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Sustainable development and credit unions in economic and social profitability: a bibliometric analysis

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Abstract
Credit unions are key players in promoting sustainable development by incorporating economic, social, and environmental aspects into their structure and operation. Their holistic approach goes beyond the mere pursuit of financial profitability, also embracing the generation of positive social impact and environmental preservation. The present study sets out to examine in depth the compatibility between credit unions and the principles of sustainable development. To achieve this objective, an exhaustive literature review was conducted, involving the compilation, synthesis and critical analysis of various data sources related to the topic. This process made it possible to identify the various roles that these cooperatives can play as catalysts for positive change in the communities where they operate. It was found that they not only offer inclusive financial services but also foster community participation and promote sustainable practices both in their operations and in their investment decisions. The results obtained highlight the transformative potential of credit unions in the quest for more equitable and sustainable development. By adopting an approach that prioritizes not only economic profitability but also social and environmental well-being, credit unions emerge as key agents in advancing a comprehensive development agenda.

Keywords: Sustainable development, Credit cooperatives, Financial, Bibliometric analysis

1. Introduction

The concept of sustainable development is deeply linked with credit unions, aiming to enhance economic and social benefits simultaneously. Yet, the complexities present in this connection are diverse and necessitate a comprehensive strategy to tackle them efficiently [1]. Banking organizations frequently prioritize financial gain, creating dilemmas in harmonizing these objectives with a dedication to encouraging ethical social and ecological behaviors [2]. Hence, it is crucial to establish effective management control in cooperatives as a valuable set of guidelines and a vital means to enhance operations amidst globalization and intense corporate rivalry [3]. In addition, the availability of financial services by credit unions seems to be at issue in such disadvantaged economic conditions [4]. This is because capital constraints deny credit unions the opportunities of providing inclusive financial services, thus leaving vulnerable communities outside the domain such services would foster. This would also leave them with limitations in the significantly needed contributions to the

economic development of vulnerable communities [5]. On the other hand, the lack of adequate regulation and supervision can lead these credit unions to the level of financial risk, affecting their sustainability and distancing them from the ever-needed contribution towards social welfare [6]. However, there would be a great obstacle to acceptance because of lack of awareness and understanding of the long-term value that arises from the convergence of sustainable development and credit unions [7]. Education and awareness by both financial institutions and society must be there to increase the uptake of sustainable practices [8]. In essence, sustainable development and the credit unions issue require a holistic approach to addressing financial, resource-related and awareness-raising challenges if they are to make a mark economically and socially [9].

Sustainable Development and Credit Unions mentions the economy and society but has the challenge of balancing between its financial goals and sustainable practices [10]. It emphasizes the need for greater management control to balance economic efficiency with social responsibility [11]. Credit cooperatives, especially in disadvantaged areas, face challenges in their access to adequate financial resources, thus raising the level of financial risk due to inadequate regulation [12]. Lack of awareness of the long-term benefits accentuates the need for educating both financial institutions and society at large [13].

1.1. Importance of research

Investigation into environmental sustenance and financial cooperatives holds a significant part in elucidating and advocating for fiscal activities aimed at optimizing both financial and societal yields [14]. The significance of this investigation lies in tackling present-day issues confronting civilization, including escalating disparity, destitution, and ecological erosion [15]. By emphasizing the role of credit unions, the study may offer significant perspectives on their potential as catalysts for beneficial transformation, fostering inclusive finance, sustaining jobs and enhancing community welfare [16].

Research in this area also helps us see everything more clearly instead of just thinking about making the most money [17]. "Maintenance of resilience necessitates reflection of societal and ecological aspects, and cooperative financial bodies, adhering to cooperative ideologies, can aptly maintain equilibrium across these three facets of sustainable progression [18]." Investigation can reveal particular routines and approaches that allow these partnerships to be not merely fiscally stable, but also socially accountable and ecologically aware [19]. Thus, studies on green development and frugality collectives are crucial since they offer insights for policymakers, lawmakers, and businesspeople to create frameworks promoting fair and eco-friendly economic expansion [20]. Enhancing knowledge of cooperatives' collaboration with eco-friendly growth, policies & enterprises can be set to advance favorable changes in tackling economic & community issues both locally & globally [21].

1.2. Research background

The scholastic focus on eco-friendly growth and credit establishments indicates a progression of investigations spotlighting the significance in comprehending the linkage between commercial endeavors and society." Prior studies have analyzed how credit associations, embracing collaboration guidelines, have advanced monetary access and levelled economic fairness. This study examines how such organizations may act as catalysts for regional growth, offering fiscal services to communities frequently overlooked by conventional banking entities.

Past research likewise highlighted the necessity of a comprehensive strategy, valuing not solely monetary gains but also the societal and ecological effects affecting credit cooperatives. Existing literature has highlighted the importance of balancing financial goals with corporate social responsibility, highlighting examples of good practice and pointing to areas for improvement. This backdrop establishes a foundational context for grasping the progression of credit unions' dedication to eco-friendly advancement and acts as a groundwork for crafting more inclusive methods in subsequent studies.

Also, studies have looked at how gov policies affect credit unions' part in green growth. The analysis evaluates the impact of policy intervention and backwardness on cooperatives' contributions towards sustained societal

and financial objectives. These inquiries have illuminated how essential a governance system is for nurturing the durability and adaptability of credit unions, thereby enhancing their beneficial impact on sustainable progress.

1.3. Theoretical framework

1.3.1. Economic system

The economic system relates to the way in which a particular society is organized in terms of the production, distribution and consumption of goods and services [22]. In a certain economy, there are established rules, institutions, and relations that govern the way the available resources would be utilized to provide services to the needs and wants of the people. Each economy has its systems that are based on guidelines and values within it, the level of government involvement, and how both private and public sector act towards the economy [23].

Economies are generally of many types, among them are the following:

1. Market economy: Such a system allows for effective allocation of resources through the forces of supply and demand operating in marketplaces. There is private ownership and freedom of doing business as the levers that push the economy and government involvement is minimal [24].
2. Planned economy: In this system, the government has centralised power in working with one agency that controls the way a country applies its resources in production of goods and services. Economies are centrally planned implying government forms are in control to direct a set of economic decisions including what is to be produced and how much. Ownership of the form of production may also be in the hands of the government [25].
3. Blended Economy: This model incorporates principles of both market and planned economies. The factors of production include both private and government ownership in a mixture of production, and the government [26].

1.3.2. Financial system

The financial system is substantiated by a set of rules and institutions, a market for instruments, and the instruments themselves. This system therefore allows the intermediation of lenders savers economic agents who have surplus money and borrowers that have a need for finances. The effective functioning of this system therefore enhances efficient distribution of and mobilization of capital, savings, and investments as well as the performance of financial transactions in the economy. Financial institutions, specifically banks, stock exchanges, insurance, investment funds and all the other financial regulators are essential parts of the financial system [27] [28]. Furthermore, financial markets, which include several commodities markets for trading in several currency stocks and bonds, are important in the mobilization of resources and price setting. There are also regulations enacted by the government and policy that set out goals in the financial system such as stability and the prescribed legal framework which the financial institutions operate [29].

1.3.3. Sustainable development

This is the reason why this conceptual framework has been constructed: it has developed the most sustainable global development [30]. It is based on the definition offered by the United Nations 2030 Agenda, which recognizes the need to tackle the economic, social, and environmental dimensions of development in a balanced manner [31]. In that framework, one of the aspects that makes sense in terms of development is the search for a balance between economic development, social justice, and the protection of the natural environment [32]. This also encompasses a sense of obligation to global objectives such as the eradication of poverty, the promotion of gender equity and climate change [33].

1.3.4. Credit unions

Credit unions, unlike conventional financial institutions, stand apart due to their unique member-centric composition. These entities, often described as quasi-cooperative organizations, are not merely financial

intermediaries but collective endeavors where members own and govern the institution. This participatory framework grants members not only a stake in financial decisions but also in the democratic processes that shape the organization's future. By contributing to the union's capital, members gain proportional influence in its governance and share in its social initiatives, blurring the lines between financial gain and communal welfare. Therefore, possessing innovative qualities must be an inherent part of a person's virtues if he or she aspires to entrepreneurship, along with the acquisition of creativity and skills cultivated throughout his or her life [34].

The conceptual framework explores the long-held belief that these distinctive characteristics form an intrinsic barrier, preventing cooperatives from transitioning into other financial models. However, it challenges this view, positing instead that such attributes position cooperatives as pivotal agents in fostering both economic development and social progress. By aligning their operations with sustainable goals, credit unions exhibit an extraordinary capacity to catalyze transformative change across communities [35].

1.3.5. Integral convergence

The synthesis of sustainable development principles with the ethos of credit unions creates a compelling narrative of integral convergence [36]. This paradigm seeks to illuminate the synergies where cooperative financial practices meet the broader objectives of sustainability. Within this integrated framework lies the potential for credit unions to transcend traditional metrics of profitability, aligning instead with inclusive growth, enhanced financial access, and community well-being. [37]. By leveraging their democratic structures, these organizations can simultaneously address economic inequities and environmental challenges. The research underlying this framework delves deeply into existing literature, revealing gaps in understanding while also proposing innovative models that emphasize the dual objectives of financial success and social impact. Through this lens, credit unions emerge as critical players in the push toward a resilient and equitable global economy. [38].

1.3.6. Social economy

The social economy, distinct from profit-maximizing paradigms, champions principles of equity, inclusivity, and environmental stewardship. Comprising cooperatives, mutuals, and social enterprises, this economic framework prioritizes collective well-being over individual gain. Unlike conventional businesses, these entities operate with a dual focus: advancing financial stability while promoting social and environmental goals [39]. Through democratic management and cooperative ownership, the social economy ensures that decision-making remains transparent and participatory. This fosters a sense of shared purpose among members, driving initiatives that not only uplift local communities but also address global sustainability challenges. By weaving together economic activities with ethical imperatives, the social economy exemplifies a progressive model for addressing 21st-century issues. [40].

1.3.7. Profitability of credit unions

Profitability within the realm of credit unions extends far beyond traditional financial metrics. While economic surplus remains a critical indicator of success, these institutions measure profitability through a broader lens, encompassing their ability to foster economic inclusion, social equity, and environmental resilience [41]. However, profitability in the context of credit unions is not limited solely to the maximization of financial profits, as in the case of traditional businesses [42]. In this context, profitability is not an isolated objective but a harmonious balance of financial health and societal contribution. Credit unions achieve this by reinvesting earnings into community-focused projects, promoting education, and financing initiatives that prioritize sustainability over short-term gains. This multidimensional approach underscores the transformative role of credit unions as both economic engines and social architects [43].

1.3.8. Popular and solidarity economy

The popular and solidarity economy (EPS) represents a paradigm shift, emphasizing grassroots empowerment over hierarchical economic models. Rooted in principles of cooperation, equity, and shared responsibility, this approach prioritizes the needs of small-scale producers, self-employed individuals, and micro-entrepreneurs

[44]. This economic model differs from conventional approaches by emphasizing social inclusion, democratic participation, and equitable distribution of benefits [27]. The popular and solidarity economy encompasses a wide range of economic activities, such as cooperatives, associations, microenterprises, local markets, and barter systems, and seeks not only to generate income and employment, but also to strengthen the social and community fabric [45]. Unlike traditional economies that often concentrate wealth and resources, the EPS disperses these benefits through community-driven initiatives such as local markets, cooperative networks, and barter systems. By fostering solidarity and mutual support, this model strengthens the social fabric, ensuring that economic activities serve as a means to uplift rather than marginalize [46].

1.3.9. Green finance

Green finance, also known as sustainable finance, integrates environmental, social, and governance (ESG) factors into financial decision-making, with the goal of fostering economic growth while mitigating climate change and environmental risks [47]. Over the past five years, green finance has gained global recognition, particularly through regulatory advancements and financial innovations. The European Union's Taxonomy for Sustainable Activities, introduced in 2020, established a framework to classify environmentally sustainable economic activities, directing capital flows towards sustainable projects [48]. Similarly, the UK government launched Greening Finance: A Roadmap to Sustainable Investing in 2021, emphasizing transparency in sustainability-related financial disclosures to guide investors [49]. Recent research highlights that financial institutions adopting green finance practices exhibit improved sustainability performance, underscoring the role of financial innovation in achieving long-term environmental and economic stability. As nations work towards achieving net-zero emissions, green finance continues to shape financial markets by promoting responsible investments and sustainable economic policies.

1.4. Objective

This research aims to unravel the intricate connections between sustainable development and credit unions, focusing on their dual capacity to drive economic profitability and social progress. Through a thorough examination of historical trends and case studies, the study identifies successful practices and innovative strategies that position credit unions as pivotal agents in achieving sustainable goals.

By proposing a holistic theoretical framework, the research not only highlights the transformative potential of these entities but also offers actionable guidance for policymakers and stakeholders. Ultimately, the study aspires to bridge knowledge gaps, providing a roadmap for leveraging credit unions in the global push for equitable and resilient development.

2. Methodology

2.1. Approach

The methodological approach adopts a qualitative lens, employing descriptive and inferential analysis to explore patterns in scientific research. Leveraging databases such as Scopus, Web of Science, Dialnet, and Google Scholar, the study scrutinizes articles across parameters like authorship, geographic origin, and publication timelines. This rigorous process ensures a comprehensive understanding of the intersections between credit unions and sustainable development, offering insights that are both nuanced and actionable.

2.2. Data collection technique and chronology

To construct this theoretical exploration of sustainable development and credit unions, a multi-faceted approach to data collection has been adopted. At its core lies a systematic review of both academic and technical literature, ensuring the breadth and depth necessary for a comprehensive analysis. The process commences with an extensive search through renowned academic databases, including Scopus, Web of Science, and Google Scholar. Employing carefully chosen search terms such as "sustainable development," "credit unions," and "economic and social profitability", this review seeks to uncover relevant studies and data.

Additionally, this endeavor extends beyond journal articles, encompassing books, reports from international organizations, and authoritative online resources. This strategy not only enriches the scope of the research but also incorporates the most recent insights on the subject. By synthesizing and analyzing the gathered information, the review aims to identify trends, patterns, and significant interconnections within the studied concepts. A particular focus is placed on scientific publications spanning the years 2018 to 2024, ensuring a time-sensitive understanding of the field. The key data extracted include bibliographic citation data, abstract, key words, publication details, bibliographic references.

3. Results and discussion

The information was collected using the Bibliometrix application and the results presented on annual scientific production is shown in Figure 1.

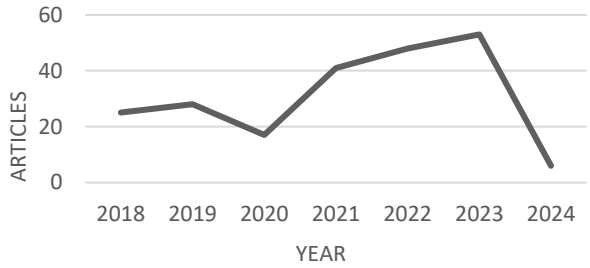

Figure 1. Annual scientific production

The data presented in the analysis and Figure 1 reveal a significant fluctuation in the annual growth rate of scientific production in the topic examined. During the period from 2018 to 2024, variations in the number of articles created each year are observed. First, a moderate increase in scientific production is evident from 2018 to 2019, where the number of published articles increased from (25) to (28). This initial increase could indicate a growing interest in the study topic during that period [50]. However, this positive trend was interrupted in 2020, when the scientific output decreased markedly to (17) articles. This abrupt reduction could be influenced by various factors, such as economic crises, changes in research policies, or external events that affected the ability of researchers to carry out their studies [51]. Concurrency and density network diagram is shown in Figure 2.

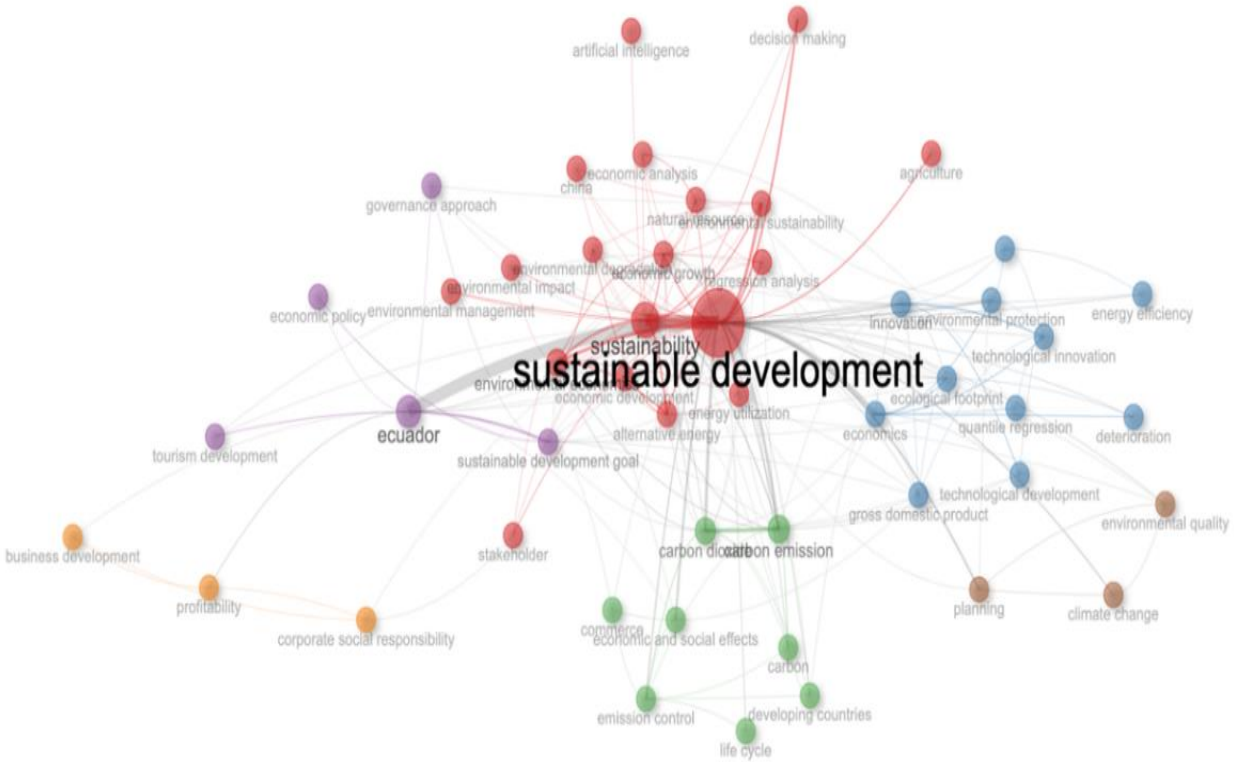

Figure 2. Concurrency and density network

It is important to note that the year 2021 marked a return to the growth trend, with a significant increase in scientific production, reaching a total of (41) articles. This increase could suggest a renewed interest in the subject or significant advances in research that motivated greater scientific activity in the area [52]. The highlight was reached in the year 2023, where the highest production of articles on the subject was recorded, with a total of (53). This significant increase could be attributed to various factors, such as increased funding of research projects, the participation of new researchers or technological advances that facilitated the generation of knowledge [53]. Finally, a marked decrease in scientific production is observed in the year 2024, with only (6) articles registered. This drastic decrease could be worrisome and require a detailed analysis to identify possible underlying causes and take corrective measures if necessary [54].

The analysis, complemented by Figure 1, reveals striking fluctuations in the annual growth rate of scientific contributions to the topic. During the six-year period from 2018 to 2024, these variations paint a nuanced picture of the evolving interest and challenges in this research domain. From 2018 to 2019, a moderate yet promising increase in output is evident, with the number of published articles rising from 25 to 28. This uptick likely reflects a burgeoning curiosity and the gradual recognition of the topic's significance. However, this optimistic trajectory falters in 2020, as the volume of articles plummets to just 17. This abrupt decline may be attributed to multiple converging factors, including global economic uncertainties, shifts in research priorities, and unforeseen external disruptions that hindered scholarly activity [55].

By contrast, the year 2021 marks a robust resurgence, with the number of articles surging to 41. This rebound signals not only a renewed commitment to the subject but possibly the influence of breakthroughs or funding incentives that reignited academic interest [56]. The pinnacle of scientific production emerges in 2022, with an impressive 53 articles—marking the highest annual output in this period. This peak could be attributed to increased research investments, technological advancements that facilitated scholarly endeavors, or the entry of new contributors energized by the field's potential [57]. Unfortunately, the narrative shifts again in 2024, with a steep decline to just 6 articles [58]. This sharp drop raises pressing questions about its underlying causes. Are these results reflective of dwindling interest, resource allocation issues, or perhaps shifting global priorities? A deeper inquiry is essential to uncover the reasons behind this regression and to propose corrective measures that can sustain the momentum in such a critical area of research [59]. Three-phase graph including country, author and keywords is shown in Figure 3.

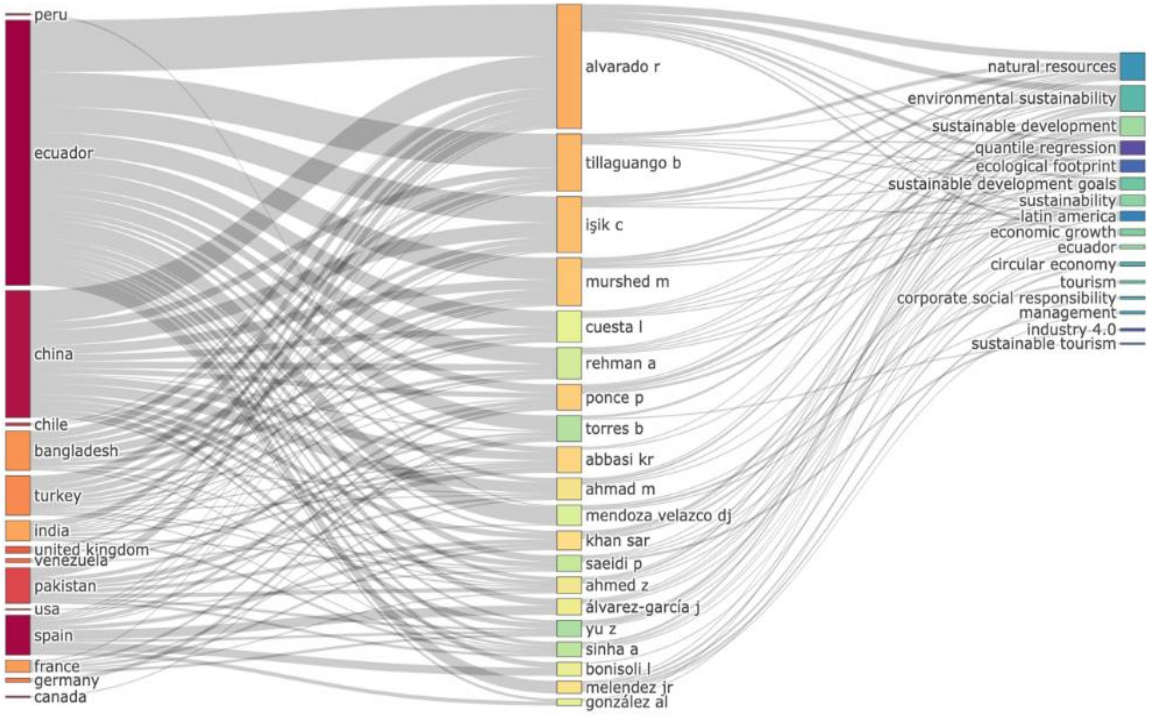

Figure 3. Three-phase graph: Country, author and keywords

The analysis depicted in Figure 3 uncovers a fascinating correlation between the most notable authors from each country and the most prevalent keywords within the realm of scientific production [60]. It is evident that Ecuador and China have made significant contributions to the production of scientific articles, with a strong emphasis on terms like "natural resources," "environmental sustainability," and "sustainable development".

This connection between the countries mentioned and the identified keywords may offer insights into the primary concerns and focal points of scientific research in these regions. Ecuador, renowned for its abundant biodiversity and dedication to natural resource preservation, showcases a clear focus on terms like "natural resources" and "environmental sustainability" in its scientific endeavors [61].

Conversely, China, as a burgeoning economic powerhouse, displays a keen interest in sustainability and sustainable development issues, likely as part of its initiatives to tackle the environmental challenges stemming from its rapidly expanding industry [62]. These findings suggest that both Ecuador and China are deeply invested in research and development within fields that directly impact environmental conservation and sustainable development [63]. The most relevant sources are displayed in Figure 4.

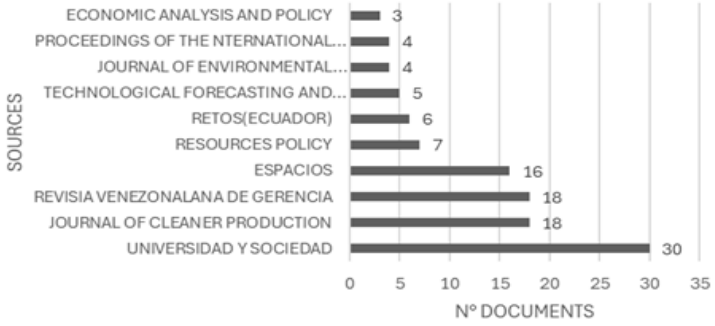

Figure 4. Most relevant sources

The analysis provided suggests an unbalanced distribution in the production of research on sustainable development and credit unions, with Ecuador emerging as the leader in the number of publications on this subject, followed by Spain, Porcelain, and Cuba [64]. The substantial number of publications from Ecuador (496) indicates a strong interest and active involvement in researching sustainable development and credit unions within the country. This focus could be attributed to national policies, academic initiatives, and the prioritization of these topics in the country's development agenda. It is noteworthy that countries like Spain, Porcelain, and Cuba also have a significant number of publications in this area, suggesting a regional interest in economic and social sustainability [65]. However, the disparity in publication numbers between these countries and others highlights an uneven allocation of resources and research priorities. For instance, countries such as the UK, USA, and Germany, renowned for their research in various fields, have relatively fewer publications on this specific topic. This situation raises the need to foster international collaboration and knowledge transfer to address the challenges of sustainable development in a more equitable and effective manner. Map of collaboration in scientific production is shown in Figure 5.

Figure 5. Map of collaboration in scientific production

The analysis of the scientific collaboration map reveals interesting patterns in research production, highlighting Ecuador as the largest producer in the specific terms examined. In addition, it is observed that Ecuador maintains a significant scientific relationship with Spain, Porcelain (China) and Cuba. Ecuador's prominence as a major research producer in this context may reflect a variety of factors, such as national interest in the topics researched, availability of resources for research, and active collaboration with academic and scientific institutions both nationally and internationally [66].

The scientific relationship identified between Ecuador, Spain, Porcelain, and Cuba indicates a transnational collaboration in research on these topics. This type of collaboration can enrich the diversity of perspectives, foster knowledge sharing, and facilitate the implementation of innovative solutions to common challenges [61]. The presence of Spain, Porcelain, and Cuba as countries with which Ecuador has a significant scientific relationship highlights the importance of international collaboration in scientific research. Such collaboration can be critical in addressing complex problems that transcend national boundaries and require the combination of resources and expertise from multiple countries [67].

The analysis of the use of keywords reveals the main themes addressed in the articles related to sustainable development and credit unions. The most frequently used words include "Sustainable Development", "Ecuador", "Sustainability", "Carbon Dioxide" and "Innovation"[68]. The prominence of the word "Sustainable Development" reflects the central focus of these articles on the search for solutions that promote equitable and sustainable development at the economic, social, and environmental levels [69].

The presence of "Ecuador" as one of the most used keywords suggests a particular interest in research on sustainable development and credit unions in this country. This could be due to national policies, development initiatives and specific experiences that make Ecuador a relevant case study in this context [70]. The inclusion of terms such as "Sustainability" and "Carbon Dioxide" indicates a focus on environmental issues and the importance of reducing greenhouse gas emissions to achieve long-term sustainable development [71].

Finally, the word "Innovation" suggests an interest in identifying and promoting new ideas, technologies and practices that can contribute to the sustainability and strengthening of credit unions in the context of sustainable development [26]. Multiple correspondence analysis is shown in Figure 6.

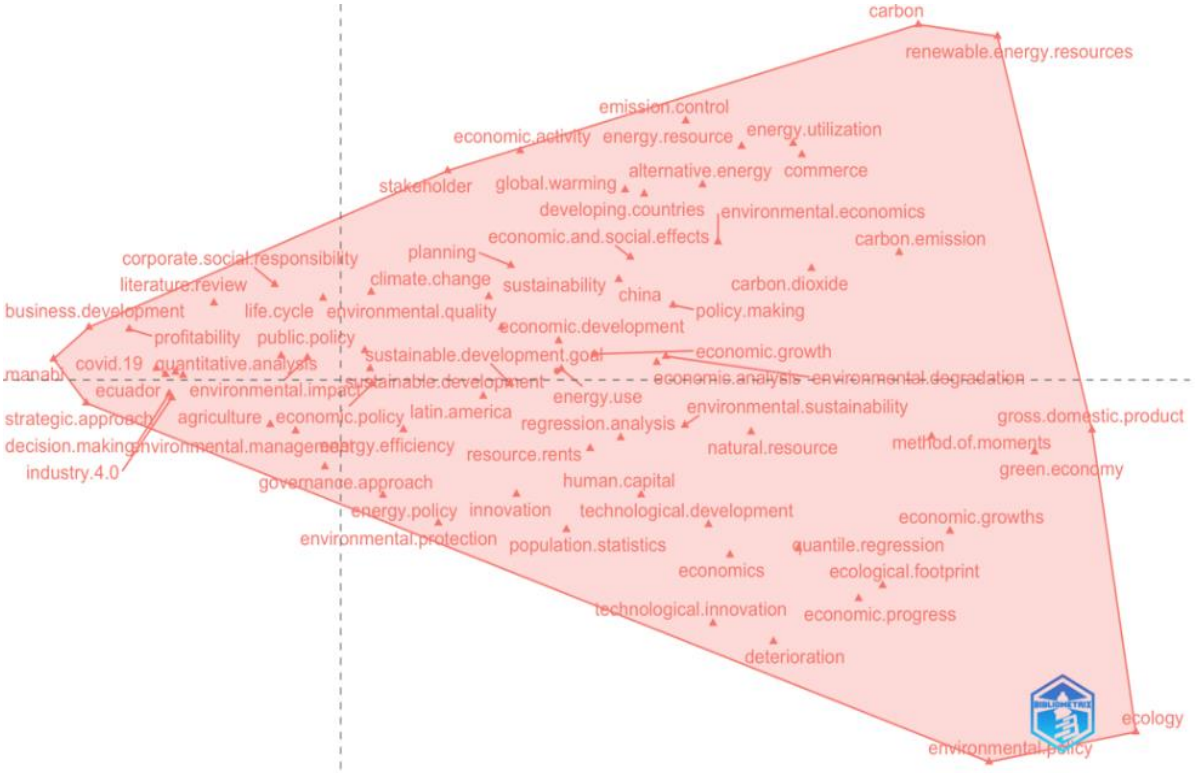

Figure 6. Multiple correspondence analysis

The Multiple Correspondence Analysis depicted in Figure 6 provides a detailed view of the stratification into two groups, each subdivided into two dimensions. Dimension (1) explains 55.44% of the variability, while dimension (2) accounts for 4.95%. The visualization of these groups reveals the terms associated with each of them, providing a deeper understanding of the issues addressed in the research. In the first group, terms such as "Manabí", "strategic approach", "business development", "profitability", "covid-19", "Ecuador", among others, are identified [72].

These terms suggest a focus on specific aspects such as decision making in business contexts, the impact of the COVID-19 pandemic on industry and the economy, as well as the implementation of policies and strategies in areas such as agriculture and corporate social responsibility [65]. On the other hand, the next dimension reveals terms related to broader issues such as "public policy", "sustainable development", "climate change", "corporate social responsibility", "planning", "sustainability", "environmental quality", "environmental economics", among others. These terms suggest a more holistic approach that encompasses public policy, environmental sustainability, and economic and social effects of climate change and other related policies [50]. In addition, the inclusion of terms such as "Latin America" suggests a regional interest in these issues and the relevance of addressing them in a broader context.

The bibliometric study conducted has shown interesting behavior concerning interaction and evolution in studies related to sustainable development and credit unions. The defined parameters inform that the precursor happens to be in 2020 when Ahmed Zahoor's work was done [73]. Additionally, there occurs another functional node with Alvarado in the same year, who revises his research in 2022 and 2023, with an embedding of ideas derived from Ahmed's work. These findings indicate a temporal progression in the generation and evolution of knowledge in this specific field [74].

Ahmed's research seems to signal a turning point for other later studies and has evoked discussions and development of ideas around this, such as from Deng, Shang, and Alvarado. With the fundamental principles from the bibliometric analysis identified, doors are now opened to study relevant studies concerning sustainable development with cooperative as appropriate explanatory approaches [75]. Such studies could very well deepen the understanding of the economic, social, and environmental dynamics within which credit unions operate against the backdrop of sustainable development [76]. Indeed, bibliometric analyses are excellent in identifying trends, patterns, and relationships in the academic research process. Analyses such as this not only upkeep a retrospectively captured image of how knowledge has evolved relative to each field but could also set future research directions by highlighting points of interest and openings towards the advancement of knowledge.

3.1. Related articles

Authors García, Hurtado, Ponce, and Sánchez carried out a descriptive study using surveys to analyze the performance of credit unions; their results indicated that these entities do respond to meet financial and social needs according to the cooperative principles. However, upon evaluating the internal control of these credit unions in canton "La Maná" using the COSO model, it was found that there was a high compliance related to certain areas such as environment and control activities, whereas lower compliance was found in risk assessment and communication. This fact underlines the need to improve risk management and internal communication [1].

Gonzales and Melo studied the qualitative methodology, using a data collection technique, further making analysis of it. Their findings show that in Ecuador, credit unions have not managed to put themselves as leaders in social, environmental and solidarity management instead have copied some of the strategies of private banks, such as high interest rates and low debt levels, leading to their lower contribution to liquidity in the financial system than private banks, distancing them from the principles of social and environmental responsibility and cooperative identity [5].

Bayas and Noriega used a descriptive method in their study to analyze the activities of COAC's in a particular region towards assessing their contribution to sustainable development. Data collection and review of the existing literature were carried out to recognize similarities and contradictions that will guide the study. Hence,

cooperatives are encouraged to put these policies in place within the context of the SDGs, making an inclusive strengthening of economies, where people and the environment are prioritized over economic profit [8].

In her article, author Aponte employs a quantitative methodology involving questions designed into tabulations aimed at a specific pool of credit unions. Hence, she deduces that social investment is a revenue-making financial mechanism in so far as it contributes to creating economic, social, and even environmental developments to communities, regions, or nations. Measuring the results of this investment becomes essential, especially for credit unions, since they are depository institutions and have social responsibility by being cooperatives. This gives them a privileged position to perform social investments effectively [21].

Betancourt and Verdezoto use a qualitative methodology to investigate how globalization affects the application of environmentally friendly measures in credit unions. By collecting and analyzing data, they conclude that globalization has provoked firms across different sectors like industry, agriculture, food, finance, cooperatives, and commercial distribution to operate on economies of scale in their production processes and global management systems [10].

Gullpa and Urbina used a panel fixed effects data collection methodology. Their outcomes state that as the cooperative's profit, capital ratio, size, and diversification increase, it becomes more likely to decide not to implement environmental measures in its financial system. This gives the impression that these cooperatives may not be socially responsible regarding the environment [11].

The study done by Duque, Meza Girarlo, and Barreto is about methodology that studies and analyzes academic literature from the WoS and Scopus online databases in the years between 2000 and 2020. This methodology utilizes bibliometric ways to map the main approaches, authors, journals, countries, and institutions pertinent to the field of study. As such, they conclude on the need to implement public policies, psychographic profile analysis of beneficiary populations, dynamization of cooperative norms toward economic growth, reduction of disparities in development between communities of a location, understanding the lifecycle of enterprises born out of social entrepreneurship, and measuring the effect of the social and solidarity economy on organizational and educational sustainability towards fostering sustainable subjects [14].

Cobian, Rosales, and Fernandez employed a mixed methodology including content analysis techniques, consultation with specialists and experts, and statistical methods. The main result was identifying particular social balance sheet variables to this sector. These variables and the derived indicators would thus require consideration of sectoral characteristics to enable cooperative comparisons and shared strategies formulation. [15].

Alarcón and Álvarez, in their study, used the Delphi methodology involving 16 leaders of the Colombian cooperative sector to identify the connection between the Cooperative Principles and the Sustainable Development Goals (SDGs). Analysis of social networks of graph theory pointed out that some economic practices of cooperatives such as prioritization of community welfare over the individual's gain and the issuance of Social Transfers in Kind (STi) are in accordance with the SDGs. These practices should very well be reflected in the Social Balance Sheet so as to show the positive effects of cooperation towards SDGs. To further explore the contribution of cooperatives with respect to SDGs in theory and practice, there is a call made for the development of stronger ties between the theoretical foundations of contemporary economic institutionalism and applied notions of Social Balance Sheet [18].

Vinueza, Guerra, and Bajaña did research that studied the effect of credit risk on Credit Unions' (COACs) profitability in Ecuador from 2015 to 2018. Through a quantitative descriptive and correlational approach, they revealed a significant negative correlation of delinquency and profitability analyzed in regression analysis. Thus, indications reveal that COACs create their way to improved profitability by lowering past-due portfolio and managing credit risk more effectively focusing on the balancing act of risk management and profitability towards additional years of operation. It has also spilled the beans about how much these cooperatives imply to

a lot of businessmen by opening the doors to financing. Overall-thereby contributing to the development of both the local and regional scope [33].

Mixed methodology was used by Capcha, Cornejo, and Jiménez, where it was qualitative and quantitative, to determine the impact of the Sustainability Report at the Cooperativa de Ahorro y Crédito Pacífico. The null hypothesis was rejected, and it considered that sustainable practices were integrated efficiently into the actions and strategies of the credit union, which enriched its image and attracted new members and customers. Areas to develop and improve were found in transparency in the information disclosure and integration of sustainable performance metrics into decision-making processes, highlighting the importance of Sustainability Report in promoting sustainability within the cooperative sector [16].

Alarcón and Pérez researched the relationship between employee engagement and corporate sustainability at "Cooperativa de Ahorro y Crédito San Cristóbal de Huamanga", Ayacucho, during the year 2021. This mixed methodology involving employees' surveys, managers interview, and financial resources analysis presented a significant positive correlation between employees' engagement and the sustainability practices of the cooperative. Findings showed that highly engaged employees were more willing to participate in sustainable initiatives and adopt responsible labor practices; and thus, translated into high talent retention, improved productivity, and customer satisfaction, emphasizing the importance of employee engagement for long-term business success [29].

Vinueza, Guerra and Bajaña used a descriptive and correlational quantitative analysis research in their study to look into the effect of credit risk on the profitability of Savings and Credit Cooperatives (SACCOs) in segment 1 and 2 in Ecuador for the years 2015-2018. It has been applied a statistical approach to evidence the relation of increase in non-performing loans with profitability of credit unions in these segments. The results showed that there exist significant negative correlations between both measures of delinquency and profitability, both in the bivariate analysis and in the regression analysis, suggesting COACs could enhance their profitability while achieving better anticipation of future levels of risk through more efficient credit risk selection and monitoring [33].

Solano employed an integrated qualitative and quantitative methodology for her study based on national fieldwork from December 2013 until February 2014 with 2,223 cases. In fact, it raised the importance that such social, environmental, and economic initiatives had in the perception of the associative base of cooperatives, revealing positive impact on the community, the finance and insurance sector representing 22.2% of Costa Rican cooperatives, such as Coope Ande N°1 R.L., with its 57,000 members [23].

In their study, Alarcón and Álvarez used the Delphi methodology with the contribution of 16 leaders of the Colombian cooperative sector to establish the relationships between the Cooperative Principles and the Sustainable Development Goals (SDGs), later analyzed with graph theory and Social Network Analysis. The results revealed then the economic specificity of some of the cooperatives in Colombia which highlighted their dimensioned commitment to the environment in accord with the SDGs, especially by further practices like Social Transfers in Kind (STI), which might be used as an effective tool to show the contribution made by cooperatives to the SDGs under the Social Balance [41]. Strengthening the linkages with the theoretical bases of modern economic institutionalism and the ideas of Social Balance Sheet will further reveal the positive effect of cooperatives in achieving SDGs as much in theory as in practice [18].

Bayas and Vega in their research used the methodology that comprises a thorough description of status of Credit Unions (COACs) complemented with an identification of the effects of applying social management methodologies. The approach was based on data directly from cooperatives together with the exploration of secondary sources of information like the International Cooperative Alliance (ICA), the Superintendence of Popular and Solidarity Economy, and other cooperative organizations in Ecuador.

Results show that the COACs paid more attention to the control and supervision aspects of financial issues and turned a blind eye to the social side of the performance that denies them the authority and the right to promote

economic, financial, social, and environmental efficiency [40]. Cobián, Ortiz, Joya, and Núñez applied an integrated methodology in their study using deductive logic methods, analysis-synthesis research methods, statistical methods, experts, and modeling. These methodologies were combined to establish a logical sequence in methodological design, ensuring the reliability of the instruments and results obtained. As a result, specific indicators of contribution to sustainable development were defined for the Caja de Ahorro y Préstamo Santa María de Guadalupe in Jalisco, Mexico, which were recognized as fundamental in enhancing the competitiveness of this organization and underscoring the significance of reasoned methodology in this process [20].

In their study, Torres and Báez used an analytical and interpretative method which was qualitative in nature focusing on a case study with the Crediflores savings and credit cooperative. The method used has a survey and reviewed all the available information on the website of the entity studied. It was found that there are quite a few good management practices including optimization of the operational processes through digital transformation as well as the establishment of the Integrated Risk Management System (SIAR) to control and mitigate risks. What was also underscored was transparency with which reports are rendered to regulatory, administrative and associated bodies that reflect the fundamental principles of cooperativism. The conclusion was that Crediflores has a solid structure and a set of business practices that generate trust within its membership, giving it a competitive market advantage over others [46]. A brief summary of related articles is listed in Table 1.

Table 1. Summary of related articles

Database	Article Title	Journal	Country	Variables Used	Quartile	Reference
Scopus	Internal control in credit unions	Cooperativismo y Desarrollo	Ecuador	Internal control, compliance, risk assessment	Q2	[1]
Scopus	Challenges in cooperative identity	REVESCO	Ecuador	Social, environmental, financial management	Q3	[5]
Google Scholar	Cooperatives and Sustainable Development	Ciencia Digital	Ecuador	Policies, SDGs alignment	Q2	[8]
Google Scholar	Social investment in credit unions	Bienal Desarrollo Coop.	Puerto Rico	Economic, social, environmental impacts	Q3	[21]
Scopus	Globalization and cooperative finance	Polo del Conocimiento.	Ecuador	Globalization, sustainability	Q2	[10]
Web of Science	Financial performance of cooperatives	Rev. Econ. Política	Ecuador	Profitability, capital ratio, size, diversification	Q1	[11]
WoS & Scopus	Social economy bibliometric analysis	REVESCO	Colombia	Economic growth, disparities, entrepreneurship	Q1	[14]
Google Scholar	Social balance in Mexican cooperatives	Cofin Habana	Mexico	Social balance variables, sector-specific indicators	Q2	[15]
Scopus	SDGs and Cooperative Principles	WoS	Colombia	Social Balance, SDGs, cooperative practices	Q2	[18]
Web of Science	Credit risk & profitability in COACs	Univ. Soc.	Ecuador	Delinquency, risk management	Q2	[33]

3.2. Discussion

Sustainable development in the field of credit unions calls for an all-encompassing approach, which holds in both economic and social aspects [31]. These financial agents need to exercise their active role in ensuring that sustainable development is what they regard as an outcome not only to their economic stability but also for social welfare in the lives of the communities where they exist [73]. According to Capcha et al. [16], "the role executed by credit unions fits into the dimension of poverty alleviation and financial inclusion directly towards the attainment of the United Nations sustainable development goals (SDGs)' [77]. This view is further supported by studies such as that of Alarcón and Alvarez [18], who demarcate the encouraging effect of credit unions as regards access to credit by marginalized communities bringing forth opportunities along with economic progress.

The credit unions are, therefore, complementary above their economic contribution in implementing socially and environmentally sustainable practices [78]. As principles of social responsibility and environmental stewardship, therefore, credit unions translate into initiatives such as financing projects in the community and environmentally friendly practices [69] in line with Bayas and Vega [8]. According to Betancourt and Verdezoto [10], it is a holistic approach to sustainable development that reflects the combinatorial treatment of economic, social, and environmental aspects into management in cooperatives.

Nevertheless, it is quite a challenge to the credit unions in such a quest towards maximizing economic and social profitability, which is considered very relevant [79]. Gracía et al., [1] further explained that some credit unions encounter problems in balancing their financial goals with social and environmental objectives having a bearing on their long-term sustainability [43]. To counter this situation, it is necessary to apply managerial frameworks that wholly give space for and integrate the economic, social aspects, as well as environmental aspects according to Solano et al [23].

However, Luque and Peñaherrera [6] say that one of the major strategies to address these challenges is reinforcing governance and transparency in cooperatives, letting a more effective management of resources and greater accountability to members and society in general [67]. Moreover, there is the need to sensitize members of cooperatives through education and training on sustainability matters, as noted by Duque et al., [14], stating that it would enable them to have more comprehension of why sustainability is important and become active in its promotion. Integrated approaches include sustainable development for credit unions, along with alliances and collaborations with other actors within the sector, namely government institutions, NGOs, and private businesses [80]. The most representative authors are listed in Table 2.

Table 2. Most representative authors

Database	Citation	Country	Key Contributions	Reference
Scopus	High	Various	Foundational work influencing multiple studies	[73]
Scopus	Medium	Ecuador	Continuously revised research on cooperative strategies	[74]
Web of Science	Medium	Ecuador	Studied credit risk impact on profitability in cooperatives	[33]
WoS & Scopus	Medium	Colombia	Mapped main authors, journals, and institutions in cooperative finance research	[14]
Scopus	Medium	Perú	Studied sustainability reporting in credit unions	[16]
Scopus	Medium	Colombia	Relationship between cooperative principles and SDGs	[18]
Google Scholar	Medium	Ecuador	Analyzed cooperatives' contribution to sustainable development	[8]
Google Scholar	Low	México	Defined indicators for sustainable development contributions	[20]

In short, the concepts of development and co-operatives have an inseparable bond and seeking an all-encompassing approach that investigates their economic, social and environmental aspects will serve further

maximization into development for society and the environment. The role of credit unions becomes even more significant in fostering sustainability by striving for a balanced integration of sound policies, education, and strategic collaborations.

4. Conclusion

Sustainable practices in credit unions are now considered the best way to optimize the function of those institutions in sustainable development. Sustainable development here implies the establishment of policies and strategies that reflect the dual analysis of financial or economic profitability versus social welfare and environmental well-being or preservation. It can be credit unions that are likely to evolve into major player brokers in promoting financial inclusion about economic and social inequalities. This can add empowerment-through the provision of financial services to marginalized communities and financial literacy to some of the most marginalized, creating fairer and fairer societies. Profitability of economy and profitability of society should not be interpreted in terms of mutual exclusion but as considered complementary. Credit unions will manage within such frameworks for an economic balance but safeguard their members' well-being and the environment. Engage fully with the United Nations Sustainable Development Goals (SDGs): they would keep credit unions continuously appraising their socio-environmental impact and aligning with improvements on key measures such as gender equality, climate action, and poverty reduction. For this reason, credit unions need to rally members and promote much deeper democratic visibility in their affairs for maximum sustainable contributions. It requires some openness of decision-making, accountability by active participants, and involvement of all stakeholders in planning and execution activities for sustainable actions. That is when these institutions can fully achieve their purposes as agents of change for the better in and beyond the communities where they operate.

Declaration of competing interest

The authors declare that they have no known financial or non-financial competing interests in any material discussed in this paper.

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Author contribution

The contribution to the paper is as follows: X. Granizo, M. Procel: study conception and design; X. Granizo, D. Lalama, S. Granizo: literature review and theoretical framework; X. Granizo, D. Lalama: data collection and analysis; X. Granizo, S. Granizo: visualization and interpretation of results; X. Granizo, M. Procel: draft preparation. All authors approved the final version of the manuscript.

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