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RESEARCH ARTICLE

Informal Entrepreneurship and Circular Economy: A Bibliometric Analysis

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Abstract

This study maps the thematic structure of two intersecting lines of research—informal entrepreneurship and circular economy—highlighting an often ignored and under-researched reality: informality is intrinsically linked to circularity. The bibliometric approach builds on Scopus-indexed publications from the last 25 years (2000-2025). The analysis reveals intense research activity during 2020-2025 and predominantly European research output, with notable contributions from India, China, and Brazil. From a domain perspective, findings show that environmental science journals publish most of this work, while business and entrepreneurship journals lag behind. Finally, the theoretical core of this research niche remains fragmented between institutional debates and practical examples that lack generalizability.

Keywords Informal Entrepreneurship · Circular Economy · Bibliometric Analysis

1. Introduction

Second-hand clothing reuse markets across Africa (Sumo et al., 2023), informal building material reuse in urban areas in Latin America (Linares-Capurro et al., 2025) or waste picking activity in the Global South (Velis, 2017) are just of a few of the many vivid examples of practices that show how circularity is far from being either new or a reality that requires formalized industrial systems (Schröder et al., 2020). This perspective has been labeled as "necessity-driven" circularity, namely the phenomena observed in low-income communities in the form of informal reuse, repair, and recycling motivated by economic need (Korsunova et al., 2022). The necessity motivation is a common trigger also for entrepreneurship – making do with available resources – with capital scarcity, exclusionary regulation and institutional asymmetry pushing the emergence of an informal side of the practice, namely informal entrepreneurship (IE) (Bromley, 1994). In other words, informal entrepreneurs adopt at least some circularity principles out of necessity and survival (Morais et al., 2022) and not due to environmental concerns (Korsunova et al., 2022; Sambyal, 2023; Velis, 2017; Ogwu and Kosoe, 2025). Number wise, this is a non-negligible reality, with more than 60% of workers and 80% of enterprises operate within the informal economy worldwide (according to the estimates provided by the International Labour Organization. Thus, the formal-informal tension, characterizing a considerable portion of global economic activity (Sassen, 1993; Williams, 2017; Williams and Lansky, 2013), further applies to the actual understanding of circular economy (CE) into the field.

CE is portrayed as an alternative to the traditional linear "take-make-dispose" economic system (Bocken, 2020), focusing on the minimization of waste and extension of resource use (Kirchherr et al., 2017; Morseletto, 2020). Nonetheless, the assumptions of such an alternative model remain conventional ones, presuming the existence of formal, well-regulated markets, and implicitly ignoring the vast perspective brough by the informal economy. In other words, there is an important disconnect between the theory supporting CE, which

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assumes formality in business models and socio-economic contexts, and its practical implementation, which in many instances relies heavily on informality. What is most noteworthy as practical cases belonging to the very dense risk category (with dangerous shortcuts and harmful practices) to which informal workers, workers are exposed (Hartmann et al., 2022). This is a consequence of the lack of formal legal protections, standards, or oversight common encountered in the informal sector (Williams, 2017; Williams and Lansky, 2013). Informal recycling provides the most cases of workers that routinely handle toxic electronic waste or unsanitary materials with little more than their bare hands, and for wages that barely scrape by. The combination of marginalization and vulnerability has been addressed through the development of decent work principles, but no clear integrative or transformative processes have been mapped at a large scale (Benavides et al., 2022; Hammer & Ness, 2021). Unfortunately, policymakers often get this wrong. Instead of recognizing the value informal workers bring, governments frequently see them as obstacles to progress—something to be "cleaned up" or formalized away in the pursuit of modernization (Tokman, 2001). This approach not only misses the point, but it can actively harm the very people who are quietly keeping CE running. While recently a more focused discussion about how to implement some transformative principles to guide CE transitions in the Global South (Hadfield et al., 2025), there are little systematic efforts to organize more effectively the existing information about the integration of informal entrepreneurship and the circular economy.

To this point, the current paper aims to provide such a review of the academic literature at the intersection of informal entrepreneurship and the circular economy through a bibliometric approach In this way, the it builds on the emerging recognition that CE literature must address the initial underestimation of informality (Kirchherr et al., 2025), and it provides an account of how this have been documented in the last decades. The analysis includes publication trends, influential authors and journals, citation patterns, and keyword co-occurrence networks to elucidate the field's development, dominant research streams, and areas of fragmentation or integration.

2. Literature review

2.1. Conceptual domain and research context

Informal entrepreneurship (IE) and circular economy (CE) have evolved in separate scholarly traditions: the former has roots in institutional and development economics, while the latter originates in industrial ecology and sustainability business models. Despite these distinct origins, their practical convergence has increased significantly in recent years for several reasons.

First, the global sustainability agenda—encompassing awareness campaigns, policy discourse, and transition initiatives—has accelerated the creation and expansion of alternative consumption and production models. CE exemplifies this trend, entering the mainstream as countries from the EU to China adopted dedicated circularity strategies (Ghisellini et al., 2016; Blomsma & Brennan, 2017). This increased attention revealed critical CE implementation challenges, including the need to integrate informal workers into sustainable development pathways (UN, 2015; Schröder et al., 2019). Specific sectors, particularly urban waste management and informal recycling, gained visibility, making the boundaries—or their absence—between formal and informal systems increasingly evident.

A second factor of influence relates to the dominant policy approach that treats formalization as a mechanical, status-quo objective without genuinely understanding the ethical and efficiency costs. Unsurprisingly, top-down formalization efforts that displace or marginalize informal workers have repeatedly failed, often reducing overall recycling rates while destroying livelihoods (Gutberlet et al., 2017). Conversely, inclusive models that recognize informal workers as legitimate stakeholders—such as cooperative integration schemes in Brazil, Colombia, and India—demonstrate superior social and environmental outcomes (Dias, 2016; Scheinberg & Savain, 2015; Lohri et al., 2014). The concept of "just transitions" in circular economy scholarship increasingly emphasizes that sustainable resource systems must be socially equitable to be environmentally effective (Moreau et al., 2017; Friant et al., 2020).

Thirdly, an important factor of disruption around informality and circularity was represented by the COVID-19 pandemic. Beyond the crisis that enhanced vulnerability, the pandemic illustrated also the hidden dimensions of informal circular networks that make them so organic: rapid reorganization, creativity and a sense of resilience were demonstrated in response to lockdowns and mobility restrictions (Benson et al., 2021;

Hartmann et al., 2022). This unplanned natural experiment highlighted in a significant way that the academic understanding of such realities remains highly scattered and sometimes counterproductive.

Thus, a review of the nexus of informal entrepreneurship and circular economy that aims to organize and integrate knowledge from terminology to disciplines, to better account for geographical imbalances and context nuances, would contribute to both theory and policy debates.

2.2. Existing Reviews and Identified Gaps

There are a couple of recent reviews of informal entrepreneurship broadly defined, respectively of circular economy. On the one hand, Salvi et al. (2023) and Simba et al. (2023) examined different types of informal entrepreneurs, their motivations, activities and also variations among different contexts. Similar work is further narrowed for informal female entrepreneurship (Martins et al., 2024, Zucchella et al., 2025). However, these reviews largely neglect environmental dimensions, treating informal entrepreneurship primarily as a labor market or institutional phenomenon without interrogating its material or ecological characteristics. A recent study suggests that informal entrepreneurship has a positive impact on economic sustainability by expanding employment opportunities and enhancing income generation, particularly in institutionally fragile contexts (Baijou et al., 2026). However, the same study confirms that these benefits come with some associated costs in terms of social and environmental impact. Its findings underline that informal workers are less protected from labor laws, not included in social policies and informal activities harm the environment (Baijou et al., 2026). However, the existing literature barely connect the informal entrepreneurship with circular economy.

On the other hand, more work was devoted to analyze barriers and drivers of circular economy implementation, focusing predominantly on formal business contexts in industrialized economies (Heshmati, 2017; Merli et al., 2018). More recently, Kirchherr et al. (2023) emphasize that a fundamental shift is needed for CE, to be more inclusive on the North-South nexus among other. Thus, solving geographical and contextual blind spots is an important knowledge gap that needs to be addressed.

Existing research on informal entrepreneurship has largely examined motivations, survival strategies, and institutional conditions, while often neglecting its material and ecological dimensions (Brown and McGranahan, 2016). Emerging evidence suggests that informal actors play a crucial role in resource recovery and waste valorization systems, particularly in developing contexts (Linzner, 2013). Informal waste pickers, for instance, operate as necessity-driven entrepreneurs whose livelihoods are closely tied to circular practices such as reuse, recycling, and repair (Korsunova et al., 2022). In many developing regions, informal systems transform waste into economic resources, effectively functioning as organic circular economy mechanisms despite limited institutional recognition. Nevertheless, academic literature rarely integrates informal entrepreneurship explicitly within circular economy frameworks (Suchek et al., 2022), leaving a significant conceptual gap.

Methodologically, bibliometric analysis offers a complementary approach that addresses many limitations of traditional reviews while introducing distinctive analytical capabilities particularly suited to mapping emerging, interdisciplinary fields (Donthu et al., 2021; Mukherjee et al., 2022; Zupic and Čater, 2015). Considering the nascent level of integration between IE and CE, the method is a good fit to provide structural mapping, pattern detection, and quantitative benchmarking.

3. Methodology

The bibliometric analysis is built around the 3-step standard procedure: identification-selection-analysis. All of the stages are built departing from the SCOPUS database, a recommended choice in terms of broader coverage (e.g. 20% more than Web of Science, Falagas et al., 2008) and in general assessed as a high-quality bibliometric data source for academic research in quantitative science studies (Baas et al., 2020; Singh et al., 2021). The string of keywords considered usual terminology for both targeted concepts:

("informal entrepreneurship" OR "informal business" OR "informal sector" OR "informal economy" OR "shadow economy" OR "unregistered business") AND ("circular economy" OR "circularity")

The filters applied in the second stage of selection considered only the manuscripts written in English and those published in peer-reviewed journal articles. The first reason is eminently practical and commonly employed in terms of costs and time constraints (Neimann Rasmussen et al, 2018), but it also follows standardization recommendations expressed as consistent terminology, keywords, and citation patterns, all key issues in bibliometric research (Morrison et al., 2012). The second, the peer-reviewed criteria (thus the implicit exclusion of gray literature), acts as a indicator of publications quality (Linnenluecke et al., 2020), being a precedent encountered in such works (Öztürk et al., 2024). A final filter was applied to align the search with the aim of the paper, which anchors IE and CE under specific disciplines: Environmental Science; Social Sciences; Economics, Econometrics and Finance; and Business, Management and Accounting.

The last step consisted in downloading the dataset and preparing it for the VOSviewer (version 1.6.20) analysis. The file included keywords, titles, abstracts and citation records (Donthu et al., 2021). To maintain analytical clarity and avoid over-representing uncommon terms, we established a frequency threshold requiring keywords to appear in at least five different publications. This filtering process yielded 49 keywords that became the foundation for our network analysis.

The co-occurrence analysis was conducted using the binary counting method, where each keyword is counted once per document regardless of the number of times it appears. This approach was selected because it reduces the risk of over-representing frequently repeated terms within individual articles and is considered more appropriate for mapping conceptual structures in relatively small and emerging research fields (Jie et al., 2022). VOSviewer's automated clustering algorithm organized these keywords into three thematic groupings, each displayed in a distinct color within the network visualization. The resulting map shows keywords as points (nodes) with connecting lines (edges) indicating how frequently terms co-occur within the same publications. What materialized were three relatively distinct intellectual communities—separate yet occasionally intersecting streams of scholarship within this emerging field.

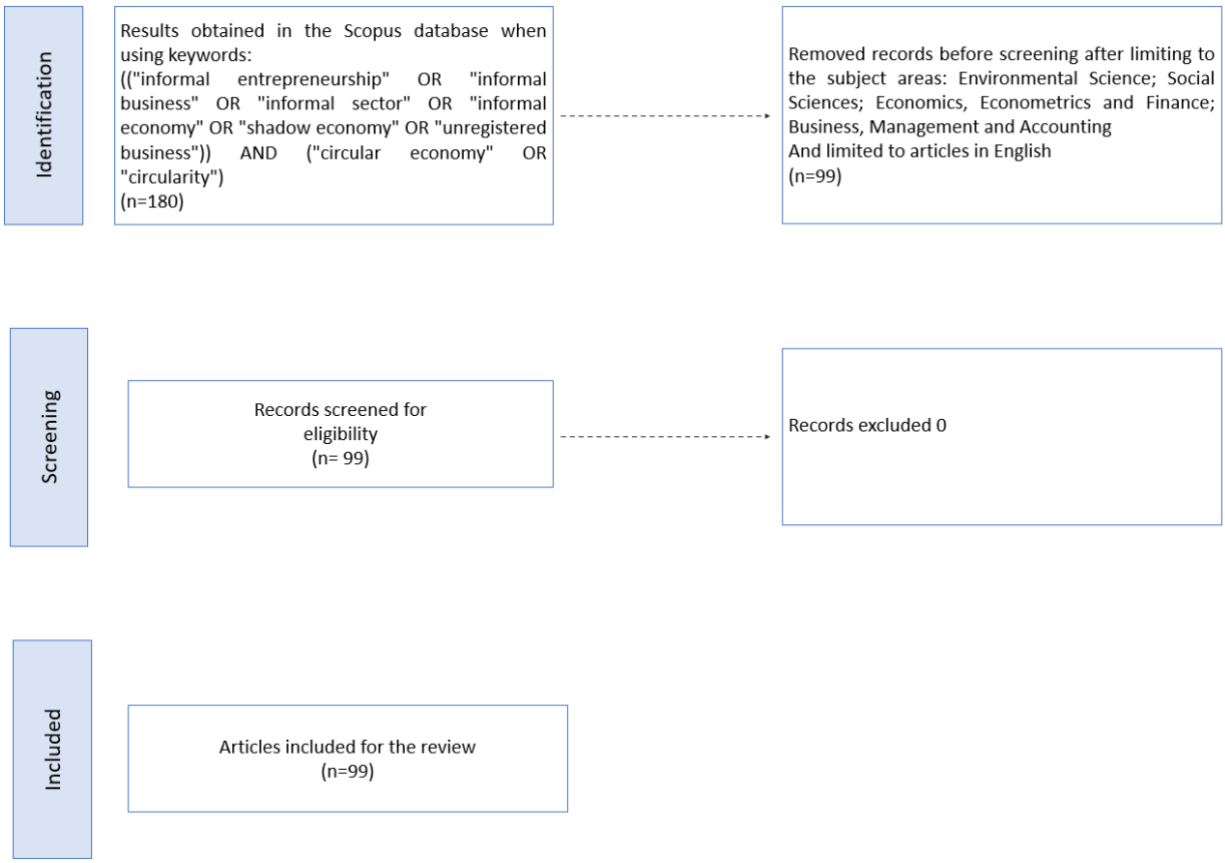

Figure 1. Data screening process. (Source: Authors' elaboration)

4. Results

4.1. Publication Trend Over Time and Space

The first insight obtained from the data reflects the temporal illustration of the concepts in academic publications, with important marks being observed starting with the mid-to-late 2010s. The growth was relatively modest until 2020 and then we observe fluctuations starting with the period of the COVID-19 pandemic. This is coherent with the research trends of that moment, oriented towards increasing resilience and intensifying sustainable iniatives across different sectors of activity and consumer habits (e.g. food waste management, Aldaco et al., 2020; plastic waste, Klemeš et al., 2020; consumption patterns, Roșu et al., 2020). Under these triggers, informality and circularity have extended as and reflection, individually and in interaction, showing the force of informal communities and networks to innovate and adapt through resource recovery, waste diversion, and livelihood generation (Benson et al., 2021; Kunz et al., 2021).

The rhythm of trend slowed down under normal conditions (around 2023) and then in retook a steady asceding pace, with publications doubling within a single year, by 2025. There are many reasons behind this growth, most of them converging into a recent recognition of informal systems as functional parts of circular economies, form the UN Sustainable Development Goals framework to cross-disciplinary research and national systems that attempt to integrate informality with circularity (e.g. Brazil, Rutkowski & Rutkowski, 2015; South Africa, Godfrey & Oelofse, 2017).

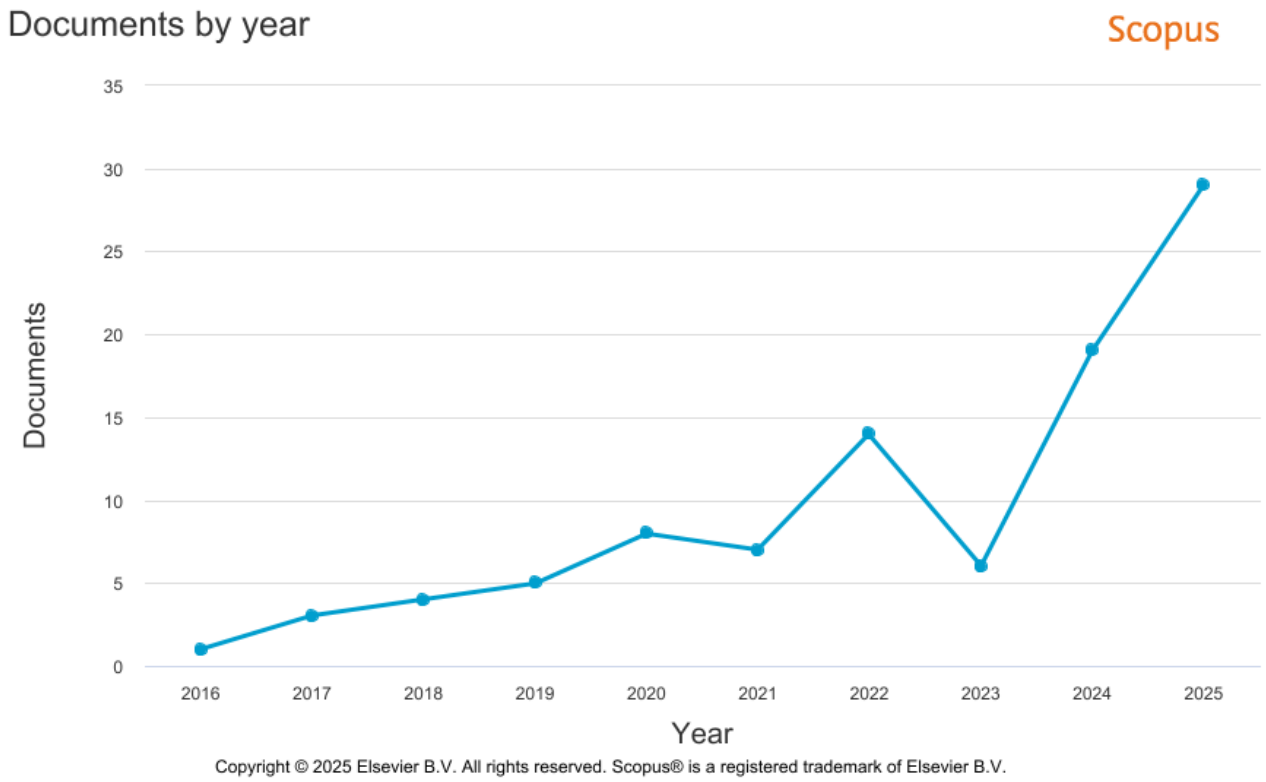

Figure 2. Publication trend over time

Moving towards the geographical distribution, figure 3 provides a ranking of the first 10 countries that examine the IE and CE in interaction. The top reflects a mix of North and South approaches, with Germany and the UK being on the first positions, and then various middle-income countries characterized by significant informal economies. The combination speaks about the transversal nature of the research, without any claim on balance and equity (e.g. there are many missing or underrepresented regions/countries, like Eastern Europe, Central Asia, much of sub-Saharan Africa, and the Pacific).

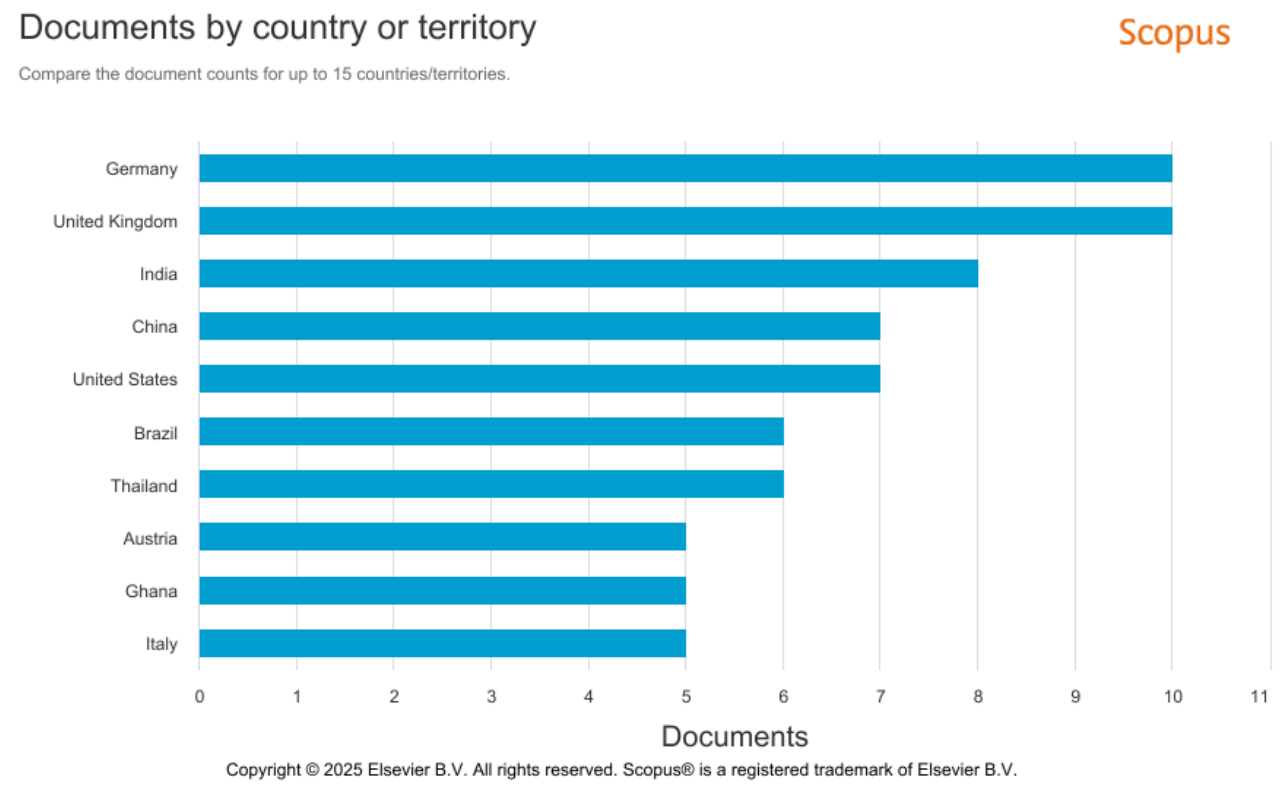

Figure 3. Geographic distribution of research

4.2. Authors and Publication Outlets

The distribution of authors and outlets is even more diversified and somewhat flatter, without dominant experts voices, as it can be observed in figure 1. The rather low number of publications, between 2 and 4, could suggest the absence of devoted schools or consolidated research programs focused on these topics.

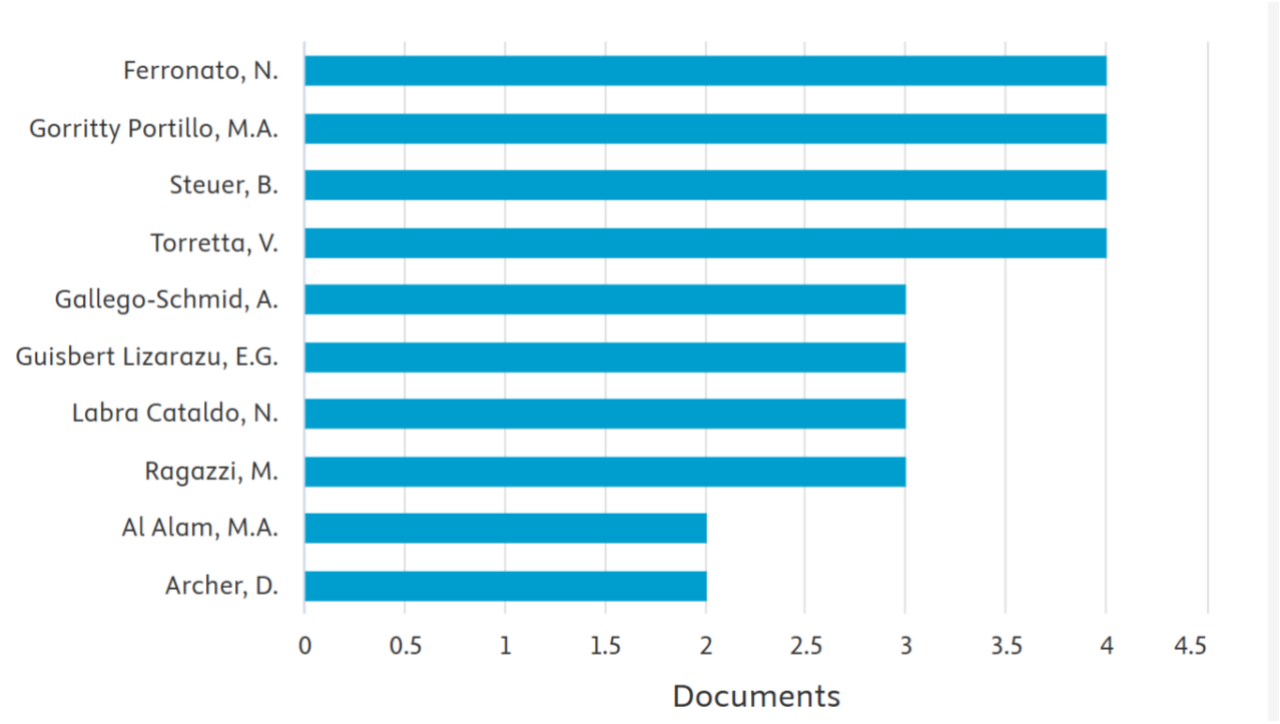

Figure 4. Documents by authors

This is further strenghten by the indepth view offered in table 1 that ranks 24 documents according to their total link strength in the bibliographic coupling network. The linkage scores are in general low, an indicative of fragmentation in terms references, and implicitly theoretical frameworks, debates and seminal works. Given the intersection between two strong concepts, the results is not completely surprising but rather a signal of how difficult is to consider trans-disciplinary views in practice, even when there is no conceptual justification, doubled by pragmatical evidence.

Table 1. Publications based on total link strength.

	Cluster	Total Link Strength	Total link strength	Total Citations
Cluster 1 (4 items)				
Devlin (2023)	1	3	3	4
Labra Cataldo (2024)	1	1	1	15
Valencia (2024)	1	9	10	2
Vanhuyse (2021)	1	2	2	78
Cluster 2 (4 items)				
Amato (2024)	2	3	3	3
Bening (2022)	2	3	3	33
Ferronato (2018)	2	2	2	59
Miranda (2020)	2	4	4	36
Cluster 3 (4 items)				
Ferronato (2019b)	3	2	2	301
Steuer (2016)	3	2	2	16
Steuer (2017)	3	10	10	11
Steuer (2018)	3	2	2	52
Cluster 4 (4 items)				
Hartmann (2022)	4	3	3	32
Moalem (2024)	4	2	2	4
Velis (2022)	4	2	2	52
Cluster 5 (3 items)				
Barford (2021)	5	2	2	61
Gall (2020)	5	10	12	132
Korsunova (2022)	5	4	5	65
Cluster 6 (3 items)				
Ferronato (2019a)	6	6	6	60
Nawaz (2021)	6	6	6	17
Nesheim (2025)	6	8	10	3
Cluster 7 (3 items)				
Gunarathne (2019)	7	2	2	43
Samarasinghe (2021)	7	1	1	27
Wilson (2023)	7	7	7	56

Table 2 continues the mapping by offering an account of academic disciplines involved in the study of IE and CE. Generic categories as environmental and social sciences are capturing most of the publication, with some granulation for subdisciplines in each case. Energy and engineering are surpassing economics and business as main fields, hinting towards a potential imbalance of priorities and understanding: the documented evidence is more organized in regard to environmental implications and technical conditions, but less is known about managerial challenges and economic impact. Given than CE is an alternative, albeit imperfect, economic

model, this ierarhy should motivate researchers to design studies that explicitly address more organizational, behavioral and business-like perspectives.

Table 2. Documents by subjects area

Subject area	Document
Environmental Science	81
Social Sciences	39
Energy	19
Engineering	15
Economics, Econometrics and Finance	12
Business, Management and Accounting	11
Computer Science	5
Earth and Planetary Sciences	3
Materials Science	3
Decision Sciences	2
Medicine	2
Agricultural and Biological Sciences	1
Arts and Humanities	1
Biochemistry, Genetics and Molecular Biology	1
Chemical Engineering	1

Citation patterns reveal that a relatively small group of publications has exerted outsized influence on how scholars think about circular economy implementation, waste governance, and the positioning of informal actors within these systems. This concentration is typical of fields in their formative stages, where a handful of early contributions set the terms of debate and anchor subsequent work.

Ranta et al. (2018), the most cited work with 516 citations, exemplifies an institutional deficit perspective: analyzing China's regulatory landscape, they frame informal economic activity as undermining circular economy policy—an obstacle to systemic circularity that persists precisely because enforcement mechanisms remain weak. This problem-oriented framing contrasts sharply with Ferronato et al.'s (2019) empirically grounded conclusion (301 citations) that informal sector actors actually drive most recycling progress in Global South contexts, even as inadequate monitoring systems obscure their contributions. The tension between viewing informality as policy failure versus practical solution intensifies in Murthy and Ramakrishna's (2022) influential work (219 citations despite recent publication), which advocates comprehensive legal reforms—extended producer responsibility, formalization pathways, technology upgrades—essentially proposing to replace informal systems with strengthened formal capacity. Yet Gall et al. (2020, 132 citations) directly challenge the technical assumptions underlying formalization imperatives: their case study demonstrates that informal collectors in lower-middle-income countries can recover plastic waste and process it into recyclates matching specifications from advanced formal systems in wealthy nations, suggesting quality concerns often mask institutional biases rather than reflect material realities. Bui et al. (2022, 136 citations) attempt to navigate this complexity by foregrounding circular resource governance and social imperatives as interdependent—acknowledging that informal sector dynamics, material flows, regulatory constraints, and waste processing technologies operate as entangled variables rather than isolated policy domains. Collectively, these highly cited works expose an unresolved scholarly debate: whether circular economy implementation requires formalizing (and potentially displacing) informal actors, integrating them as legitimate stakeholders, or fundamentally reconceptualizing what "formal" and "informal" mean in resource circulation systems.

Table 3. Articels with highest number of citatios

Authors	Article	Total citations
Ranta et al. 2018	Exploring institutional drivers and barriers of the circular economy: A cross-regional comparison of China, the US, and Europe.	516
Ferronato et al. 2019	Introduction of the circular economy within developing regions: A comparative analysis of advantages and opportunities for waste valorization	301
Murthy and Ramakrishna, 2022	A Review on Global E-Waste Management: Urban Mining towards a Sustainable Future and Circular Economy	219
Godfrey and Oelofse, 2017	Historical review of waste management and recycling in South Africa.	157
Bui et al. 2022	Opportunities and challenges for solid waste reuse and recycling in emerging economies: A hybrid analysis	136
Gall et al. 2020	Building a circular plastics economy with informal waste pickers: Recyclate quality, business model, and societal impacts	132

The distribution of publications across journals reveals a strong concentration of research within environmental and waste-focused outlets, highlighting the disciplinary orientation of the literature linking informal entrepreneurship to the circular economy.

Table 4. Journals with the highest number of publications

Journal	Number of publications
Waste Management and Research	7
Resources Conservation and Recycling	7
Waste Management	6
Sustainability Switzerland	6
Local Environment	4
Journal of Cleaner Production	4
Sustainable Production and Consumption	3
Recycling	3
Journal of Material Cycles and Waste Management	3
Journal of Environmental Management	3

5. Discussion and implications

Our keyword co-occurrence analysis of 99 Scopus-indexed publications revealed 49 keywords meeting the minimum threshold of five occurrences. The cluster analysis performed by VOSviewer distinguishes between thematic groups: (i) informality through the institutional lens; (ii) informality as promotor of sustainability; (iii) informality as organic practice.

Cluster 1 (Red, 21 items) approaches informality in a direct manner, through the relation with the state and governance systems, while circularity is rather marginally addreses in relation to waste management and potentially recycling. Namely, the observerd keywords are *waste management, developing countries, governance, municipal solid waste, converging towards* the role of public administration and urban service delivery frameworks. This mirrors what we know from the institutional asymetry theory in informal economy and underclared work, with a dominant perspective that informality is the result of weak institutions and incomplete modernization efforts. This is convergent with the cluster's geographic emphasis on developing countries where informality is presented as a transitional phenomenon usually tackled with measures aimed at reducing it as the institutional capacity grows.

Cluster 2 (Green, 19 items) approaches both informality and circularity with keywords like *circular economy, sustainability, sustainable development, recycling, e-waste, life cycle assessment*. The focus in this

case is much more constructive and pragmatical, with informal actors being considered active contributors to environmental and social sustainability (e.g. agents who close material loops, extend product lifespans, enable resource recovery, and support livelihoods in contexts where formal circular infrastructure is limited or nonexistent). The conceptual shift is significant: informality moves from problem to solution. Informal recyclers become circular economy practitioners, demonstrating material stewardship and resource efficiency even without legal recognition. This framing opens space for questions about inclusion, recognition, and formalization pathways that preserve rather than dismantle informal circular systems.

Cluster 3 (Blue, 9 items) reflects on informal practices, without connecting them with more comprehensive theoretical frameworks. The keywords—*waste pickers, informal sector, employment, recycling*—describe what informal actors actually do: how they collect materials, organize sorting operations, access markets, generate income, and participate in both local and global recycling value chains. This research tends to be empirically rich and geographically specific, often emerging from case studies in the Global South. Rather than debating whether informality represents institutional failure or sustainability innovation, this work takes informal recycling as a social and economic fact and investigates its mechanics. The focus on *employment* and *waste pickers* (as opposed to more abstract terms like "informal sector actors") suggests attention to lived experience, working conditions, and livelihood strategies.

These findings characterize an emerging research niche, without a stable focal point. Theoretically, this signals a lack of integration due to distinct epistemological commitments and normative orientations: governance scholars concerned with state capacity, sustainability scientists focused on environmental outcomes, and development researchers focused on problem-solving in the community. Some institutiional incentives—funding priorities, journal editorial policies, academic reward structures— could motivate academics to establish more cohesive collaborative and be more open towards new theories and evidences.

Practically, a first policy recommedation could be establishing a meaningul dialogue between parties. To this end, while formalization seems to be intrinsically complex, recognition is a much more feasible step that can signal a change of mindset. This can be further elaborated through hybrid governance models and more appropiate measurement and valuation frameworks (e.g. participatory tools, citizen science methods).

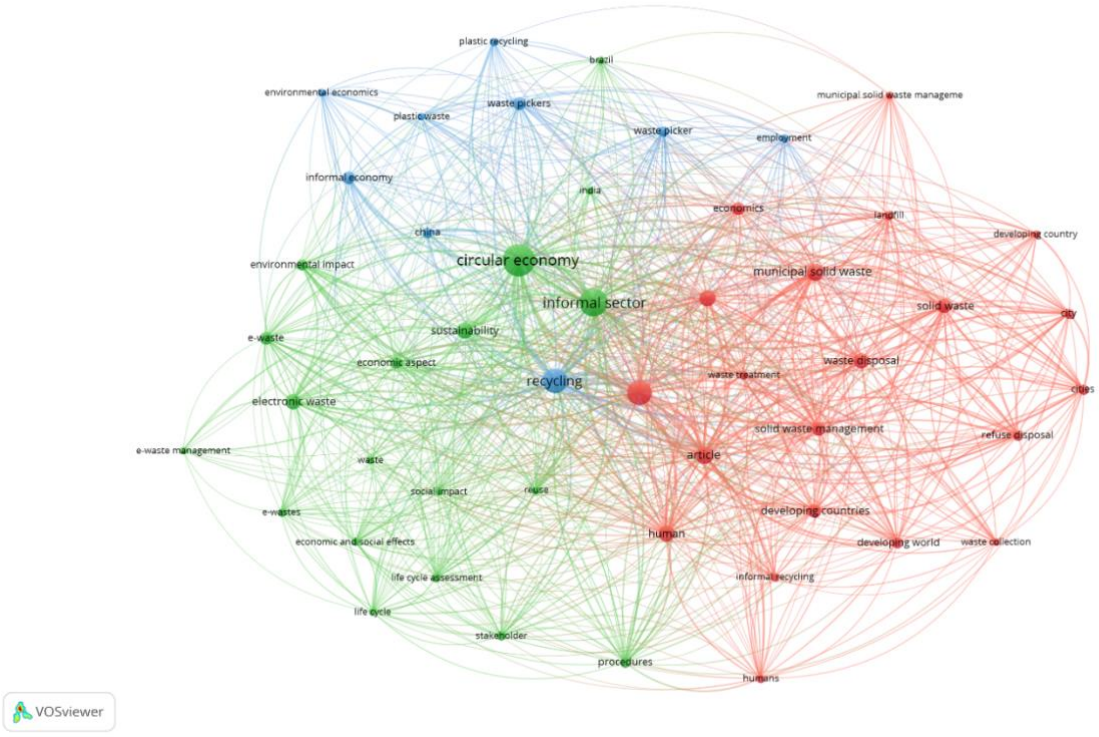

Figure 5. Maps of the keywords processed in VOSviewer (*Source: Author's elaboration using VOSviewer)*

6. Conclusions, discussions, limitations and future work

This bibliometric analysis systematically mapped scholarly output at the intersection of informal entrepreneurship and circular economy, examining 99 Scopus-indexed publications spanning 2000 to 2025. Our investigation reveals a research domain characterized by rapid recent growth, thematic fragmentation, and incipient but uneven internationalization. In other words, it is a field gaining momentum but not yet cohesion. The citation analysis empahsizes some of the hot points of the current debates, indicating areas like waste management governance or formalization pathways, but anchored in distinct theoretical frameworks. Finally, the cluster analysis complements this perspective but confirming the institutional view, the central link between informality and CE, respectively the practices without the theory. The co-occurrence analysis revealed three major clusters. The analysis uncovered that these two research domains integration remains an emerging research niche, without a stable focal point. Theoretically, this signals a lack of integration due to distinct epistemological commitments and normative orientations: governance scholars concerned with state capacity, sustainability scientists focused on environmental outcomes, and development researchers focused on problem-solving in the community.

This bibliometric analysis aimed to map the existing evidence that tries to connect informal entrepreneurship and circular economy. Beyond geographical distribution and citation analysis, the main finding is that there is a consistent fragmentation between these two research domains. Studies on informal entrepreneurship and the circular economy remain divided across institutional, sustainability, and practice-oriented perspectives, leading to inconsistent interpretations of informality as a barrier, an enabler, or simply an operational reality. This lack of theoretical convergence indicates that the field is still emerging rather than consolidated.

This fragmentation also has policy relevance, as differing scholarly narratives translate into competing approaches—formalization, inclusion, or technical efficiency—often without integration. The main contribution of this study is therefore to show that, despite growing publication activity, the literature remains weakly integrated, highlighting the need for greater theoretical and empirical convergence in future research.

Despite providing a structured and quantitative overview of the literature, bibliometric analysis is subject to several limitations. First, the study relies exclusively on the Scopus database, which, although comprehensive, does not fully cover all relevant publications. Important contributions indexed in other databases such as Web of Science, may therefore be omitted. Second, the analysis was restricted to English-language publications, potentially excluding valuable research published in other languages, particularly from regions where informal economic activity is most prevalent. Third, the study excludes grey literature, including policy reports, institutional publications, working papers, and practitioner-oriented studies, which are often highly relevant in fields such as informal entrepreneurship and circular economy but are not systematically indexed in academic databases.

Expanding the analysis on other databases and further narrowing down terminology through more concrete descriptors (waste picker cooperatives," "repair cafés," "reuse networks," or "second-hand markets) could respresent very approachable next steps. On a deeper level, the bibliometric approach is just a starting point that suggests the need for empirical and methodolodical diversification (e.g. longitudinal and comparative designs). Not last, it also suggest the need for research to more faster, and wiser, so that it produces convincing evidence with the power of informing policies in the direction of supporting informal entrepreneurs and circular economy innovators.

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Data Availability The data used in this study were retrieved from the Scopus database. The dataset generated and/or analyzed during the current study is available from the corresponding author upon request, subject to the terms and conditions of Scopus data access.

Declarations

Competing Interests The authors declare no competing interests.

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