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MAPPING SUSTAINABLE DEVELOPMENT GOALS RESEARCH IN SOCIAL SCIENCES: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

Objective: This study aims to conduct a bibliometric analysis to track the evolution of research on sustainable development goals in the social sciences field. The main objective is to understand how this research has evolved over time and the underlying intellectual structure guiding the studies.

Method: The research utilizes bibliometric analysis, examining citations, author networks, and keyword recurrence in the relevant literature. This approach allows for mapping the development of the scientific field related to sustainable development goals and identifying influential authors, their affiliations, and research collaborations.

Results: The bibliometric analysis revealed seven distinct research clusters in the field of sustainable development goals within applied social sciences. Particularly noteworthy was a significant cluster focused on exploring the interrelation among the 17 Sustainable Development Goals (SDGs), highlighting the interest in understanding their interactions and complementarity.

Conclusions: The bibliometric analysis provided valuable insights into the evolving trends and themes in sustainable development goal research within the social sciences. The identification of seven clusters and the emphasis on the interplay of the SDGs underscore the relevance and complexity of this research area. These findings have important implications for researchers, policymakers, and practitioners working on implementing sustainable development goals. Understanding the intellectual structure and influential authors in this field can enhance the effectiveness of future research efforts. Additionally, fostering collaboration among institutions and researchers can further advance knowledge and generate innovative solutions to address the challenges of sustainable development.

Keywords: Bibliometric Analysis, Sustainable Development Goals, Applied Social Sciences

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Introduction

The concept of sustainable development (SD) piqued the interest of the academic community in the mid-20th century. The term was structured and used for the first time in a report titled "The Limits to Growth," published by the Club of Rome after the 1972 Stockholm Conference (Botkin et al., 2014). Due to this report, special committees were established to analyze five major global concerns, such as industrialization, unchecked population growth, widespread malnutrition, depletion of non-renewable resources, and environmental deforestation (Botkin et al., 2014; Meadows et al., 1972).

The concept of sustainable development is defined in the Brundtland Report as follows: "We must ensure that development meets the needs of the present without compromising the ability of future generations to meet their own needs." Sustainable development (SD) encompasses policies and practices that lead to a process of change in which the consideration of resource exploitation, investment direction, technological development, and institutional change are consistent, enabling the well-being of future generations (Hulse, 2007; WCED, 1987).

Promoting sustainable development encompasses various ecological and social aspects, such as resource management within individual sectors, resource scarcity, environmental pollution, eradication of hunger, and sustainable development (Jansen, 2003; Lafferty, 2006). It's important to note that these challenges are interconnected, meaning they are actions that are achieved together (Van Zanten, 2018). Since these goals contribute to the sustainable development of all nations, harmonious international cooperation is essential for the effective emphasis of sustainable development goals (SDGs) by governments (Botkin et al., 2014).

Emphasizing the importance of international collaboration, the United Nations (UN) set goals for countries regarding the SDGs in 2015 to measure progress towards sustainability, poverty and hunger eradication, and to promote innovation and economic growth (UN, 2015). These objectives are developed through international and interdisciplinary cooperation, and countries are encouraged to design self-appropriate strategies (UN, 2015). In this context, the SDGs, consisting of 17 goals and 169 targets to promote transformation in the world, aim to address multiple and complex challenges affecting humanity to preserve human well-being, economic prosperity, and environmental protection (Nilsson et al., 2016).

In this regard, Telfer & Sharpley (2015) synthesized the fundamental principles of sustainable development from three perspectives. Firstly, the holistic approach encompasses social, economic, and ecological issues on a global scale in an integrated manner. Secondly, the principle of equality enables resources to be shared fairly and equally among countries, meaning that underdeveloped countries have access to the same resources as developed countries to allow for the development of all nations and future generations. Thirdly, the focus is on ensuring the long-term sustainability of the ecosystem and people on a global scale (Telfer & Sharpley, 2015).

Given the social relevance of the subject regarding Sustainable Development Goals (SDGs), more studies oriented towards solutions for asymmetries are needed to support the transformation towards sustainable development, aiming to end poverty, preserve the world, and provide prosperity for all peoples. A sustainable strategy should be developed within this perspective to better manage the interdependence of socioeconomic systems and natural resources (Van Zanten, 2018; Schmandt, 2010). In this context, sustainable development has become the subject of numerous studies in international literature, expanding the discussion of the theme in recent years (Moyer et al., 2020).

Despite significant progress in scientific research on sustainability in various areas, the concept of sustainable development remains fragmented and complex (Moyer et al., 2020). To comprehensively address these dimensions, interdisciplinary studies involving environmental, social, and economic sciences must be emphasized (Moyer et al., 2020). Additionally, the literature lacks studies on Sustainable Development Goals (SDGs) in developing countries, as a significant portion of the studies found in the literature has been conducted in developed countries. This leads to the question of whether it is possible to achieve the sustainable development targets defined by the UN in underdeveloped countries (Moyer et al., 2020).

For successful sustainable development, discussions must encompass all three dimensions of the concept (Palmer et al., 2019). The first dimension is the economic aspect, which discusses the utilization and sharing of increasingly scarce resources (Palmer et al., 2019). An economically sustainable system is one capable of producing goods and services in line with the principles of continuity, preventing sectoral imbalances that harm agricultural and industrial production, and ensuring manageable sustainability

of internal and external debt (UN, 2015). The second aspect is the social dimension, which emphasizes the human aspect. A socially sustainable system should ensure the adequacy and equitable distribution of social services such as education, health, gender equality, political responsibility, and social participation for all peoples (UN, 2015). The third dimension is the environmental aspect, which stipulates balanced biological and physical systems. The purpose of this dimension is to ensure that ecosystems adapt to changing conditions (UN, 2015). An environmentally sustainable system must condemn the exploitation of renewable resource systems.

Despite the relevance of the topic and the impacts of Sustainable Development Goals (SDGs) on all nations, the literature lacks elements that allow for the identification of how the research flow has evolved over time. Understanding the evolution of research on this theme can generate new insights and provide new ways to implement sustainable development goals. In this context, this study is a sustainable bibliometric analysis that should only consume resources that have been properly replenished through investments (Giddings et al., 2002; Harris, 2000). It aims to identify how the knowledge domain related to SDGs has emerged and evolved in the field of applied social sciences, as well as to identify boundary-spanning studies and emerging themes regarding SDGs.

Theoretical Framework

The Sustainable Development Goals (SDGs) were presented collectively, as we still study today, on September 25, 2015, when the United Nations approved the 2030 Agenda for Sustainable Development. The 2030 Agenda consists of 17 SDGs and 169 global targets with the aim of improving the lives of people in all countries, preserving the planet, and securing a future for the world (United Nations, 2019). These goals, depicted in Figure 1, and the definitions of each goal are presented in Table 1. It is worth noting that the Sustainable Development Goals (SDGs) were designed to be achieved within a 15-year timeframe.

Figure 1. United Nations Sustainable Development Goals.

Table 1 – Definitions of the 17 Sustainable Development Goals (SDGs).

1. Poverty eradication – End poverty in all its forms, everywhere.
2. Zero hunger and sustainable agriculture – End hunger, achieve food security and improved nutrition, and promote sustainable agriculture.
3. Health and well-being – Ensure a healthy life and promote well-being for all, at all ages.
4. Quality education - Ensure inclusive, equitable and quality education, and promote lifelong learning opportunities for all.
5. Gender equality – Achieve gender equality and empower all women and girls.
6. Clean water and sanitation – Ensure availability and sustainable management of water and sanitation for all.
7. Clean and affordable energy – Ensure access to cheap, reliable, sustainable and renewable energy for all.
8. Decent work and economic growth – Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all.
9. Infrastructure innovation – Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation.
10. Reducing inequalities - Reducing inequalities within and between countries.
11. Sustainable cities and communities – Make cities and human settlements inclusive, safe, resilient and sustainable.
12. Responsible consumption and production - Ensure sustainable production and consumption patterns.
13. Action against global climate change – Take urgent action to combat climate change and its impacts.
14. Life in water - Conservation and sustainable use of oceans, seas, and marine resources for sustainable development.
15. Terrestrial life - Protect, recover and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss.
16. Peace, justice and effective institutions – Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17. Parcerias e meios de implementação - Fortalecer os meios de implementação e revitalizar a parceria global para o desenvolvimento sustentável.

Source: United Nations Organization, 2019.

To promote the implementation of the SDGs and achieve the proposed target for the 2030 Agenda, in 2016, the United Nations, in partnership with member countries, developed a United Nations Global Compact. The goal of this compact was to mobilize organizations from all nations to truly engage in socially and environmentally responsible

policies and actions (UN, 2019). This agreement led to the pursuit of numerous partnerships by companies aimed at promoting sustainable development. By 2018, around 9,500 companies in 145 countries had joined these initiatives (United Nations Global Compact, 2018).

Achieving the 2030 Agenda's goal regarding the SDGs is only possible through the global collaboration of all stakeholders: governments, businesses, academia, and society (United Nations Global Compact, 2018). In this regard, a deep awareness of the most important current social issues by all stakeholders is of utmost importance (Mukhi & Quental, 2019). The SDGs serve as a guide to ensure a more sustainable and equitable planet for future generations (Mukhi & Quental, 2019).

The SDGs explicitly emphasize the critical role of businesses in nations' achievement of these objectives, as organizations are agents of social and economic transformation and contribute to the economic and social development of the countries in which they operate (Toro-Frias et al., 2016). Sustainability over time has increasingly been integrated into organizations' strategic decisions, and with stakeholder pressures, it has become an essential element in organizations' pursuit of competitive advantages (Toro-Frias et al., 2016; Palmer et al., 2019). At the operational level, any organizational activity should encompass sustainability considerations, ranging from shifts in technology to changes in the financial environment (Palmer et al., 2019).

The implementation of the SDGs in business strategies can enhance financial performance through various factors. For instance, the integration of systems that enhance decision-making processes, efficient resource management that can minimize costs, disclosure of reports that enhance brand value, consequently contributing to increased value distribution to stakeholders and reassuring investors, improved long-term results, development of value-added products through innovation, and the positive social image attributed to the company by the media (Malik, 2015).

The pressure for the disclosure of sustainability-related information is understood based on three dimensions (people, planet, and profit), and this emphasis is increasing at the same rate as competitiveness is rising (Palmer et al., 2019). Companies recognize that disclosing their sustainability reports indeed improves the business environment and enhances reciprocity with their stakeholders, thereby contributing to the organization's goals. In this sense, the pursuit of SDGs implementation by companies has become a

central aspect of competitive strategies grounded in sustainability actions (Bonini & Swartz, 2014; Moyer et al., 2020).

While the literature examines the reasons that underlie companies' sustainability goals (Ransom & Lober, 1999) and their content (Galpin et al., 2014), little attention has been given to how specific contexts affect companies' sustainability goals. Palmer & Flanagan (2016) describe the need for studies that examine the SDGs across different companies and countries. For instance, Ali et al. (2018) noted the lack of key SDGs in the vision and mission of companies in the BRICS countries.

Since the approval of the UN's 2030 Agenda, scientific organizations and international institutions have conducted various studies to monitor progress towards the SDGs, mapping available resources and reviewing applied strategies. The capabilities and challenges of each country are being explored, analyzing necessary strategies and forecasting outcomes. Gil (2018) highlighted studies conducted in the UK, Sweden, France, and other contexts.

Methodology

This is a review study conducted through bibliometric analysis, a technique that enables the mapping of the emergence and evolution of a scientific field. It also allows for identifying the most cited/influential authors, author institutions, author cooperation networks, recurring keywords, and border studies on a specific topic (Zupic & Cater, 2015). Bibliometric studies are generally carried out to identify trends in knowledge growth in a particular discipline, existing theoretical currents, and obsolescence (Zhu et al., 2021).

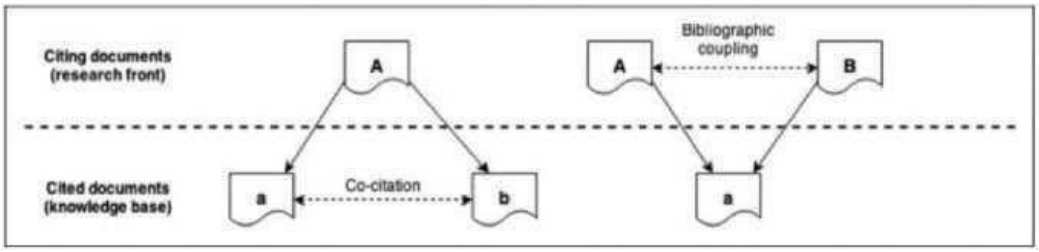
Specifically, publications utilizing bibliometrics have increased over the years, with an average of 1021 publications in the last decade, which can be attributed to the growth of scientific research itself. Bibliometrics has provided an alternative for analyzing large sets of bibliographic data, as traditional review methods are complicated and impractical due to the volume of information (Ramos-Rodrígues & Ruíz-Navarro, 2004). It's worth mentioning that the emergence of scientific databases like Scopus and Web of Science has made it relatively easy to acquire large volumes of bibliometric data, and bibliometric software like Gephi, Leximancer, and VOSviewer allows for pragmatic data analysis, thereby increasing academic interest in bibliometric analysis in recent times (Donthu et

al., 2021).

Bibliometric review can be carried out based on five main techniques: a) citation analysis; b) co-citation analysis; c) bibliographic coupling; d) co-authorship analysis; and e) co-word analysis (Zupic & Carter, 2015; Donthu et al., 2021). In this study, we will only use the techniques of co-citation and bibliographic coupling analysis – considered predominant techniques for analyzing relationships between study citations (Marshakova, 1981). The choice of these two techniques was made based on the scope and objectives of this research.

Regarding the choice of co-citation and bibliographic coupling analysis technique, it's worth highlighting the emphasis of these techniques on analyzing relationships between citations of the selected studies in the sample, allowing for mapping the knowledge domain in a particular scientific field (Zupic & Carter, 2015). Scientific literature is defined as an objective manifestation representing a domain, the result of social research activity. Figure 2 presents these two techniques.

Figura 2. Co-citation and bibliographic coupling



Source : (Zupic & Cater, 2015)

The Web of Science database was chosen for collecting articles for the sample of this study. The choice was based on the significance of this database in scientific research; it is the oldest database and includes important indexed journals (Birkle et al., 2021). The Web of Science (WoS) is the oldest, most widely used, and reliable database of research publications and citations in the world. Based on the Science Citation Index founded by Eugene Garfield in 1964, it has expanded its selective, balanced, and comprehensive coverage of the world's leading research to currently encompass around 34,000 journals (Birkle et al., 2021).

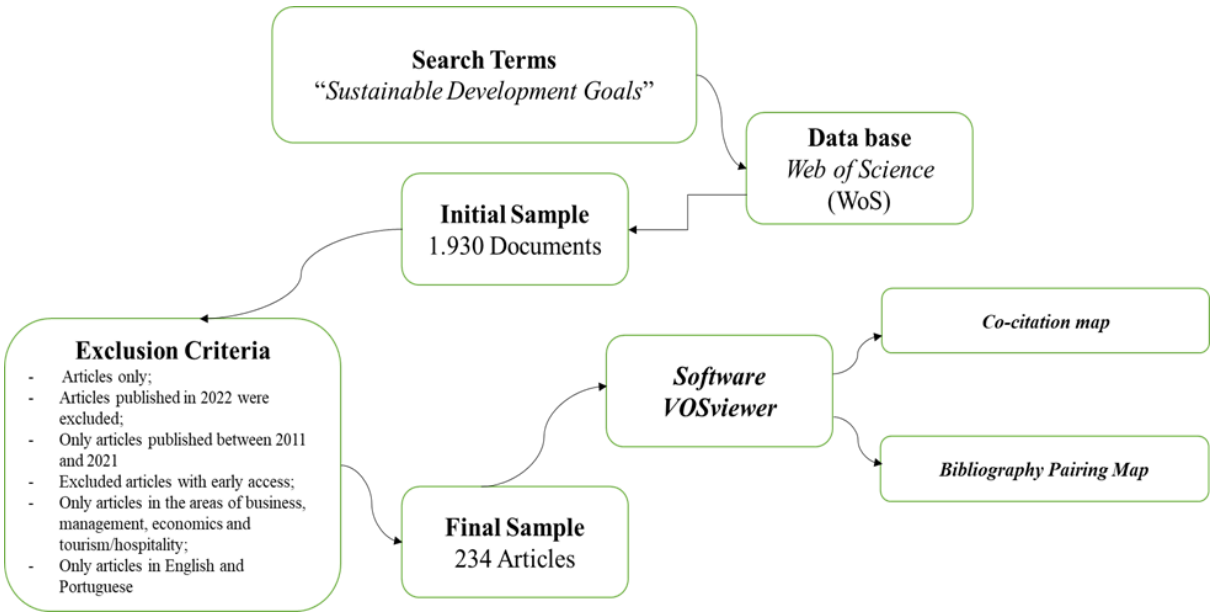
To perform the graphical mapping of co-citation and bibliographic coupling analysis, we will use the software Vosviewer. Despite various software options capable of analyzing co-citations and conducting bibliographic coupling analysis, we chose Vosviewer

because it provides high-resolution graphical outputs and is freely accessible, facilitating researchers' access (Van Eck & Waltman, 2018).

For article selection in the sample, the term "Sustainable Development Goals" was searched in the topic field (title, abstract, and keywords) of the Web of Science database. The initial search identified 1,930 studies. After excluding studies published in the year 2022, the sample was reduced to 1,608 studies (a necessary procedure to ensure the replicability of the research, as unfinished years are not considered in bibliometric reviews).

Considering methodological rigor, we selected only "articles," a document type that undergoes peer review, minimizing risks related to methodological rigor and study contributions. After applying this filter, 1,536 articles remained in our sample. We selected only articles published in the field of applied social sciences (Management, business, economics, hospitality, tourism, and leisure) since the research aims to investigate the evolution of the theme in this field. Applying this filter reduced our sample to 248 studies. Finally, only articles in English and Portuguese were selected, resulting in a final sample of 234 articles. The research methodology design is presented in Figure 3.

Figure 3 – Research Methodology Design

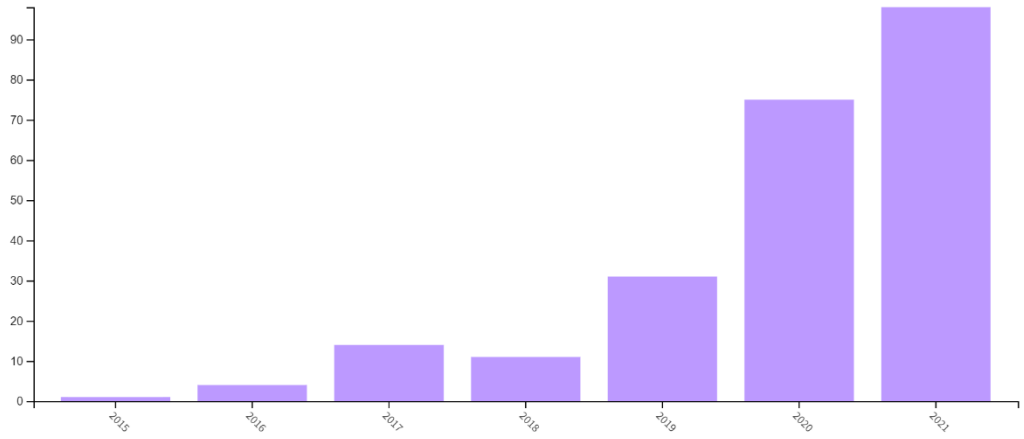


Fonte: Autores (2022)

The evolution of research on sustainable development goals is shown in Figure 4, which clearly shows the exponential evolution of research in the years that followed the

2015 meeting of the united organizations that defined the 17 sustainable development goals and the implementation of these goals by 2030.

Figure 4. Evolution of Studies on SDGs in Web of Science



Source: Authors (2022).

Analysis of Results

The 234 studies comprising the sample of this research were imported into the VOSviewer software to facilitate the creation of the co-citation and bibliographic coupling map. In relation to the co-citation map, this resulted in the identification of seven clusters, which are discussed in-depth in the subsequent sections of this research.

Co-citation analysis

Interdependence of Sustainable Development Goals (SDGs) (Red Cluster): The main cluster in the co-citation map is the red cluster, according to the VOSviewer software manual (Van Eck & Waltman, 2018). This cluster consists of 34 studies, and the studies within this cluster analyze the interdependence relationships among the SDGs, where the achievement of one partially depends on the achievement of another SDG.

The primary study in this cluster is the work by Nilsson et al. 2016, which was published shortly after the UN meeting in 2015 that established the 17 SDGs. This study aimed to analyze the interrelations among the SDGs, with the authors asserting that the logic of the SDGs implies that the goals are interdependent – but no one has specified exactly how. International negotiations involve intricate compromises. Nevertheless,

balancing interests and priorities is what policymakers do – and the need will arise as the goals are being implemented. If countries ignore overlaps and simply start ticking off the goals one by one, they risk perverse outcomes. For instance, using coal to improve energy access (Goal 7) in Asian nations, let's say, would accelerate climate change and ocean acidification (undermining Goals 13 and 14), besides exacerbating other issues such as health damage from air pollution (disrupting Goal 3).

The second most influential study in this cluster is Pradhan et al. 2017. This study holds a link strength of 100 and has been cited 12 times by other studies in the sample. The study posits that the SDGs provide a holistic and multidimensional view of development. Therefore, interactions between the SDGs can lead to divergent outcomes. To analyze SDG interactions, the study systematizes the identification of synergies and trade-offs using official SDG indicator data for 227 countries. A significant positive correlation between a pair of SDG indicators is classified as a synergy, while a significant negative correlation is classified as a trade-off.

The Role of Multinational Enterprises in Implementing Sustainable Development Goals (SDGs) (Green Cluster): The green cluster is considered the second most significant cluster in the co-citation analysis, comprising 22 studies. The theme analyzed by the studies in this cluster revolves around the role of multinational enterprises in the implementation of sustainable development goals.

The primary study in this cluster is an article by authors Van Zanten & Van Tulder (2018). In this study, the authors found that the Sustainable Development Goals (SDGs) cannot be achieved without the contributions of multinational enterprises (MNEs). However, at the time, international business research did not emphasize the role of the private sector in achieving international policy objectives. This study holds a link strength of 112 and has been cited 13 times by other studies. The second most important study in this cluster was conducted by Kolk et al. 2017. This study has been cited 10 times by other studies and has a link strength of 159. The authors assert in the study that Multinational Enterprises (MNEs) can play a significant role in the implementation of the SDGs. This article examines 'what we know' about their involvement in SDG implementation and their impact, both positive and negative, on People, Planet, Prosperity, and Peace, as identified in the United Nations' 2030 Agenda.

Influences of Stakeholder Pressures on Organizations to Develop Corporate Social Responsibility Policies and Practices (Blue Cluster): The blue cluster was the third cluster identified in our analysis, comprising 21 studies. The theme analyzed by these studies pertains to the influences of stakeholder pressures on organizations to develop corporate social responsibility actions. These studies generally discuss the pressures for companies' operations to genuinely contribute to stakeholders beyond shareholders.

The most influential study in this cluster was conducted by Freeman et al. (2010). This study holds a link strength of 72 and has been cited 9 times by other studies in the sample. The study by these authors emphasizes that organizations should adopt strategies to enhance their relationship with stakeholders based on corporate social responsibility, thereby displaying the potential to enact positive social change. The second most significant study in the blue cluster was developed by Porter & Kramer (2006). In this study, the authors assert that there is a relationship between stakeholder pressure, the adoption of practices focused on corporate social responsibility, and improvements in organizational performance. This study holds a link strength of 80 and has been cited 8 times by other studies in our sample.

Barriers and Challenges in Implementing Actions that Promote Sustainable Development Goals (SDGs) (Yellow Cluster): The yellow cluster is the fourth and final cluster identified in the co-citation map, comprising 18 studies. The overarching theme analyzed by the studies in this cluster revolves around barriers and challenges in implementing actions that promote sustainable development goals (SDGs). Authors in this study affirm that the SDGs agenda requires a global partnership – at all levels – among all countries and stakeholders that need to work together to achieve the goals and targets, including a broad spectrum of actors such as multinational enterprises, local governments, regional and international bodies, and civil society organizations. The objective of this article was to present a comprehensive literature review and develop a new framework to address the barriers and challenges for operationalizing and monitoring the implementation of the SDGs.

The second most influential study in this cluster was conducted by Hart (1995). This study holds a link strength of 107 and has been cited 7 times by other studies in the sample. The study mentions that management theory has largely ignored the constraints imposed by the biophysical (natural) environment. Based on resource-based theory, this

article seeks to fill this gap by proposing a view of the firm based on natural resources – a theory of competitive advantage based on the firm's relationship with the natural environment. It comprises three interrelated strategies: pollution prevention, product management, and sustainable development. Propositions are put forth for each of these strategies in relation to key resource requirements and their contributions to sustained competitive advantage.

The Importance of the Private Sector in SDG Implementation (Purple Cluster): The fifth cluster identified in the co-citation analysis is the purple cluster, comprising 17 studies. The theme analyzed by these studies pertains to assessing the importance of the private sector in helping countries achieve sustainable development goals (SDGs). The most influential study in this cluster was conducted by Scheyvens et al. (2016). This study has been cited by 27 studies in the sample and holds a link strength of 235. The authors state that under this 2020 Agenda, there are expectations for businesses, governments, and actors in civil society to equally share responsibility for advancing a more sustainable path. Many assert that the private sector possesses specific strengths to contribute to achieving the SDGs, including innovation, responsiveness, efficiency, and provision of specific skills and resources. Interestingly, the business sector played a strong role in influencing the development of the SDGs.

The second most significant study in the purple cluster was authored by Le Blanc (2015). This study holds a link strength of 177 and has been cited 23 times by other studies. The author emphasizes the integration of the SDGs and the role of various stakeholders in countries' efforts to implement the SDGs. In 2014, United Nations member states proposed a set of Sustainable Development Goals (SDGs), which would succeed the Millennium Development Goals (MDGs) as reference targets for the international development community for the period 2015-2030. The proposed goals and targets can be seen as a network, where there are linkages between goals through goals that refer to multiple objectives.

The Impacts of Corporate Social Responsibility on Countries' Ability to Achieve the Proposed SDG Targets in the 2030 Agenda (Light Blue Cluster): The sixth cluster identified in our analysis was the light blue cluster, comprising 13 studies. The studies in this cluster focused on understanding how corporate social responsibility can impact the ability to achieve the implementation targets of SDGs proposed in the UN's 2030 Agenda (2015).

The primary study in this cluster was conducted by Rosati & Faria (2019). In this study, the authors analyzed how companies can play a critical role in achieving the Sustainable Development Goals (SDGs). Contextually, business reports on the SDGs can support organizations in planning, implementing, measuring, and communicating their SDG efforts. This study investigates the relationship between the early adoption of SDG reporting and a range of organizational factors, combining data from two databases – provided by the Global Reporting Initiative and Orbis – to identify organizations that addressed the SDGs in their sustainability reports and their respective structural characteristics. This study has been cited 15 times and holds a link strength of 158.

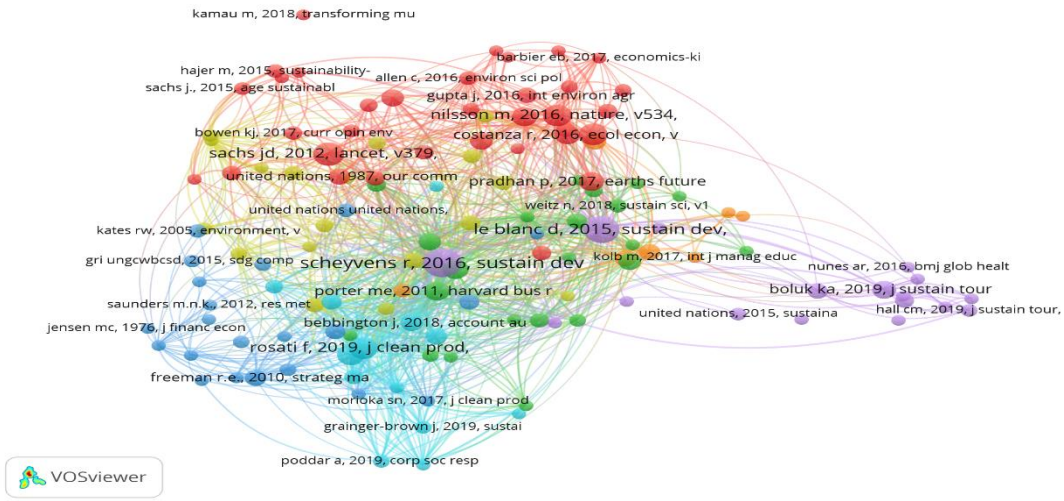
The second most influential study in this cluster was also authored by Rosati & Faria (2019), holding a link strength of 130 and being cited 14 times by studies in the sample. The authors stated in this study that organizations reporting on Sustainable Development are more likely to have goals located in countries with higher vulnerability to climate change, national corporate social responsibility, higher company expenditures on higher education, indulgence and individualism, and lower levels of market coordination, employment protection, power distance, and long-term orientation.

The Effects of Responsible Management Education (RME) on the Sustainable Development Goals (SDGs) (Orange Cluster): The final cluster identified in the cocitation analysis is the orange cluster. The theme examined by studies in this cluster revolves around exploring the field of Responsible Management Education (RME) within the context of the 2030 Agenda and the Sustainable Development Goals (SDGs). It situates the United Nations Principles for Responsible Management Education (RME) in relation to a range of associated initiatives and organizations, employing a light theoretical framework. The emergence of the SDGs as a framework for RME and the role of RME as an agent in this field are explored in the context of the literature on how business schools have addressed sustainability and responsibility imperatives.

The second most significant study in this cluster was conducted by Annan-Diab & Molinari (2017), having a link strength of 50 and being cited 7 times by other studies in the sample. The authors emphasize the importance of adopting an interdisciplinary approach to education for sustainable development and illustrate how to advance it, recognizing different perspectives of sustainability and corporate social responsibility (CSR) within the context of diversity. It examines the broad agenda of the SDGs, which

requires the involvement of various disciplines and sectors for delivery, considering the Principles for Responsible Management Education (RME).

Figure 5 – *Cocitation Map*



Source: VOSviewer (2022)

Bibliographic Coupling Analysis

The bibliographic coupling analysis allowed us to present the frontier studies, that is, the current research trends and paths for future research on sustainable development goals (SDGs). The bibliographic coupling map resulted in the identification of seven clusters that will be discussed in depth in this research.

Social Well-being and Inclusive Development and Their Relationship with Sustainable Development Goals (SDGs) (Red Cluster): The primary cluster in the bibliographic coupling map is the red cluster, composed of 26 studies, and the predominant theme analyzed by studies in this cluster pertains to social well-being, inclusive development, and their relationship with sustainable development goals (SDGs).

The main study within this cluster was conducted by Constanza et al. 2016. This study holds a link strength of 25 and has been cited by 267 other studies. The authors examined alternative methods to connect SDGs with comprehensive measures of sustainable well-being that can motivate and guide the process of global social change. They described a Sustainable Well-being Index (SWI) that connects and complements the SDGs panel.

The second most influential study in this cluster was carried out by Gupta et al.

2016. It has been cited 241 times and holds a link strength of 24. In this study, the authors conclude that while the context of SDGs relates well to social inclusion, it relates less intensely to ecological and relational inclusion. This implies a risk that implementation processes might focus more on social inclusion than ecological and relational inclusion. Additionally, to truly achieve social inclusion in the Anthropocene, it is crucial that the latter two receive equal weight in the actual implementation process.

The Influence of External Investors and the Private Sector's Contribution to the SDGs (Green Cluster): The second cluster identified in the bibliographic coupling map is the green cluster, composed of 16 studies. The theme analyzed by studies in this cluster pertains to examining the influence of external investors and the private sector's contribution to the Sustainable Development Goals (SDGs).

The most influential study within this cluster was conducted by Garcia-Sanches et al. 2020. This study holds a link strength of 55, has links with 20 other studies, and has been cited 50 times by other studies. In this study, the authors analyzed how institutional investors are increasingly interested in how companies align their corporate social responsibility strategies with the SDGs proposed by the United Nations (UN). The information disclosed in this regard is essential for understanding and monitoring corporate contribution to the 2030 Agenda. The authors examined the influence that institutional investors have on the adoption of the disclosure strategy established by the UN and the Global Reporting Initiative (GRI)—GRI-ODG Compass.

The second most important study in this cluster was conducted by Claro (2021). The study holds a link strength of 65, has 36 links with other studies, and has been cited 12 times by other studies in our sample. This study analyzes sustainability-oriented strategies, which involve considering all possible environmental, social, and economic factors that impact stakeholders and sustainable development. These strategies could be a crucial contribution of the private sector to the SDGs. The study has a dual objective: first, to discover whether companies conducting business in Brazil are incorporating the SDGs into their strategies; second, to identify the external and internal factors that motivate them.

The Relationship Between Specific Institutional Aspects of Countries and the Capacity for Implementing the SDGs (Blue Cluster): The third cluster on the bibliographic coupling map is the blue cluster, comprising 13 studies. The theme investigated within

this cluster pertains to analyzing the relationship between specific institutional aspects of countries and their capacity to implement the Sustainable Development Goals (SDGs).

The most influential study within this cluster was authored by Van Zanten & Van Tulder (2018). This study holds a link strength of 110, has 56 links with other studies, and has been cited 160 times by other studies in our sample. The results of this study, based on exploratory research of 81 European and North American companies from the Financial Times Global 500, indicate that multinational companies engage more with actionable SDG targets within their operations (value chain) than those outside it, and more with SDG targets that "avoid harm" than those that "do good." Differences in SDG engagement are also explored based on the home and host countries of the multinationals and their industry sectors.

The second most important study in the blue cluster was conducted by Herrera (2019). The study holds a link strength of 1,194, has 292 links with other studies, and has been cited 142 times by other studies. The author highlights in the study that the 2030 Agenda for Sustainable Development is ambitious and inclusive, but how well these global aspirations are likely to result in implementable policy changes for water and sanitation? This article evaluates governance challenges at the local level associated with Sustainable Development Goal (SDG) 6, which commits to ensuring sustainable water and sanitation for all. Most developing countries manage services at the subnational level, making the quality of local governance a key ingredient for sector improvements.

New Challenges for the Implementation of the SDGs (Global Governance, Community Engagement, and Open Innovation): The yellow cluster was the fourth cluster identified in the bibliographic coupling map, comprising 12 studies. The theme analyzed by studies within this cluster pertains to the analysis of new challenges for the implementation of the Sustainable Development Goals (SDGs) involving global governance, community engagement, and open innovation.

The most influential study within this cluster was conducted by Tsalis et al. 2020. This study holds a link strength of 167, has 47 links with other studies, and has been cited 88 times by other studies. The study examined a scoring system based on topics from the Global Reporting Initiative, and a scoring system was developed to assess the quality of information disclosed in sustainability reports in relation to each SDG. An empirical analysis was conducted on a sample of sustainability reports to examine the structure and

applicability of the proposed methodological framework. The results of the empirical analysis reflect some implications for future research on sustainability reporting practices.

The second most important study in the yellow cluster was authored by Joshi et al. 2015. This study holds a link strength of 51, has 22 links with other studies, and has been cited 57 times by other studies in the sample. The authors provide a pioneering forecast of the future of domestic governance (of countries) up to the year 2060 for 183 countries using a long-term integrated global futures modeling system. Although the forecast anticipates global gains in security, capacity, and inclusiveness, extended scenario analyses suggest that timely and effective interventions to strengthen governance and implement development policies will result in much greater advances in post-2015 Sustainable Development Goals.

Alternative Policy Pathways to Achieve SDG Targets: Technology, Lifestyle Change, and Decentralized Governance (Purple Cluster): The purple cluster is the fifth most important cluster in the bibliographic coupling map, comprising 11 studies. The theme of this cluster relates to the analysis of alternative policy pathways to achieve SDG targets: technology, lifestyle change, and decentralized governance.

The most important study within this cluster was conducted by Moyer et al. 2020. This study has a link strength of 44, has been cited 49 times by other studies, and has links with 22 studies in the sample. The authors emphasize a particular difficulty in achieving goals in some SDG indicators (access to safe sanitation, high school completion, and low birthweight) representing persistent development issues that will not be resolved without significant shifts in domestic and international aid policies and prioritization.

The second most influential study in this cluster was authored by Moyer & Bohl (2019). It also has a link strength of 44, has been cited 49 times by other studies, and has links with 22 studies in the sample. The authors raise the question in the study of how achievable the Sustainable Development Goals (SDGs) are through different policy pathways. In this article, they present three alternative policy pathways to achieve SDG targets: technology, lifestyle change, and decentralized governance. They use countries that historically developed rapidly to scale alternative pathways in an integrated assessment framework and explore the feasibility of achieving nine SDGs related to human development by 2050.

The Role of Global Supply Chains in Achieving the SDGs (Light Blue Cluster): The

light blue cluster is the sixth most important cluster in the bibliographic coupling map, consisting of 10 studies. The theme of this cluster pertains to the analysis of the role of global supply chains in achieving the SDGs.

The most important study within this cluster was conducted by Tsolakis et al. 2021. This study has a link strength of 11, has been cited 43 times by other studies, and has links with 11 studies in the sample. The authors assert that the design of blockchain-centered food supply chains promotes Sustainable Development Goals, within the context of the Thai fish industry. The main findings suggest that there is data asymmetry in supply chains to achieve sustainable development objectives. This research presents four design principles and an integrated technology implementation framework, derived from empirical data, for blockchain-centered food supply chains.

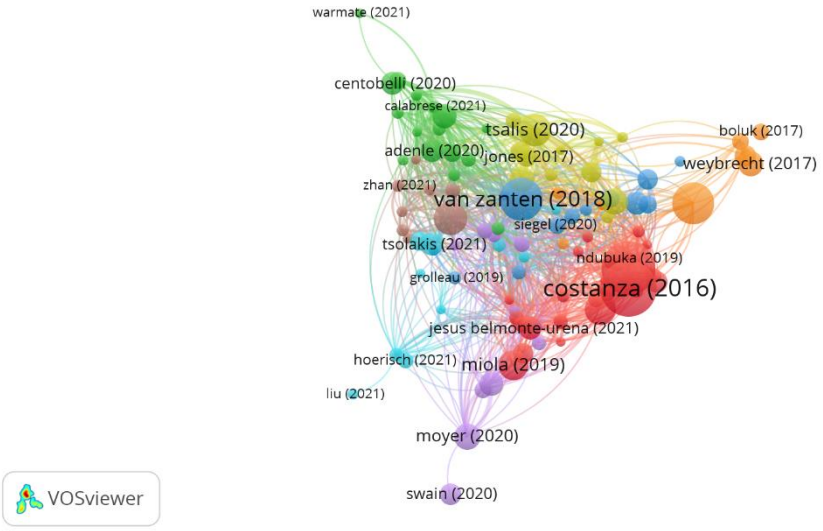
The second most influential study in this cluster was authored by Cai & Choi (2020). It has a link strength of 3, has been cited 33 times by other studies, and has links with 3 studies in the sample. Motivated by the United Nations Sustainable Development Goals (SDGs) and the importance of sustainability, this study examines how textile and apparel (TA) supply chains can fulfill the SDGs. By examining the literature as well as industry practices, we show that current sustainable operations in the TA industry fall short of realizing the objectives of economic growth in tandem with social and environmental sustainability.

The Effects of Education in Responsible Management (ERM) on the Sustainable Development Goals (SDGs) (Orange Cluster): The last cluster considered in the bibliographic coupling analysis was the orange cluster, composed of 9 studies. The central theme of this cluster is the analysis of the effects of education in responsible management (ERM) on the Sustainable Development Goals (SDGs).

The most important study within this cluster was conducted by Moyer et al. 2020. It holds a link strength of 44, has been cited 49 times by other studies, and has links with 22 studies in the sample. The authors demonstrate the importance of adopting an interdisciplinary approach to education for sustainable development and illustrate how to advance it, recognizing different perspectives of sustainability and corporate social responsibility (CSR) within the context of diversity. They examine the broad agenda of the SDGs, which demands the participation of various disciplines and sectors for delivery, while considering the Principles for Responsible Management Education (ERM).

The second most important study in this cluster was authored by Weybrecht (2017). It holds a link strength of 2, has 2 links with other studies, and has been cited 54 times by other studies in the sample. The author asserts that managerial education needs to be considered to play this role, which not only incorporates sustainability and responsible management but also plays a crucial and active role on a global stage to advance the SDGs..

Figura 6– Bibliographic Coupling Map



Source: VOSviewer (2022)

Final Remarks

The bibliometric analysis conducted enabled the identification, through co-citation mapping, of the intellectual structure that guides the evolution of studies on sustainable development goals in the field of applied social sciences. This technique facilitated the identification of seven clusters, with the most important cluster investigating the interconnection among the 17 Sustainable Development Goals (SDGs). It was found that achieving the implementation target of all 17 SDGs by 2030 will only be possible through organizations emphasizing the comprehensive implementation of all 17 SDGs, rather than pursuing individual goals separately. The other clusters in the co-citation map examined the following themes: The Role of Multinational Companies in the

Implementation of Sustainable Development Goals (SDGs); Influences of Stakeholder Pressures for Organizations to Develop Corporate Social Responsibility Policies and Practices; Barriers and Challenges in Implementing Actions that Promote Sustainable Development Goals (SDGs); The Importance of the Private Sector in Implementing the SDGs; and finally, The Effects of Education in Responsible Management (ERM) on Sustainable Development Goals (SDGs).

The bibliographic coupling map identified seven clusters of studies on corporate social responsibility in the field of applied social sciences. The most significant cluster within this group analyzed social well-being, inclusive development, and their relationship with sustainable development goals (SDGs). The other clusters, in sequential order, investigated: the influence of external investors and the contribution of the private sector to the SDGs; the relationship between country-specific institutional aspects and the capacity to implement the SDGs; new challenges for SDGs implementation (global governance, community involvement, and open innovation); alternative policy pathways to achieve SDG targets: technology, lifestyle change, and decentralized governance; the role of global supply chains in achieving the SDGs; the effects of education in responsible management (ERM) on sustainable development goals (SDGs), and finally, the effects of education in responsible management (ERM) on sustainable development goals (SDGs).

The objective of this study was to conduct an analysis of the emergence, evolution, and emerging studies on SDGs in the field of applied social sciences. Through bibliographic coupling, it identified the boundaries of areas of study related to the addressed theme, as well as research trends and insights for future studies. The primary contribution of this study lies in its exploratory nature, going beyond the mapping of theoretical-conceptual evolution. It encompasses the main theoretical influences, existing theoretical currents, and current theoretical frontiers on SDGs. As such, it enhances the understanding of the formation and evolution of the scientific field and presents the current study boundaries. It marks a starting point for future descriptive and causal studies, especially within the clusters formed in the bibliographic coupling map.

However, the study presents certain limitations. Firstly, it focused solely on the Web of Science (WoS) database, although there is a high degree of overlap with the Scopus database. Future studies are recommended to consider both databases for a more robust analysis. Additionally, the bibliometric analysis, while effective in identifying

the theoretical evolution of SDGs in applied social sciences, does not allow for an in-depth analysis of divergences between studies within each cluster. It is suggested that future research conduct systematic literature reviews, particularly in areas identified in bibliographic coupling, as the identified clusters address study trends and the frontiers of knowledge regarding the SDG theme.

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