribution of research.
  - Science Mapping - focusing on the relationship between research.

The emergence of scientific databases such as Scopus, Web of Science and Dimensions has made acquiring large volumes of bibliometric data relatively easy, and bibliometric software such as VOSviewer, Gephi and Lexi Mencer that enables pragmatic analysis and network visualisation (Moed et al, 1995). The bibliometric method aligns with the objective of this study as it outlines the specific procedures to uncover meaningful outcomes on the impact of entrepreneurship education on Sustainable Development Goal 1 in Nigeria.

3.1 Data Collection

The source from which the bibliographic data is being collected is Dimensions. Launched in January 2018, Dimensions links over 133 million research documents across the research life cycle (Williams, 2018). Dimensions go beyond the standard publication citation ecosystem to give users a much greater sense of the context of a piece of research (Daniel et al., 2018) by including not only books, chapters and conference proceedings but also awards, great patents, clinical traits, policy documents and altmetrics information.

The original idea of the database is to facilitate the identification of experts and leaders in different scientific domains and, therefore, to favour and stimulate academic networking and partnership (Mcshea, 2018). The entrance of the science citation index (SCI) and social science citation index (SSCI) allowed, for the first time, the realisation of studies that had been impossible and unthinkable in data mapping. By 2004, Scopus and Google Scholar represented another turning point in the database ecosystem (Marzo-abril, 2018).

These data are enriched with impact information, both in times of citation received and altmetric academic profiles, Global Research Identifier Database (GRID), geotagging, and classification of subject areas based on machine learning techniques (Bode et al., 2018).

The coverage and evaluation of the Dimensions database are comparable to the Web of Science (WOS) and Scopus and even show higher coverage from 2000 to 2016 (Ordeina-Melea et al., 2015). The core aim of the Dimensions project was to do more than deliver another research database; it is to build a tool that aligns with the requirements and success of research organisations in ways that can change how the scholarly landscape is navigated and understood (William, 2018).

Dimensions is compared to Scopus, not Web of Science (WOS), since Scopus has consistently been found to have greater overall coverage of academic journals (Mongeon and Paul-Hus, 2016; Waltman, 2016). Dimensions provides access to diverse research output, including academic journal

articles. This interdisciplinary coverage aligns with the multi-faceted nature of SDG1, which requires insight from various fields, including education, economics and policy (Piwower et al., 2018).

Data production, collection, processing and analysis have changed how research takes place, which has made it extremely valuable because we can understand "who is citing a paper and the diversity of fields that cite a piece of research" (Hook et al., 2018). Citations are a central part of the puzzle in databases like Dimensions. Scholarly attention in the form of citations has been a mainstay of bibliometric analysis since the 1950s and also an evaluative tool since the 1980s.

In Dimensions, standard reproducible subject categories are achieved algorithmically using a machine learning approach. An expert can build a classification based on a set of research terms with it, which can include more detailed data views in an expandable tab called "Analytical view." This tab offers more detailed metrics breakdown based on the current research criteria—a wide range of options and filters within the analytical views (http://app.dimensions.ai).

3.2 Search Query

Specific search terms or Boolean operators are used to retrieve relevant records from the Dimensions databases. The keywords used in this study include: ENTREPRENEURSHIP EDUCATION OR SUSTAINABLE DEVELOPMENT GOALS 1O RPOVERTY OR NIGERIA .

The keyword research was performed on TITLE, AUTHORS, ABSTRACT or BIBLIOGRAPHIC REFERENCES. Inclusion and Exclusion Criteria This refers to the rules and conditions used to determine which publications from the database will be included in this analysis (Inclusion) and those that will be excluded in the analysis (Exclusion). This criterion are applied to filter and refine the database to ensure that it aligns with the research objectives to maintain consistency and relevance. Inclusion is a positive filter that a publication must meet to be considered for analysis. At the same time, exclusion criteria are negative filters that filter out irrelevant data (http://app dimensions.ai).

On the focus of the publication related to entrepreneurship education and SDG 1, the following inclusion criteria were considered:
- Publication year: 2020, 2021, 2022 & 2023.
- Publication type: Articles
- Sources title: sustainability, International Journal of Entrepreneurial Behaviour and Research, Small Businesses Economics, Academy of Management Proceedings, Journal of Business Research, International Journal of Entrepreneurship and Small Businesses, International Entrepreneurship and Management Journal, Journal of Entrepreneurship in Emerging Economies.
- Journal list: Gold and All open-access.

The following were exclusion criteria considered:
- Publication year: before 2019
- Source title: non-related sources

3.3 Data Retrieval and Preparation

The bibliographic information for selected records, including publication titles, publication years, source titles, abstracts, and citation data, were downloaded and saved in Excel using Comma Separated Values (CSV) format.

Dimensions also allows access to the full bibliographic description of each document, which includes analytical views of the number of publications, publication citations, authors, and source titles.

The clearing and preprocessing of the data were conducted in Excel to ensure accuracy and consistency, and this wasdone by deduplication, standardised authors' names and addressing missing data. The structure of the database was checked to ensure that the arrangement of rows and columns were well arranged (http//app. Dimensions.ai). This is an essential procedure in preparing data for analysis, as well as ensuring its quality and suitability for analysis.

3.4 Validity and Reliability

To ensure the bibliographic data are sound and replicable in producing accurate research results, validity and reliability tests are crucial.

Validity

Content Validity is the extent to which the measures in a study adequately cover the content of the main under investigation (Trochim, 2006). It entails the careful selection of pertinent keywords and author names that harmonise with the study's focus on the Dimensions database, chosen for its extensive coverage and free online accessibility.

It ensures that the data retrieved for analysis are representative of the scholarly landscape related to entrepreneurship education and its impact on SDG1 in Nigeria.

Construct Validity: Covers the extent to which it accurately represents the theoretical construct it is intended to access (Trochim, 2006).

Construct validity ensures that VOSviewer structures in the scholarly data align with the study's research questions.The selection and analysis of keywords are central to the study's construct. It ensures that the chosen keywords accurately capture the key concepts within the research domain Trochim (2006).

Reliability

Reliability is a critical aspect of any research study, and in the context of bibliometric analysis, using VOSviewer ensures data consistency and accurate duplication record detection is pivotal. In justifying these measures, consistent data is essential to ensure the accuracy and worthiness of the analysis conducted in VOSviewer. Accurate publication counts are vital for citation analysis and other bibliometric indicators. Detecting and resolving duplicate records ensures the reliability of these counts. By emphasising data consistency and duplicate record detection, this study aims to maintain the integrity and accuracy of the bibliometric data used in VOSviewer.

3.5 Software and Tools

Bibliometric analysis employs quantitative and visual approaches to examine patterns and relationships within academic literature, providing valuable insight into the interactions between publications within a broader scholarly context.

VOSviewer offers an intuitive interface with the ability to transform bibliographic data into visual representations that offer a clearer understanding of the subject matter. VOSviewer provides researchers with the capability to:

- Network Mapping: visualise co-authorship and citation network, offering insights into collaboration patterns and research relationships.
- Keywords Visualisation: discern the significance of specific keywords or terms in scholarly outputs.
- Cluster Analysis: identify thematic clusters and research domains within the literature.
- Geospatial Mapping: ensure the geographical distribution of authors, institutions and research collaboration. The use of VOSviewer will unravel research trends, highlight key contributors and shed light on the intricate dynamics that establish the relationship between entrepreneurship education and poverty alleviation (Von Eck, N. J. & Waltman, L., 2010).
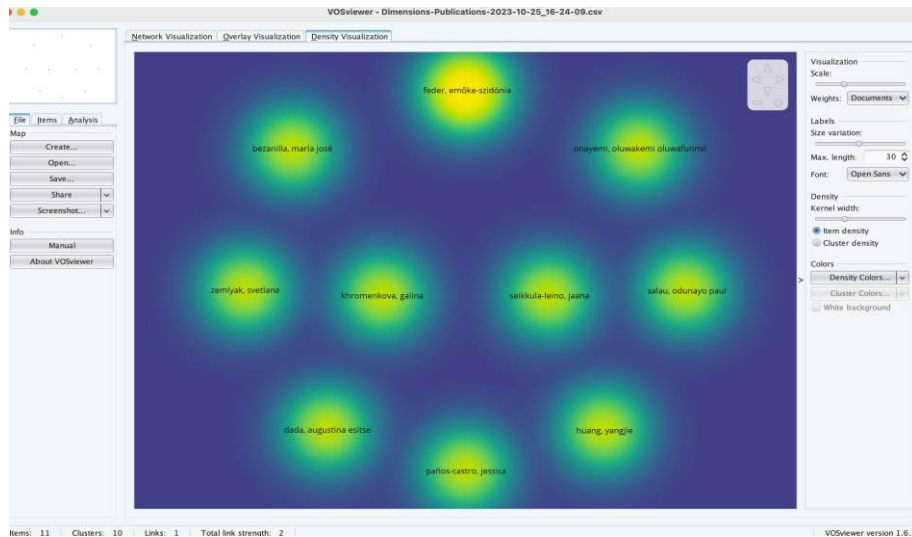
4 RESULTS

a) CITATION ANALYSIS

i) Citation Analysis Using Authors As Unit of Analysis

Full counting method was utilised, where documents with large numbers of authors were ignored.

- The maximum number of authors per document selected was 25.

- The minimum number of documents of authors was 7.
- The minimum number of citations of an author was 2.
- This resulted in 11 authors out of the 356 authors that met the thresholds. For each of the 11 authors, the total strength of the citation links with other authors was calculated. The authors with the greatest total link
- strength were selected (figure. 1). The following results were obtained (Table 1):

Figure. 1- Citation Analysis - Authors

i. Citation Analysis Using Countries as Unit of Analysis
   Full counting method was used, where documents co-authored by a large number of countries were ignored. The maximum number of countries per document is 25.
   The chosen threshold was a minimum number of the document of a country, which was 1.
   45 countries met the threshold (Figure. 2)
   For each of the 45 countries chosen, the total strength of the citation links with other countries was calculated. The countries with the greatest total link strength were selected. Of the 45 countries chosen, 20 countries were not linked (figure. 2)
   Some of the countries that were linked included the United Kingdom, Switzerland, Romania, UAE, Nigeria, Germany, Spain, the United States, Finland, Austria, China, Poland, Sweden, Taiwan, Saudi Arabia, and Malaysia(figure. 3).
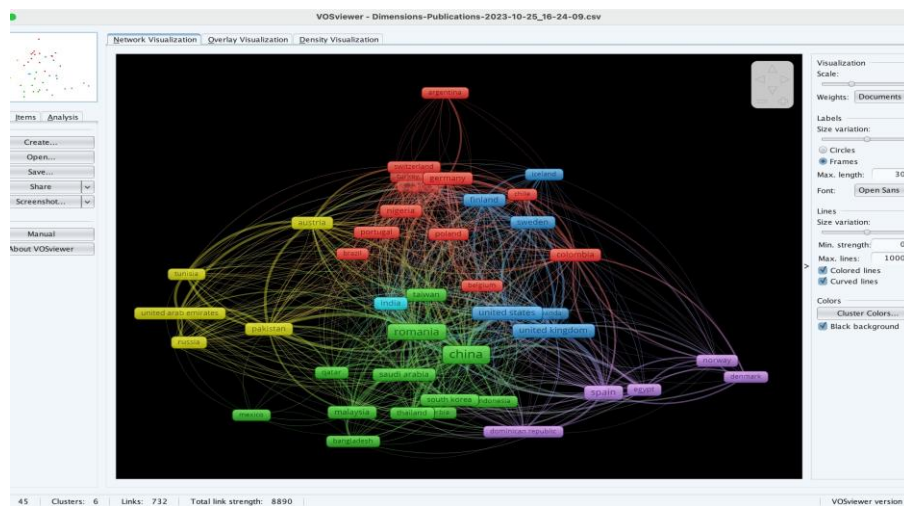   The top five countries with the highest citation counts included the following (Table 2):

Table: 2

S/N	COUNTRY	DOCUMENTS	CITATIONS	TOTAL LINK STRENGTH
1	Romania	12	252	6
2	China	22	180	3

3	Spain	7	61	3
4	U.K.	5	39	1
5	U.S.	5	30	1
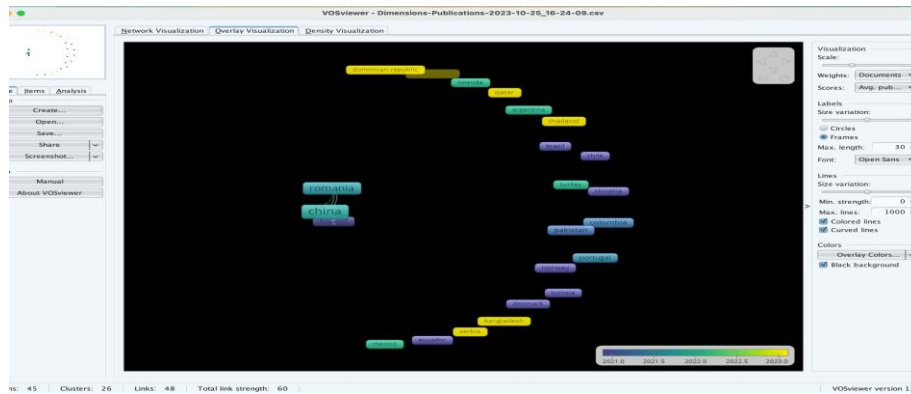
Figure. 2: Citation Analysis- linked & unlinked countries.

Figure 3: Citation Analysis - Countries

ii.   Citation Analysis using Documents as a Unit of Analysis
Full counting method was used.
627 meet the threshold. For each of the 627 documents, the number of citation links was calculated.
The documents with the largest links were selected. Further filtering of the document was done to removedocuments not relevant to the subject of study, which resulted in 103 documents (figure. 4).
Five (5) top documents, are as follows (Table 3):

Table: 3

S/N	Author	Links	Citation	Total linkstrength
1	Boldureau, (2020)	52	168	172
2	Rashid, Lubna(2019)	2	68	85
3	Filser (2019)	2	61	179
4	Grivokostopoulou(2019)	2	41	47
5	Tunio (2021)	2	52	73

Figure 4: Citation Analysis - Documents

a) BIBLIOGRAPHIC COUPLING ANALYSIS
i.   Bibliographic coupling using documents as a unit of analysis

Using the full counting method, 627 documents met the household, where the total strength of the bibliographic coupling link with other documents was calculated.

Documents with the greatest link were selected after filtration of documents that are not relevant to the subject of the study.

101 documents showed relevance to the subject topic (figure. 5), with the following results of the top ten documents (Table 4):

Table: 4

| S/N	Document	Citation	Total linkstrength
1	Thananusak (2019)	27	219
2	Yasir (2022)	10	216
3	Lu (2021)	41	214
4	Dodescu (2021)	4	200
5	Tehseen (2021)	14	191
6	Nitu-Antonie (2022)	4	183
7	Filser (2019)	0	173
8	Contreras (2022)	2	173
9	Boldureanu (2020)	168	172
10	Hotos (2022)	2	168

Figure 5: Bibliographic Coupling- Documents

Nigerian Authors captured in the analysis are presented in table 5 and figure 6:

Table: 5

S/N	Documents	Citation	Total link strength	Links
1	Igwe (2022)	2	110	60
2	Onyekwelu (2023)	0	83	38
3	Dada (2023)	0	43	36
4	Arejiogbe et.al (2023)	2	18	12
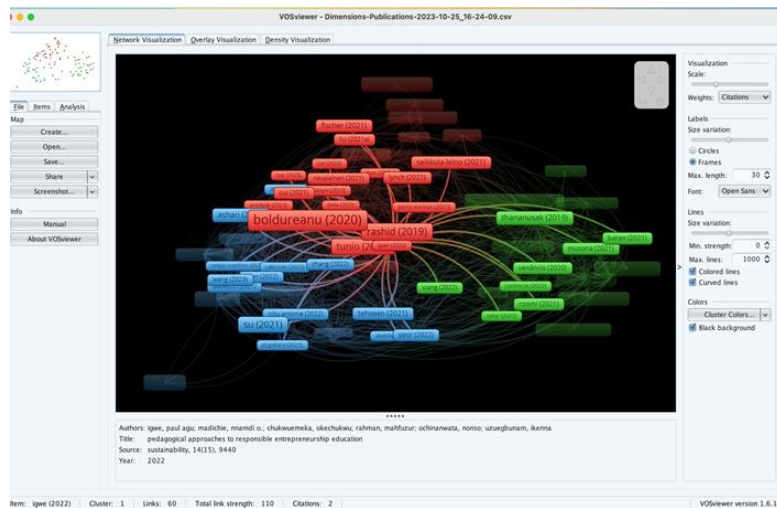
Figure. 6: Bibliographic Coupling - Documents

ii.   Bibliographic analysis using authors as a unit of analysis

Using the full counting method, with a minimum number of documents of an author as one (1); of the 356 authors,12 met the thresholds. For each of the 12 authors, the total strength of the bibliographic coupling links with other authors were calculated, and the authors with the greatest links were selected (figure. 7).

The result of authors with the highest links to the lowest links are as follows (Table 6):

Table: 6

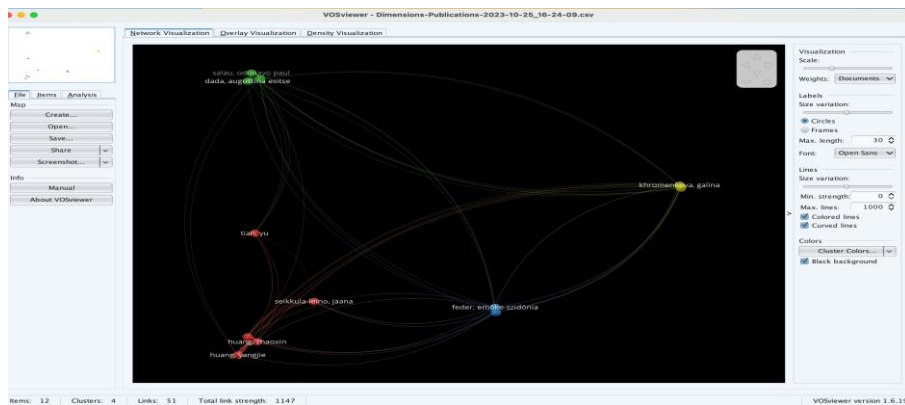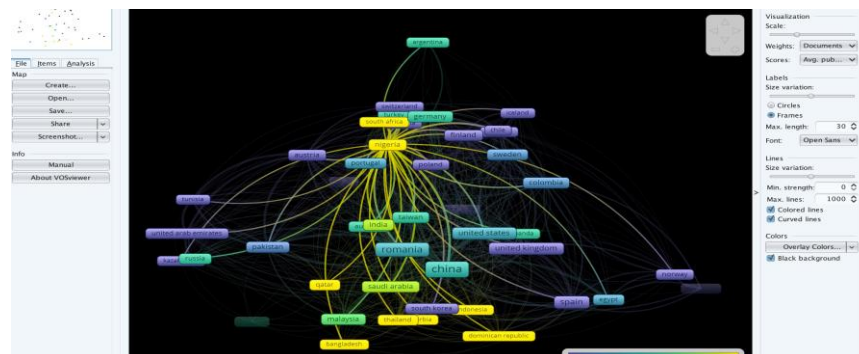| S/N	Authors	Documents	Citations	Total LinkStrength
1	Huang, Zhaoxin	2	1	316
2	Jiang, Yujia	2	1	316
3	Huang, Yangjie	2	6	251
4	Feder, Emoke-szidonia	2	4	240
5	Nitu-Antonie, Renata dana	2	4	240
6	Dada, Augustina Esitse	2	2	224
7	Onayemi, Oluwakemi	2	2	224
8	Salau, Odunayo Paul	2	2	224
9	Khromenkova, Galina	2	4	106
10	Zemlyak, Svetiana	2	4	106
11	Seikkula-Leino, Jaana	2	17	33
12	Tian, Yu	2	0	14

Figure 7 : Bibliographic Coupling - Authors

iii.   Bibliographic coupling using countries as a unit of analysis

Using full counting method, with a maximum number of countries per document as 25, and minimum number of documents of a country is one (1). Forty-five (45) countries met the threshold, where for each of the 45 countries, the total strength of the bibliographic coupling links with other countries were computed. The countries with the greatest total link strength were computed (figure. 8), with the following results obtained (Table 7):

Figure. 8: Bibliographic Coupling - Countries

Table: 7

S/N	COUNTRY	DOCUMENTS	CITATIONS	TOTAL LINK STRENGTH
1	China	22	180	2026
2	Romania	12	252	1285
3	United States	5	30	921
4	United Kingdom	5	39	885
5	Pakistan	4	108	783
6.	Finland	4	80	779
7	Spain	7	61	772
8	Austria	3	112	732
9	Germany	4	11	679
10	Columbia	3	19	587
:	:	:	:	:
27	Nigeria	3	2	224

b) CO-OCCURRENCE ANALYSIS
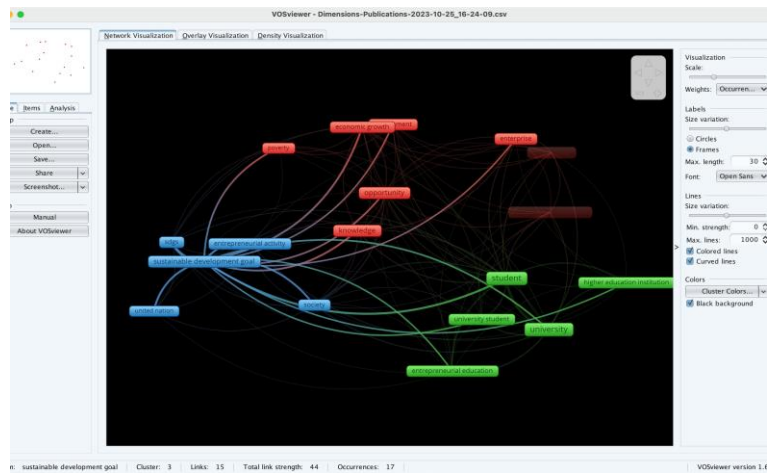   i. Co-occurrence analysis based on text data
   The fields from which terms are extracted are *Titles* and *Abstract* fields.
   The counting method used was the binary counting method. The minimum number of occurrences of a term chosen was 6, in which of the 2834 terms computed, 112 terms met the threshold.
   For each of the 112 terms, a relevance score was calculated. Based on this score, the most relevant terms were selected. The default choice selected 60% of the most relevant terms, computing a result of 67 terms. This was further filtered to remove terms not related to the study, resulted in 15 terms (figure. 9 & 10), as shown below (Table 8):

Table: 8

S/N	Term	Occurrences	Relevance
1	United Nations	6	3.82
2	Sustainable development goal	17	1.34
3	Entrepreneurial Activity	11	1.23
4	Entrepreneurship education	14	1.40
5	Government	10	0.57
6	Economic Development	9	0.52
7	Sustainable development	34	0.64
8	Economic growth	11	0.56
9	Opportunity	19	0.55
10	Society	15	0.41
11	Policymaker	9	0.45
12	Enterprise	15	0.64
13	Knowledge	16	0.93
14	Poverty	6	1.07
15	Student	46	0.73

Figure 9: Co-occurence Analysis - Text Data (SDG)
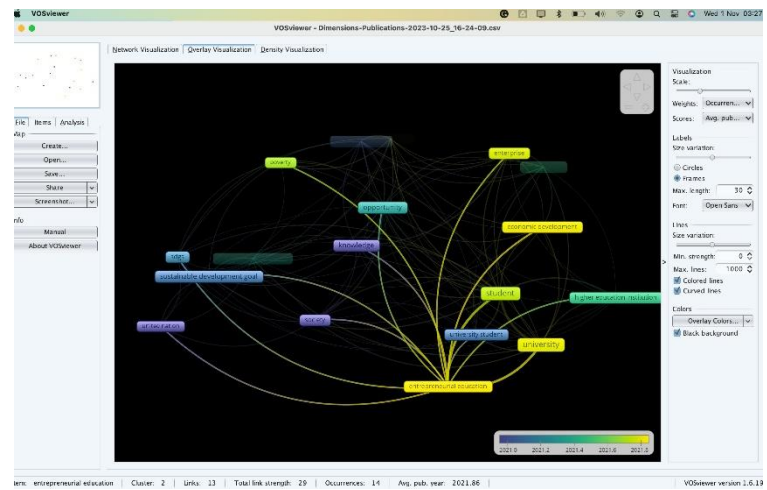
Figure 10: Co-occurence Analysis - Text data (E.E)

5 DISCUSSION

This section serves as a platform to examine and interpret the results obtained from the bibliometric study that revealed the intricate link between entrepreneurship education and sustainable development goals (SDG I) withinthe Nigerian context and other countries.

The methodology underpinned the bibliometrics study, using data sources obtained from Dimensions that provided structure and standardised bibliographic data based on keyword analysis. The keyword data obtained from Dimensions included the *title, abstract, source of data, authors, dates, times cited and cited references*. The data wasexported using CSV (Comma-Separated Values) formatting, and Excel to VOSviewer software for further analysis.

Features of VOSviewer include *network mapping, citation analysis, thematic clusters* and *visualisation of collaborative efforts*. These features are possible through scaling methods by VOSviewer to highlight the most influential or relevant items in the network, through pruning the network to remove low-level connections or nodes with fewer connections, also so as to focus on the most relevant and significant relationships within the data, related to the study (Van Eck & Waltman, 2010).

Clustering by VOSviewer groups related publications or keywords together, which can also reveal thematic structures within the data. Thresholds are set by VOSviewer to create limitations on various

metrics, such as *citation counts or co-authorship strength*, for more refined visualisations. (Van Eck & Waltman, 2010)

This study using VOSviewer transcends in creating *citation analyses, keyword co-occurrence maps* and *bibliographic coupling* in order to achieve clear insights on the relationship between entrepreneurship education and sustainable development goal 1 (SDG1) and how the findings from these results can shape the trajectory of entrepreneurship education and sustainable development in Nigeria.

i. **Citation Analysis using Authors as unit of Analysis** - the purpose of this analysis was to evaluate the impact of researchers or research groups. The analysis involved examining how often authors were cited across all their documents. It aimed to identify influential authors or research terms (Rousseau 2021). A full counting method was utilised, where documents with over 25 authors were excluded, to allow the focus on a well-defined research area, as Jacso (2005) noted that, citation analysis can be more effective when it concentrates on a specific topic or field.

Restricting the dataset to a smaller number of recent documents can facilitate the exploration of emerging research trends, as newer papers may have a higher likelihood of influencing the current state of the field (Duricux & Gevenion, 2010). The maximum number of authors per document selected was 25, while the minimum number of documents of an author was 7; the minimum number of citations of an author was 2.

This resulted in 11 authors out of the 356 authors that met the thresholds. For each of the 11 authors, the total strength of the citation links with other authors was calculated. The authors with the greatest total link strength were selected, they included (Table 1):

- Feder, Emoke-Szidenia with two (2) documents, four (4) citations, and total strength link of two (2), means that Feder, Emoke has been associated with or has authored two (2) scholarly documents; and has been cited four (4) times in other scholarly publications in relation to the study; as a measure of the impact of his work, which other researchers have found valuable. The total link strength of two (2) is a measure of the strength of connections or collaborations between authors.

- Nitu-antonie (2022) with 2 documents, 4 citations and a total link strength 2, would have a similar representation as with Feder, Emoke-Szidenia (Figure. 1)

Three (3) authors from Nigeria ranked fourth, seventh and ninth in the hierarchy of the citation analysis ranking, they were: Dada, Augustina Esitse, with 2 documents, 2 citations and no total link strength, Onayemi, Oluwakemi with 2 citations, and no total link strength, and Salau, Odunaya Paul with 2 citations and no link strength-showed no evidence of collaborative ties with other authors (Table 1).

ii. **Citation Analysis using countries as unit of Analysis -** this type of citation analysis can be referred to as 'country-level bibliometrics'. It involved evaluating the scholarly output and impact of research at the national level. It allowed for the assessment of a country's overall research output and productivity, as researchers often use this information to compare and rank countries based on their scientific contributions (Abramo et. al, 2013).

This approach helped identify international collaboration networks between countries, where it can reveal countries that frequently co-author research papers and collaborate on scientific projects. These collaborations contribute to the global exchange of knowledge (Glanzel & Schubert, 2003). The countries with the greatest total link strength were selected. Out of the 45 countries, 20 countries were not linked (figure. 2). Countries that were linked included:-

United Kingdom, Romania, United Arab Emirates, Nigeria, Germany, Spain, United States, Finland, Austria, Switzerland, China, Poland, Sweden, Taiwan, Austria, Saudi Arabia, and Malaysia (figure. 3).

- Romania had two (2) documents, with the highest citation of 252, and the greatest total link

of 6 - that indicated Romania has been associated with two (2) scholarly documents that contributed to the subject; with the document been cited 252 times in other scholarly publications, a high citation count indicates the impact and influence of entrepreneurship education and sustainable development. A total link strength of six (6), suggested that Romania has some level of scholarly collaborations with other countries (Table 2).

- This was followed by China with citations of 180 and a total link strength of 3.
- Nigeria had 3 clusters that were formed based on the strength of citation links among items. The significance of these clusters in citation analysis, as represented and visualised by VOSviewer, lies in the ability to reveal the thematic structure of a research field, the collaboration networks among researchers, or the co-citation patterns of documents (Van Eck & Waltman, 2010).

iii. **Citations Analysis using Documents as a unit of Analysis -** VOSviewer created 627 documents for visualisation based on citation analysis using 'document' as a unit of analysis. For each of the 627 documents, the number of citation links were calculated. These links formed the basis of *citation analysis* and are made from one research document to another; they serve as a means of acknowledging prior research and tracing the flow of knowledge within the scholarly landscape (White & McCain, 1998).

The resulted documents after filtering out all irrelevant terms, were 103 documents. The highest document from Boldureau, et al (2020), titled "Entrepreneurship Education through successful entrepreneurial models in higher education institutions," having the highest citations of 168 and citation links of 6 (Figure 4). This suggested that it is highly interconnected with other related documents in the field. 52 links, implies that this particular document is influential and has been frequently cited by other scholars. The document has a total citation count of 168 citations, which reflects the impact the document has within the field of entrepreneurship education. A total link strength of 172 represents the cumulative strength of all the connections or links associated with the document by Boldureau (2020) (Table 3).

iv. **Bibliographic Coupling Analysis using documents as unit of analysis -** bibliographic coupling focused on the similarity of the reference lists in different documents. It identified documents that shared common references, suggesting that they are related in content or subject matter (Kessler, 1963). This can be useful for identifying research clusters and trends in the broader field of entrepreneurship education and sustainable development goal 1 (SDG l).

Of the 101 documents that showed relevance to the subject, the document by Thananusak (2019), with 27 citations suggested that 27 other scholarly works have referred to or cited the document by Thanaunusak in their various research, making it a relevant document in the field. A total link strength of 219, represents the cumulative strength of all the connections associated with this document, hence having a substantial influence within its academic network. This was followed by the document by Yasir (2022), with a citation of 10, and a total link strength of 2016, and followed thirdly by Lu (2021), with 41 citations and a total link strength of 214 (figure.4).

The Nigerian authors with the highest bibliographic coupling were Igwe, Madichie, Chukwuemeka, Rahman, Ochinanwata & Uzuegbunam (2022), with 2 citations and 110 total links, in their journal article titled: "Pedagogical

Approaches to responsible Enterpreneurship Education". This was followed by Onyekwelu, Ibe, Monyel, Attamah &

Ukpere (2023), with zero (0) citations and a total link strength of 83, in their article titled: "The impact of Entrepreneurship Institutions on access to micro-financing for sustainable entreprise in an Emerging Economy." Thirdly, Dada, Austin, Adegbuyi, Omotayo, Ogbari, Mercy, Palau, Odunayo, Atolagbe, Tolulupe, Onayemi & Oladotun (2023), with zero (0) citations and a total link strength of 43 in their article titled "Envisaging the Impact of Entrepreneurial

Cultural on Venture Creation among Undergraduate Students of Selected Universities in Nigeria."
This shows the burgeoning of Nigerian scholars in this field (Table 5)

v. **Bibliographic Coupling Analysis using Authors as unit of analysis -** bibliographic coupling using authors as the unit of analysis is a method that focuses on identifying commonalities in the references authors cite in their works. It is useful for uncovering collaborative networks and identifying authors with similar research interests. It helps in mapping research communities, understanding research trends, and discovering potential research partners(Bayack & Klavans, 2011).

For each of the 356 authors that met the threshold, the total strength of the bibliographic coupling links with other authors was calculated (Figure. 7). The authors with the greatest link included: Huang & Jiang, both with 2 documents, 1 citation and a total link strength of 316 each, this suggest that documents authored by Huang & Jiang are not strongly cited, but have significant relevance within the field (Table 6).

Three authors from Nigeria were captured in this bibliographic coupling: Dada, Onayemi and Salau; with two (2) documents each, two citations and total link strength of 224 (Table 6).

vi. **Bibliographic Coupling using countries as unit of analysis -** bibliographic coupling at the country level involved identifying countries that frequently cited the same set of references in their research publications (Vinkler 1996). It aims at highlighting commonalities in the references cited by researchers from various nations. This can identify countries that collaborate on topics selected on entrepreneurship education and sustainable development goal I (SDGI). It can provide the mapping of global research communities or clusters that show common bibliographic connections, giving a sense of the international intellectual structure of the research domain.

Using full counting method, with a maximum number of countries per document as 25 and a minimum number of document of a country as one (1). Forty-five (45) countries that met the threshold had 732 links and a total links strength of 8890. The top five countries with the greatest total link strength were:- Chain, Romania, United States, United Kingdom and Pakistan, accordingly. Nigeria came up as the twenty-seventh position out of the 45 countries, with 3 documents, 2 citations and a total strength of 224 (Table 7).

China with the highest documents of 22, and 180 citations, suggested that other scholarly documents from within the dataset have referenced or cited the documents from China. A total link strength of 2026 indicates that the documents from China are also strongly associated with other documents within the field. This also indicates that China has contributed significantly to the field of entrepreneurship education and sustainable development (fig. 8).

vii. **Co-concurrence Analysis -** help researchers identify the key topic and themes within a research field, discover connections between concepts, and highlight emerging trends (Coboet et al., 2011). Using co-occurrence maps in this study can help gain a deeper understanding of the research landscape related to entrepreneurship education and SDG 1.

The binary counting method, which is one of the two common counting methods, is also known as *presence-absence counting* (Salton & McGill, 1983). It focused on the presence-absence of a co-occurrence relationship that is used to emphasise the existence of relationships between terms without considering their frequency or intensity. This made it a suitable choice to relate a simplified network that highlight only the existence of connections (Van Eck & Waltman, 2009). Interpreting the co-occurrence findings based on text data involves analysing the frequency of terms and their relevance in relation to the research context (Table 8).

   o *United Nations* - with occurrence: 6, relevance: 3.82, had a relatively high relevance source. This suggests that *United Nations* is a significant and relevant concept in this study. This could indicate that possibly it related to entrepreneurship and sustainable development goals, which are central themes in the analysed documents.

   o *Sustainable Development Goal* - with occurrence: 17, relevance; 1.34, suggests a strong relation between the concept of sustainable development goals and entrepreneurship

education (figure. 7).

- o *Entrepreneurial Activity*- with occurrence: 11 relevance: 1.23, represents a moderately frequent concept with above-average relevance. This will be interpreted as *entrepreneurial activity* as a notable aspect of the content under analysis and is relevant to the study.
- o *Entrepreneurial Education* - with occurrence: 14, relevance: 1.40, is moderately frequent, and it is relevant above average. This suggested that *entrepreneurial education* is a significant theme in the document and is considered relevant in the context of this study (figure.8).

6 CONCLUSION AND RECOMMENDATIONS

This bibliometric study explored the nexus between entrepreneurship education and sustainable development goal I (SDG I) in Nigeria, as it aligned with the timely theme of the research "A tool for National Development and Innovation in the 21st Century."

The study used a transformative and modern database - Dimensions, and VOSviewer as a software tool. Several critical findings from this study included the thematic clusters and research themes identified through VOSviewer representing countries that contributed to the multifaceted exploration of entrepreneurship education to sustainable development goal I (SDGI).

Citation analysis and bibliographic coupling provided valuable insights into research collaborations and trends. This interconnectedness offers opportunities for shared knowledge while contributing to tackling poverty in Nigeria.

Other findings included key concepts and themes using co-occurrence analysis that suggested key concepts- 'United Nations', 'Sustainable Development Goal', 'Entrepreneurial activity', and 'Entrepreneurial Education' were pivotal in discussions surrounding entrepreneurship education's impact on SDG 1.

Based on this bibliometric study, it is obvious that the bulk of most of the top literature is traced to developed countries, such as the United States and the United Kingdom. Also, the prolific authors are not found in countries where poverty is endemic.

There is a need to foster more international collaboration in advancing research in entrepreneurship education as it impacts sustainable development goal 1 (SDG 1). With research gaps in literature that focused on authors and documents that originate from areas where poverty is at its highest prevalence, there is a need for more inclusion of documents produced by authors from countries with high poverty indicators, such as Nigeria.

Finally, with the robust structure of entrepreneurship education, there is the need to recommend to governments of developing countries to reinforce their strategies and mechanisms in achieving a robust entrepreneurship education scheme that can provide effective interventions for sustainable development goal 1 (SDG1) in Nigeria.

References

[1] Abidemi, A. A., Adeniyi, A. O., Oluseye, O. O., Stephen, I. A., & Idowu, F. O. (2018). Role of learning orientation on SMEs' performance: Empirical evidence from SMEs in Nigeria. *Journal of Entrepreneurship Education, 21*(4), 1-6.

[2] Acs, Z. J. (1992). Small business economics: A global perspective. *Challenge, 35*(6), 38-44.

[3] Alberti, F., Sciascia, S., & Poli, A. (2004). Entrepreneurship education: Notes on an ongoing debate. In *Proceedings of the 14th Annual IntEnt Conference* (Vol. 4, No. 7).

[4] Austin, J., Steveson, H., & Wei-Skillern, J. (2006). Social and commercial entrepreneurship: Same, different or both? *Entrepreneurship Theory and Practice, 30*(1), 1-22.

[5] Beynaghi, A., Trencher, G., Moztarzadeh, F., Mozafari, M., Maknoon, R., & Leal Filho, W. (2016). Future sustainability scenarios for universities: Moving beyond the United Nations Decade of Education for Sustainable Development. *Journal of Cleaner Production, 112*, 3464-3478.

[6] Bode, C., Herzog, C., Hook, D., & McGrath, R. (2018). A guide to the Dimensions data approach. *Dimensions Report*. Cambridge, MA: Digital Science.

[7]   Brock, W. A., & Evans, D. S. (1989). Small business economics. *Small Business Economics, 1*, 7-20.

[8]   Cobo, M. J., Martínez, M. Á., Gutiérrez-Salcedo, M., Fujita, H., & Herrera-Viedma, E. (2015). 25 years at knowledge-based systems: A bibliometric analysis. *Knowledge-based Systems, 80*, 3-13.

[9]   Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research, 133*, 285-296.

[10] Duffy, S., & Tarabishy, A. (n.d.). The State of Entrepreneurship Education In the United States: A Nationwide Survey and Analysis. *George T. Solomon The George Washington University Department of Management Science*.

[11] T. Solomon The George Washington University Department of Management Science.

[12] Egeln, J. (2000). Die Volkswirtschaftliche Bedeutung Junger Unternehmen. In Buttler, G. H., et al. (Eds.), *Existenzgrundung. Rahmenbedgungen und strategien*. Heidelberg: Physica verlag.

[13] Fayolle, A. (2013). Personal views on the future of entrepreneurship education. *Entrepreneurship & Regional Development, 25*(7-8), 692-701.

[14] Galvao, A., Mascarenhas, C., Marques, C., Ferreira, J., & Ratten, V. (2019). Triple helix and its evolution: A systematic literature review. *Journal of Science and Technology Policy Management, 10*(3), 812-833.

[15] Gibb, A. (2012). Exploring the synergistic potential in entrepreneurial university development: Towards the building of a strategic framework. *Annals of Innovation & Entrepreneurship, 3*(1), 16742.

[16] Gem Consortium. (2023). Global Entrepreneurship Report. Retrieved from https://www.gemconsortium.org/report/gem-20202021-global-report

[17] Grant, J. (2015). An introduction to bibliometrics. *International School on Research Impact Assessment*. http://app.dimensions.ai

[18] Hills, G. E. (1988). Variations in university entrepreneurship education: An empirical study of an evolving field. *Journal of Business Venturing, 3*(2), 109-122.

[19] Hook, D. W., Porter, S. J., & Herzog, C. (2018). Dimensions: Building context for search and evaluation. *Frontiers in Research Metrics and Analytics, 3*, 23.

[20] Hytti, U., & Kuopusjärvi, P. (2007). Evaluating entrepreneurship education: Play of power between evaluators, programme promoters and policy makers. In *Handbook of Research in Entrepreneurship Education, Volume 2*, 244.

[21] Kasgak, C., Bahago, S. B., & Gotip, N. W. (2022). Contemporary Entrepreneurship Education for Economic Growth and Sustainable Development. *Journal of African Studies and Sustainable Development*.

[22] Katz, J. A. (2003). The chronology and intellectual trajectory of American entrepreneurship education: 1876–1999. *Journal of Business Venturing, 18*(2), 283-300.

[23] Laurie, R., Nonoyama-Tarumi, Y., Mckeown, R., & Hopkins, C. (2016). Contributions of education for sustainable development (ESD) to quality education: A synthesis of research. *Journal of Education for Sustainable Development, 10*(2), 226-242.

[24] López-Fernández, M. C., Serrano-Bedia, A. M., & Pérez-Pérez, M. (2016). Entrepreneurship and family firm research: A bibliometric analysis of an emerging field. *Journal of Small Business Management, 54*(2), 622-639.

[25] Lubna Rashid. (n.d.). Entrepreneurship education and sustainable Development goals: A literature review and closer look at fragile states and Tech enabled.

[26] McClelland, D. C. (1961). *The Achieving Society*. New York: Van Nostrand Company, Inc.

[27] Mongeon, P., & Paul-Hus, A. (2015). The Journal Coverage of Web of Science and Scopus: A Comparative Analysis. *Scientometrics, 106*. https://doi.org/10.1007/s11192-015-1765-5

[28] Mowery, D. C., Nelson, R., Sampat, B., & Ziedonis, A. A. (2001). The growth of patenting and licensing by U.S. universities: An assessment of the effects of the Bayh-Dole act of 1980. *Research Policy, 30*(1), 99-119. https://doi.org/10.1016/S0048-7333(99)00101-5

[29] Mukhtar, S., Wardana, L. W., Wibowo, A., & Narmaditya, B. S. (2021). Does entrepreneurship education and culture promote students' entrepreneurial intention? The mediating role of entrepreneurial mindset. *Cogent Education, 8*(1), 1918849.

[30] Mwasalwiba, E. S. (2010). Entrepreneurship education: A review of its objectives, teaching methods, and impact indicators. *Education+ Training, 52*(1), 20-47.

[31] Nabi, G., Liñán, F., Fayolle, A., Krueger, N., & Walmsley, A. (2017). The impact of entrepreneurship education in higher education: A systematic review and research agenda. *Academy of Management Learning & Education, 16*(2), 277-299.

[32] Nabi, G., & Liñán, F. (2011). Graduate entrepreneurship in the developing world: Intentions, education and development. *Education+ Training, 53*(5), 325-334.

[33] Naveen, Satish, K., Mokherjee, D., Pandey, N., & Lim, W. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research, 133*, 285-296.

[34] NIU Outreach. (2005). The role of higher education in economic development. Retrieved from http://www.hearr.org/pdf/HEARRR white paper. pdf.

[35] Ogedengbe, F. A., Okhakhu, C. O., & Adekunle, S. A. (2015). Entrepreneurial education for sustainable development. *Nigerian Journal of Management Sciences, 4*(1), 78-87.

[36] Orduña-Malea, E., Ayllón, J. M., Martín-Martín, A., & Delgado López-Cózar, E. (2015). Methods for estimating the size of Google Scholar. *Scientometrics, 104*, 931-949.

[37] Piwowar, H., Priem, J., Lariviere, V., Alperin, J. P., Muench, A., & Suhail, S. (2018). The state of OA: A large scale analysis of the prevalence and impact of open access of articles. *PeerJ, 6*, e4375.

[38] Sexton, D. L., & Bowman, N. B. (1984). Entrepreneurship education: Suggestions for increasing effectiveness. *Journal of Small Business Management (pre-1986), 22*(000002), 18.

[39] Shapero, A. (1975). The displaced, uncomfortable entrepreneur. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*.

[40] Sofoluwe, Shokonbi, Raimi, & Ajewole. (n.d.). Entrepreneurship education as a strategy for boosting human capital development and employability in Nigeria: Issues, prospectus.

[41] Soubbotina, T. P. (2004). Beyond economic growth: An introduction to sustainable development. *World Bank Publications*.

[42] Studer, S., & Texeire, R. (2020). Entrepreneurship and Poverty Reduction: An analysis of linkage and issues. *World Development, 136*, 105138.

[43] Trochim, W. M., Cabrera, D. A., Milstein, B., Gallagher, R. S., & Leischow, S. J. (2006). Practical challenges of systems thinking and modeling in public health. *American Journal of Public Health, 96*(3), 538-546.

[44] van Eck, N. J., & Waltman, L. (2010). Vosviewer: A Computer Program for Bibliometric Mapping. *Journal of Informetrics, 4*(4), 629-635.

[45] Viera, M. R., Lopez, F. M., Pernas, A. M., & Martin, J. L. (2011). Challenging in measuring web impact: The need for record standardization. *Journal of the American Society for Information Science and Technology, 62*(4), 719-725.

[46] Von Graevenitz, G., Harhoff, D., & Weber, R. (2010). The effects of entrepreneurship education. *Journal of Economic Behavior & Organization, 76*(1), 90-112.

[47] VOSviewer version 1.6.19 Copyright 2009-2023 Need Jan van Eek & Ludo Waltman. Universiteit Leiden.

[48] Waltman, L., Van Eck, N. J., & Noyons, E. C. (2010). A unified approach to mapping and clustering of bibliometric networks. *Journal of Informetrics, 4*(4), 629-635.

[49] Watson, D. M. (2001). Pedagogy before technology: Re-thinking the relationship between ICT and teaching. *Education and Information Technologies, 6*, 251-266.

[50] Wiklund, J., Davidsson, P., Audretsch, D. B., & Karlsson, C. (2011). The future of entrepreneurship research. *Entrepreneurship Theory and Practice, 35*(1), 1-9.

[51] Williams, C. (2018). Dimensions from Digital Science. *Insights: The UKSG Journal, 31*(0), 33. DOI: https://doi.org/10.1629/uksg.420

[52] Sustainable development: World Bank glossary. [Electronic resource]. - Retrieved from: http://www.worldbank.org/depweb/english/beyond/global/glossary.html.

[53] Yatu, L., Bell, R., & Loon, M. (2018). Entrepreneurship education research in Nigeria: Current foci and future research agendas. *African Journal of Economic and Management Studies, 9*(2), 165-177.

[54] Zhao, J., & McShea, W. (2018). Behind eMammal's Success: A Data Curator With A Data Standard. *Journal of eScience Librarianship, 7*, e1154. https://doi.org/10.7191/jeslib.2018.1154

[55] Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods, 18*(3), 429-472.