









Review Article

Topic modelling and thematic analysis of research gaps and methodological innovations in rural sociology: A systematic review

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ABSTRACT

Rural sociology, shaped by enduring global forces such as globalisation, sustainability, and community resilience, continues to evolve as these themes remain central to understanding rural life. This study systematically reviews research from 2016 to 2024, employing bibliometric tools, topic modelling, and thematic analysis to assess current trends, influential works, and emerging themes in the field. Results indicate a significant reliance on case study methods, with Social Case Studies with Policy Implications showing an 82 % dominance. Meanwhile, Urban & Rural Comparative Studies reveal a growing adoption of machine learning methodologies (67 %), indicating an increasing integration of advanced analytical techniques. The use of case studies remained consistently high, ranging from 60 % to 85 % annually, while machine learning and regression techniques have shown a notable increase after 2020, reaching 15 % by 2024. This shift suggests a gradual adaptation to technological advances and improved data availability. International collaboration is also increasing, with 29.13 % of documents featuring co-authorships from multiple countries, though significant geographic disparities persist. The conclusions emphasise the importance of inclusive research practices, expanded mixed methods approaches, and greater attention to underrepresented regions. This study provides a foundation for future research by identifying existing methodological gaps and encouraging more diverse research collaborations to effectively address the complex dynamics of rural sociology.

1. Introduction

Rural sociology has increasingly become a crucial area of study, particularly in light of the profound transformations affecting rural areas worldwide (Flora et al., 2018; Bryceson, 2002). These transformations are driven by globalisation, technological advancement, and shifting socio-political dynamics, which significantly impact rural communities and their development. The uniqueness of this study lies in its use of novel analytical tools, including topic modelling and thematic analysis, to systematically explore and understand these evolving dynamics in rural sociology.

The relevance of this research is underscored by the rapid transformations affecting rural areas, particularly the advancement of digital technologies, which necessitate an updated understanding of the

evolving challenges and opportunities these communities face. The field of rural sociology is actively adapting to these technological developments; however, this adaptation has resulted in identifiable knowledge gaps that may impede effective policymaking and community development initiatives (Salemink et al., 2017; Mack et al., 2023). By employing advanced tools such as VOS Viewer and Bibliometrix, this study provides a fresh perspective on how rural communities are being shaped by global trends, emphasising underexplored areas and research gaps.

The scientific problem this study addresses is the lack of a comprehensive, quantitative analysis of the current landscape of rural sociology that also identifies thematic gaps and underrepresented perspectives. This problem is compounded by the diverse and complex factors influencing rural communities, such as environmental change, economic

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instability, and social inequality (Leong et al., 2016). By applying innovative methodologies, this study aims to bridge these gaps and provide a clearer, data-driven picture of where rural sociology is headed, thereby informing future research and policy directions.

2. Literature review

Rural sociology plays an essential role in understanding the social, economic, and environmental dynamics that shape rural life and development. Traditionally focused on agrarian issues and rural livelihoods, the field has expanded its scope to address broader concerns such as migration, globalisation, environmental sustainability, and technological advancements (Flora et al., 2018). Like other social science fields, rural sociology seeks to examine how rural communities interact with larger societal forces and how they adapt to or resist global changes, particularly in an era of rapid economic and environmental transformations (Woods, 2005).

Recent research in rural sociology has been influenced by three dominant streams of inquiry: livelihoods and resilience, rural-urban migration, and sustainable development. The livelihoods and resilience perspective explores how rural communities diversify their income sources to adapt to socio-economic uncertainty and external pressures such as globalisation and market fluctuations (Ellis, 2000; Dzobbenuku et al., 2021). The rural-urban migration stream investigates the increasing rural-urban linkages, with particular attention to how migration flows impact both rural and urban economics (Tacoli, 2003). Lastly, the sustainable development approach examines the intersection of rural life with environmental sustainability, advocating for policies that support rural resilience in the face of climate change and resource degradation (Bebbington, 1999; Bell, 2015).

As with many social science concepts, the terms “rural development” and “rural transformation” lack a singular, universally accepted definition. Within the context of rural sociology, development may be interpreted as economic modernisation, improved infrastructure, or sustainable livelihoods, depending on the context (Scoones, 2009). Different conceptual frameworks have emerged to address these variations, including the agrarian reform model, rural-urban linkages theory, and resilience thinking. For instance, Van der Ploeg (2009) argues that the new peasantry movement reflects resistance to global capitalist forces, promoting autonomy and sustainability in rural settings. Similarly, Rigg (2006) discusses the complex relationships between land, farming, and livelihoods, particularly in the rural South.

There is a debate around the definition of “rural success” within rural sociology. Scholars conceptualize rural success in diverse ways, with some emphasising economic performance and agricultural productivity (De Janvry & Sadoulet, 2000), while others focus on dimensions such as social cohesion, environmental sustainability, or cultural continuity (Shucksmith, 2018). This diversity reflects the complex, multidimensional nature of rural life and the varying priorities of different communities and stakeholders. Rather than seeking a single, standardised definition, it is widely recognized that the meaning of rural success is inherently context-dependent, shaped by local conditions, values, and policy objectives (FAO Food and Agriculture Organization, 2018). This context sensitivity allows for more nuanced and relevant assessments of progress and well-being in rural areas, accommodating the heterogeneity of rural experiences across regions and over time.

While general sociology textbooks often present a standardised set of core topics, rural sociology literature is characterized by its focus on themes specific to rural contexts, such as demographic change, economic and community development, spatial inequality, social institutions, education, food systems, and environmental issues (Flora et al., 2018; Woods, 2005). The distinctiveness of rural sociology arises from its historical development within the US land grant system and its enduring engagement with these substantive areas, rather than from debates about the coherence or content structure of textbooks (Lyson, 2004; Shucksmith, 2018).

Given the global pressures on rural communities—including climate change, technological innovations, and demographic shifts—there has been an increasing academic interest in understanding the evolving nature of rural sociology (Bock & Shortall, 2006). Scholars have explored the potential of digital technologies to bridge the rural-urban divide (Heeks, 2008) and the role of migration in shaping rural social and economic landscapes (Woods, 2005). However, despite these advancements, inconsistencies remain regarding the impact of these changes on rural communities. Some studies indicate positive impacts, such as increased access to information and economic opportunities (Tacoli, 2003), while others point to challenges like depopulation and social disintegration (Shucksmith, 2018).

In light of these challenges, it is essential to examine how rural sociology has evolved in response to globalisation, sustainability, and community resilience, while also identifying influential works, collaboration trends, and prevailing theories. This bibliometric review aims to explore these aspects by analyzing publications, authorship patterns, citation networks, and common themes, with the following objectives:

1. To analyse the evolution of rural sociology research over time.
2. To identify the most cited and influential authors in the field of rural sociology.
3. To determine the most influential works that have shaped rural sociology as a discipline.
4. To explore trends in author and country collaborations within rural sociology research.
5. To identify common themes and theories that dominate rural sociology literature.
6. To highlight research gaps and emerging areas of interest within rural sociology.

This bibliometric review will utilize publication analysis, authorship patterns, citation networks, and thematic analysis to achieve these objectives, providing a comprehensive overview of the field’s development and its future trajectory. This analysis will provide insights into the current state of rural sociology and offer guidance for future research, particularly as rural communities navigate the pressing challenges of sustainability, migration, and technological change.

3. Materials and methods

The methodology for this study adopts a systematic literature review approach, as defined by Fink (2020), which is characterised as a systematic, explicit, and reproducible method to identify, evaluate, and interpret the existing body of literature related to a specific topic. This literature review aimed to capture the direction of rural sociology by analysing trends and research themes.

Fig. 1 provides a PRISMA flow diagram illustrating the study selection process. This figure directly addresses the research question by demonstrating the systematic approach used to filter studies and select influential works. Moreover, it helps answer “RQ3” by showcasing the criteria used to identify the most impactful studies in the field. The diagram outlines the progression from the initial identification of records to the final inclusion of studies, providing transparency in the study selection process.

The review process was informed by Saunders et al. (2019), which comprised the following five steps:

- a. Formulating research questions.
- b. Searching for relevant literature from both online databases and other sources.
- c. Selecting and evaluating studies based on predetermined inclusion and exclusion criteria.
- d. Analysing and synthesising the selected literature.
- e. Reporting the results.

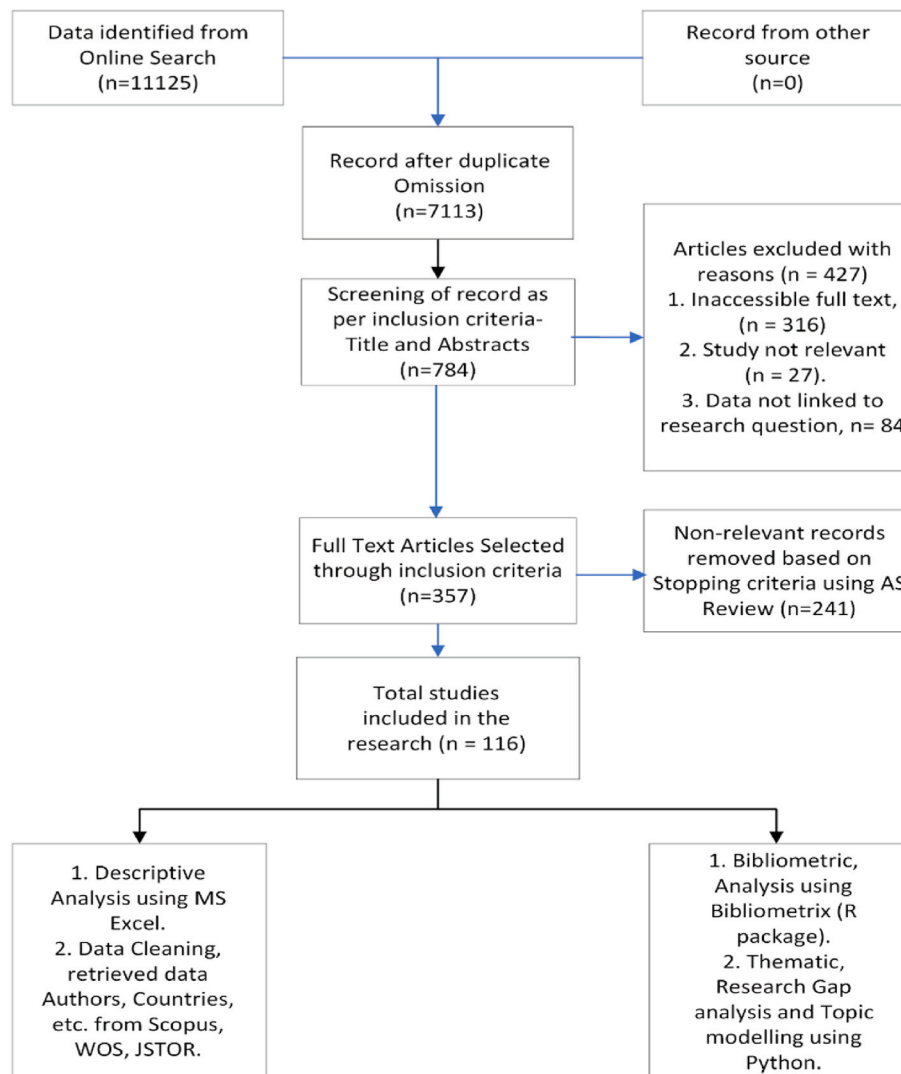


Fig. 1. PRISMA flow diagram for inclusion of studies and exclusion reasons, formulated by authors using Microsoft Visio (2016).

The following research questions guided the systematic review:

- RQ1.** How has research on rural sociology evolved over time, particularly in the context of globalisation, sustainability, and community resilience?
- RQ2.** Who are the most cited and influential authors in studies focused on rural sociology?
- RQ3.** What are the most influential works that have shaped the field of rural sociology?
- RQ4.** What are the trends in cooperation among authors and countries in rural sociology research?
- RQ5.** What are the common themes and most-referred theories among researchers in rural sociology?

In line with Saunders' model, the research questions aimed to explore how rural sociology has evolved in the context of globalisation, sustainability, and community resilience, identifying key authors, influential studies, and emerging thematic areas. This structured approach facilitated a comprehensive understanding of the topic and ensured the rigour of the review process. The literature review was conducted through searches in five major databases: Scopus, Web of Science, JSTOR, ProQuest, and ScienceDirect. These databases were selected to ensure comprehensive coverage of high-quality,

multidisciplinary, and peer-reviewed literature relevant to rural sociology. These platforms collectively capture a broad spectrum of scholarly articles, historical works, dissertations, and grey literature, maximising the retrieval of both foundational and emerging research across the social sciences. We used keywords like "rural sociology", "rural studies", "rural communities", "rural life", "sustainable development", "community resilience", and "agriculture and society". To ensure comprehensive coverage, the selection of keywords followed an established process as recommended by Creswell & Creswell (2018), which includes consulting recent literature and experts to identify relevant terms. Searches were confined to studies published between 2016 and 2024 in English or with available translations, a timeframe selected to capture the unprecedented transformations affecting rural sociology, including rapid artificial intelligence integration, accelerated digitalisation, and the societal impacts of the COVID-19 pandemic.

The search terms had to be present in titles, abstracts, or keywords to ensure a high level of relevance. Despite various filters, some irrelevant publications remained; these were subsequently eliminated after reviewing their abstracts. Additionally, ASReview powered by AI was used to select and filter the most suitable studies based on the adopted criteria (Van de Schoot et al., 2021). The PRISMA flow diagram (Fig. 1) illustrates the selection process and exclusion reasons.

To address concerns regarding the quality and reliability of the sources included in this review, stringent inclusion criteria were

implemented. Specifically, only articles published in journals indexed by Scopus or Web of Science were considered eligible. Furthermore, these journals were required to possess either an established impact factor or a quartile (Q) ranking, ensuring that all selected publications met recognised standards of academic rigour and impact. This approach aligns with best practices for systematic literature reviews, as outlined by Fink (2020), and is consistent with the methodology employed in recent bibliometric analyses in rural sociology, which emphasise the importance of transparent and reproducible selection criteria to enhance the credibility and comparability of findings (Saunders et al., 2019; Van de Schoot et al., 2021). The reliance on impact factor and quartile rankings, as determined by major indexing platforms, is widely recognised as a means to benchmark journal quality and scholarly influence (Clarivate, 2024; Editage, 2024). In our study, we used normalised citation counts following the bibliometric methodologies advocated by Bornmann (2020). This approach combines citing-side normalisation and citation percentiles, ensuring fair selection of the most cited articles across different fields.

The thematic analysis began with a systematic cataloguing of study titles, abstracts, keywords, and measured outcomes in MS Excel. Bibliometrix was used to visualise and analyse bibliometric maps, uncovering relationships among research clusters, author collaborations, institutional contributions, and thematic trends in rural sociology. Network analysis highlighted influential studies and researchers, revealing research gaps and future directions. (Batista-Canino et al., 2024; Firdaniza et al., 2022; Oppioli et al., 2023). Python was employed for topic modelling, identifying trends and gaps through natural language processing, enabling efficient selection of relevant papers and identification of key research topics (Principe et al., 2022; Pugliese et al., 2024). Additionally, the *metaknowledge* package in Python offers optimised tools for network analysis, further enhancing quantitative outputs such as computational text and network analysis (McLevey & McIlroy-Young, 2017). The analysis of geographic, methodological, and research area gaps was conducted using Bibliometrix and Python highlighted underrepresented regions and approaches in the literature.

The combination of these tools streamlined the literature review process, offering automation in analysing research articles and providing insights into research trends and gaps (Mortenson & Vidgen, 2016). The systematic literature review, supported by Python scripts and Bibliometrix, thoroughly mapped the field's intellectual landscape and identified key research gaps, particularly in regional and methodological areas, laying the groundwork for future research in rural sociology.

4. Results

The results and analysis section presents tables and figures derived from the systematic literature review spanning 2016 to 2024. Each table and figure is designed to answer specific research questions (RQs) that were formulated to explore the current landscape of rural sociology during this transformative period.

The data in Table 1 reveals several important trends in rural sociology research:

1. Recent focus: With a time span of 2016–2024 and an average document age of 2.17 years, the field is clearly focused on recent developments.
2. Declining growth rate: The negative annual growth rate (−7.34 %) suggests a slight decline in publication volume, which could indicate either a maturing field or shifting research priorities.
3. Collaborative nature: The high number of co-authors per document (3.87) and the significant percentage of international co-authorships (29.13 %) demonstrate strong collaboration trends, both domestically and internationally.

Table 1

Overview of literature data sources (RQ1 and RQ4).

DESCRIPTION	RESULTS
Timespan	2016:2024
Sources (Journals, Books, etc.)	447
Documents	1016
Annual Growth Rate %	−7.34
Document Average Age	2.17
Average citations per doc	11.85
Keywords Plus (ID)	3545
Author's Keywords (DE)	3382
Authors	3760
Authors of single-authored docs	183
Single-authored docs	184
Co-Authors per Doc	3.87
International co-authorships %	29.13
Research Article	1006
Review	10

4. Keyword richness: The large number of keywords (3545 Keywords Plus and 3382 Authors' Keywords) indicates a diverse range of topics within rural sociology.
5. Dominance of research articles: The overwhelming majority of documents are research articles (1006) compared to reviews (10), suggesting a field focused on primary research rather than synthesis.

The low number of review articles presents a prospect for synthesising work in the field, which could help consolidate knowledge and identify new research directions. To address RQ1 and RQ4, we refer to Fig. 2 below illustrating Country Scientific Production, which unveils a stark contrast in research output across different regions (see Table 2).

The United States and China emerge as clear leaders in terms of sheer volume of publications, followed by a cluster of European countries. This concentration of research in certain regions is indicative of the resources, academic infrastructure, and perhaps the prioritisation of rural sociology as a field of study in these nations. The dominance of these countries in research output likely reflects their robust academic traditions, well-established funding mechanisms, and the presence of numerous institutions dedicated to rural studies.

However, this concentration also highlights a significant imbalance in global research representation. Many parts of the world, particularly in the Global South, appear to have a limited contribution to the field, at least in terms of the quantity of publications. This underrepresentation is particularly concerning given that many of these regions face pressing rural challenges that could benefit from increased scholarly attention. The apparent lack of research output from large parts of Africa, South America, and parts of Asia suggests a research gap and a potential disconnect between where rural issues are most acute and where they are most studied.

Interestingly, Fig. 3, which depicts the Most Cited Countries, adds another layer of complexity to this geographic analysis. The geographic distribution of rural sociology research, as revealed by Figs. 2 and 3, presents a complex landscape of scientific production and impact across different countries. This analysis provides crucial insights into addressing RQ1 and RQ4, which seek to understand the globalisation of the topic and the trends in cooperation among authors and countries in rural sociology research.

While countries like the United States and China lead in terms of research volume, it is notable that smaller nations such as Singapore and Finland top the list in terms of average citations per article. This discrepancy between the quantity of output and citation impact is revealing. It suggests that while some countries may produce a large volume of research, the work emerging from other nations may have a disproportionately high impact on the field.

The high citation rates for countries like Singapore and Finland could be attributed to several factors. These might include a focus on niche or cutting-edge areas of rural sociology, high-quality research

Table 2
Key Insights, Research Gaps identified from most cited studies.

S#	Author Name (Year)	Study Title	Key Insights	Research Gap Identified	Challenges	TC
1	Salemink, K; Strijker, D; Bosworth, G (2017)	Rural development in the digital age: A systematic literature review on unequal ICT availability, adoption, and use in rural areas	Urban-rural digital gaps are growing; policies lag behind change; low skills in rural areas slow tech uptake.	Few place-based studies link connectivity with digital inclusion to craft targeted policies for excluded rural communities.	Speeding up infrastructure roll-out, tailoring solutions to varied local needs, and boosting digital literacy amid scarce resources.	612
2	Bock (2016)	Rural marginalisation and the role of social innovation: a turn towards nexogenous development and rural reconnection	Social innovation, driven by local civic-cross-sector collaboration, offers a “nexogenous” path to reverse rural marginalisation.	We still lack comparative evidence on the conditions that make rural social innovation succeed.	Scarce funding, low local capacity, and complex multi-actor coordination hinder scaling and sustainability.	368
3	Leong et al. (2016)	The emergence of self-organizing e-commerce ecosystems in remote villages of China: A tale of digital empowerment for rural development	Taobao Villages show how e-commerce can digitally empower remote communities, allowing them to self-organise and drive their own development.	We still know little about how digital-empowerment pathways vary across settings or how the ecosystem’s social side-effects evolve over time.	Providing equitable digital access, coping with unintended consequences, and coordinating multiple actors to keep the ecosystem viable.	306
4	Neumeier (2017)	Social innovation in rural development: identifying the key factors of success	Article identifies three tiers of factors drive successful rural social innovation.	Limited comparative tests of which factors matter most across cases.	Many drivers lie outside policy control, making top-down steering hard.	233
5	Philip, L., Cottrill, C., Farrington, J., Williams, F., & Ashmore, F. (2017)	The digital divide: Patterns, policy and scenarios for connecting the ‘final few’ in rural communities across Great Britain	Fine-grained maps reveal an entrenched urban-rural broadband divide in GB.	Need “future-proof” telecom policies to stop new gaps emerging.	Extending infrastructure to remote areas, affordability, policy inertia.	210
6	Müller & Korsgaard (2017)	Resources and bridging: the role of spatial context in rural entrepreneurship	Spatial context shapes two modes of rural venturing: resource endowment & spatial bridging.	Mechanisms by which external value circulates back to rural locales remain unclear.	Accessing external networks, limited resources, building bridging capacity.	212
7	Park S. (2017)	Digital inequalities in rural Australia: A double jeopardy of remoteness and social exclusion	Remoteness plus socio-demographics create a “double jeopardy” of exclusion.	Integrated strategies that balance supply (infrastructure) and demand (skills) are understudied.	High rollout costs, low skills, vast distances.	181
8	Castro-Arce K; Vanclay F. (2020)	Transformative social innovation for sustainable rural development: An analytical framework to assist community-based initiatives	“Bottom-linked” governance can scale social innovation via bridging roles.	How to replicate & scale governance changes in diverse contexts.	Sustaining multiple bridging roles, sharing power, scaling impact.	175
9	Monnat, S. M.; Brown, D. L. (2017)	More than a rural revolt: Landscapes of despair and the 2016 Presidential election	Counties suffering high economic distress, drug-mortality and social disintegration were disproportionately likely to vote for Trump, showing that “despair” factors—not rurality alone—drove support.	Need longitudinal and comparative studies to test whether despair indicators continue to shape political behaviour and how policy interventions modify these patterns.	Reversing entrenched economic decline, opioid and health crises, and data limits on multi-scale “despair” metrics.	154
10	Philip L; Williams F. (2019)	Remote rural home-based businesses and digital inequalities: Understanding needs and expectations in a digitally underserved community	Fit-for-purpose broadband is vital for rural micro-firms, yet gaps persist post-deployment.	Long-term effects of upgrades on business performance remain unknown.	Unreliable connectivity, skill deficits, risk of falling further behind.	146

Note: TC = Total Citations.

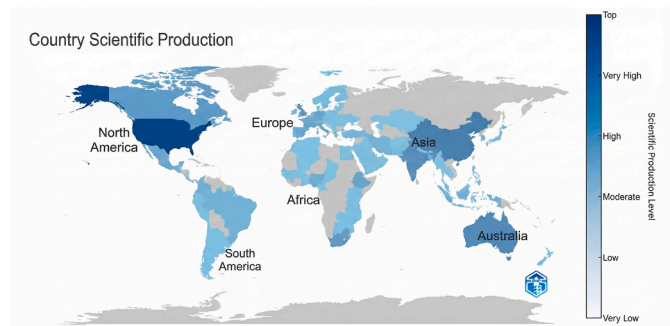


Fig. 2. Country Scientific Production (RQ4), created by authors using Bibliometrix.

methodologies, or perhaps the ability to draw generalisable conclusions from their specific contexts. It is also possible that researchers in these countries are more effectively engaging with international academic networks, leading to higher visibility and citation of their work. This dichotomy between volume of output and citation impact raises important questions about how we measure influence and contribution in the field of rural sociology. It suggests that a nuanced approach is necessary when considering the global landscape of research in this area, one that considers both quantity and quality metrics.

Fig. 4 provides data on the corresponding authors’ countries, categorising publications by whether they are single country publications (SCP) or multiple country publications (MCP). The United States, China, and India are the leading countries for corresponding authorship, with a substantial share of multiple country collaborations, which helps answer RQ4 by depicting international cooperation trends.

The geographic distribution of rural sociology research shows clear patterns of international collaboration, especially in countries like the United States, China, and India. These countries dominate in multi-

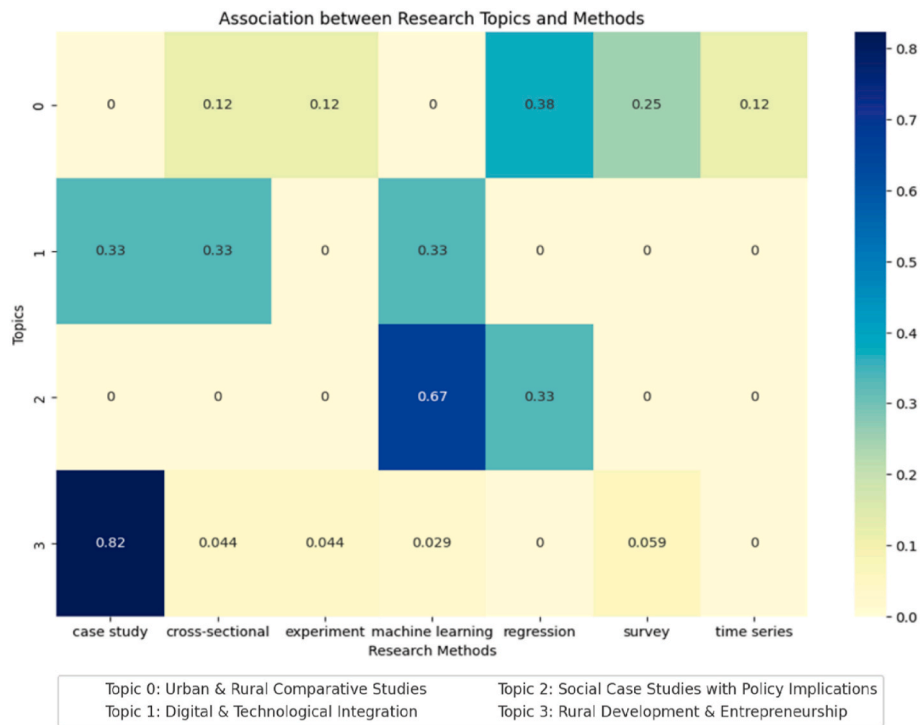


Fig. 6. Association Between Research Topics and Methods (RQ5), created by authors using Python.

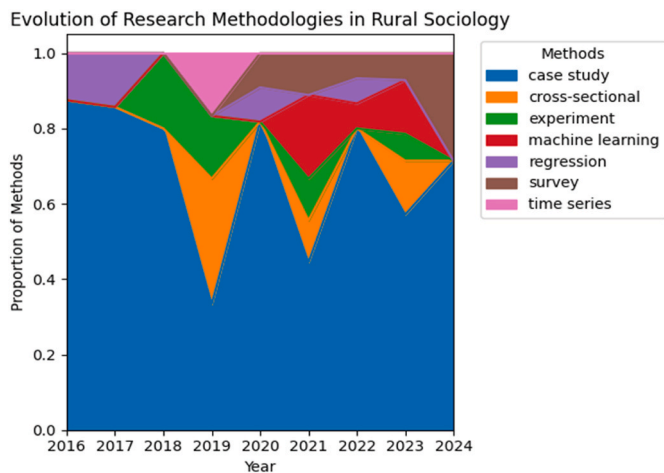


Fig. 7. Evolution of Research Methodologies in Rural Sociology (RQ1), created by authors using Python.

Fig. 7 below shows the evolution of research methodologies in rural sociology from 2016 to 2024. Case study methods consistently dominate, representing between 60 % and 85 % of methodological choices each year, with a noticeable peak in 2020. The use of machine learning, regression, and experimental methods began increasing notably after 2020, with machine learning reaching around 15 % in 2024. Cross-sectional and survey methods showed fluctuations, peaking in 2018 and 2021, respectively. Time-series analysis remains minimally used, barely exceeding 5 % in any year. This methodological evolution, addressing Research Question 5 (RQ5), suggests a gradual incorporation of diverse approaches, influenced by technological advancements and new data availability. However, the overall reliance on traditional methods like case studies indicates that further diversification is needed to fully leverage modern techniques and provide comprehensive insights into rural sociology.

The analysis reveals several key findings. Case studies dominate the literature, providing valuable in-depth insights but also suggesting an overreliance on this method. Topics like rural development and community resilience could benefit from complementary quantitative approaches to improve generalisability. Case studies and other qualitative methods remain central in rural sociology because they provide essential, in-depth insights into the unique, place-based dynamics of rural communities. However, the field's strong reliance on these approaches can limit generalisability and comparability across contexts.

Mixed-methods approaches are underutilised, especially in areas like sustainable agriculture and rural-urban migration, where integrating qualitative and quantitative insights could be highly effective. Advanced analytics, such as machine learning and big data, are emerging in some areas like digital rural development but remain limited in others, such as rural poverty and food security, which could greatly benefit from their application.

Many topics lack long-term, longitudinal studies, particularly in areas like climate change adaptation and the impact of rural education policies, which need more temporal perspectives. Participatory methods are also underexplored, especially in areas like rural governance and local knowledge systems, despite their presence in some community-based studies. This gap analysis not only identifies methodological shortcomings but also highlights opportunities for innovative research designs. Encouraging diverse methodological approaches can foster a more holistic understanding of complex rural issues.

Moving forward, there is a need for greater integration of mixed-methods approaches, especially in areas like rural entrepreneurship and social capital formation (Musinguzi et al., 2023). More longitudinal studies are needed to capture long-term trends in rural demographic shifts and technological adoption. Advanced analytics and big data methods should be applied more broadly in traditional rural sociology topics, such as agricultural economics and land use patterns. Expanding participatory research methods in policy-related topics would help incorporate local knowledge and perspectives more effectively. Addressing these methodological gaps will enhance the analytical rigour and practical relevance of rural sociology, leading to more comprehensive and impactful research outcomes.

An in-depth bibliometric analysis helped us identify key influencers and seminal works in rural sociology. This was done to identify important foundational literature and emerging thought leaders in the field. To enhance our understanding of the most critical topics, research gaps, and limitations in the field of rural sociology, we refer to [Table 1](#). This table highlights the most cited studies, key insights contributing to the field, the research gaps identified, and the challenges these studies faced. Through an analysis of these frequently cited works, several trends and research priorities in rural sociology emerge, helping to frame future areas of investigation and address Research Question 2 i.e. [RQ2](#). In this study, we used normalised citation counts following the bibliometric methodologies advocated by [Bornmann \(2020\)](#). This approach combines citing-side normalisation and citation percentiles, ensuring fair selection of the most cited articles across different fields.

The top-cited work by [Salemink et al. \(2017\)](#) with 612 citations—centres on rural development in the digital age, signalling how critical ICT access has become to contemporary rural sociology discourse. By documenting the persistent and widening digital infrastructure gap between urban and rural areas, the authors elevate digital connectivity to the forefront of rural development debates. Their call for place-specific, “customised” policies that integrate both connectivity and digital inclusion goals has shaped subsequent scholarship and policy discussions, emphasizing that equitable digital access is now a cornerstone of sustainable rural progress.

[Bock's \(2016\)](#) article, “Rural Marginalisation and the Role of Social Innovation: A Turn Towards Nexogenous Development and Rural Reconnection,” has garnered well over 350 citations, underscoring its impact on rural sociology discourse. The study reframes the urban–rural divide by introducing a “nexogenous” development paradigm in which grassroots social innovation—fostered through collaboration between local communities, external networks, and multiple governance levels—drives renewed socioeconomic vitality in marginalised countryside areas. By showing that rural well-being now hinges less on top-down investment and more on civic self-reliance, relational networks, and place-based creativity, Bock shifts policy conversations towards enabling environments for community-led change and cross-territorial partnerships. The paper’s call for deeper, comparative evidence on how such initiatives take root across diverse contexts continues to shape both scholarly research agendas and practical rural development strategies.

[Leong et al.'s \(2016\)](#) article in “MIS Quarterly”—already cited more than 230 times—has become a touchstone for research on ICT-enabled rural development. Examining two “Taobao Villages” in remote China, the authors demonstrate how e-commerce platforms can spark “self-organising ecosystems” in which local entrepreneurs, logistics providers, and support institutions co-evolve around digital marketplaces. By foregrounding the notion of “digital empowerment”, the study challenges the prevailing view of rural communities as passive recipients of top-down aid, showing instead that appropriate digital affordances can let them orchestrate their own development trajectories. The paper’s nuanced account of both the benefits (new income streams, local job creation) and unintended consequences (dependency on a single platform, new inequalities) continues to shape debates on inclusive digital economies and the governance of platform-based rural entrepreneurship.

Drawing on two “Taobao Villages”, [Leong et al. \(2016\)](#) show how a readily available e-commerce platform can seed a self-organising rural ecosystem, empowering local entrepreneurs, logistics brokers and service providers to co-evolve without top-down aid. The paper coins “digital empowerment” to explain this bottom-up dynamic and highlights both new income streams and unintended dependencies on a single platform. Future research must compare empowerment pathways across contexts and track long-term social side-effects, while practitioners face the triple task of extending affordable access, cushioning negative knock-ons, and coordinating many actors to keep the ecosystem viable.

[Neumeier \(2017\)](#) utilises a theory-guided review to identify three tiers of success factors—process, room-to-manoeuvre and participation—that together drive effective rural social innovation. Because most drivers sit outside direct policy control, the article warns that social innovation cannot simply be “rolled out” from above, calling for comparative empirical tests of which factors matter most and when. For policymakers this means supporting enabling environments rather than prescribing solutions.

[Philip et al. \(2017\)](#) analyse detailed Ofcom data to reveal that Britain’s urban–rural broadband gap is not closing but deepening into pockets of “final-few” exclusion. By pairing national maps with village vignettes, the authors expose how sluggish, piecemeal policies leave remote households and firms behind. They argue for “future-proof” telecom strategies that anticipate escalating speed benchmarks; the practical challenge is funding last-mile infrastructure while ensuring affordability and regulatory agility.

[Müller & Korsgaard \(2017\)](#) present a 28-venture case study that uncovers two modes through which rural entrepreneurs leverage place: drawing on local resource endowments and bridging to external networks. The article synthesises these into a typology that enriches theorising on rural entrepreneurship but concedes that we still lack clarity on how value created elsewhere recirculates locally. Entrepreneurs must cultivate bridging ties despite thin networks and scarce resources, while policymakers can bolster “bridging capacity” with connector programmes.

[Park \(2017\)](#), using Australian Bureau of Statistics data, demonstrates that remoteness plus socio-demographics creates a double jeopardy: even where infrastructure reaches rural areas, lower education and employment compound digital exclusion. Effective inclusion thus needs integrated supply-and-demand strategies—building networks and digital skills in tandem—yet vast distances, low population density and skill gaps make this costly and complex.

[Castro-Arce and Vanclay \(2020\)](#) introduce a “bottom-linked governance” framework where bridging organisations connect grassroots initiatives with higher-level institutions, enabling transformative social innovation to scale sustainably. Tested through a Costa Rican case, the model pinpoints five bridging roles (network enabler, knowledge broker, etc.). Open questions concern replicability across cultures and how to maintain multiple roles over time; sustaining trust, shared power and resources are key practitioner challenges.

[Monnat and Brown \(2017\)](#), analysing county-level data for the 2016 US election, find that areas marked by economic distress, drug mortality and social disintegration—labelled as “landscapes of despair”—were especially likely to swing to Trump, implying that despair rather than rurality per se shaped voting. They call for longitudinal work to see whether these indicators continue to drive political behaviour and how targeted interventions might blunt despair. The policy hurdle is reversing entrenched decline while simultaneously tackling opioid and health crises.

[Philip and Williams \(2019\)](#) use case studies of micro home-based businesses in a digitally underserved Scottish community to reveal that “fit-for-purpose” broadband is indispensable yet still unreliable post-deployment, with firms improvising costly workarounds. While upgrades promise inclusion, their long-term effect on business growth remains unmeasured. The enduring obstacles are service instability, skill deficits and the risk of falling further behind as digital standards rise.

[Fig. 8](#) illustrates the evolution of top keyword pairs over time in rural sociology research from 2016 to 2024. This figure is obtained by utilising advanced topic modelling via Python from study titles, keywords, and abstracts. Topics like “Financial development - Panel co-integration” and “Entrepreneurship - Social capital” are established areas of inquiry, reflecting growing interest in economic sustainability and entrepreneurship in rural areas.

Conversely, “Digital divide - ICT” shows fluctuating interest, highlighting both advancements and ongoing challenges in rural technology adoption. Renewed interest in “Rural areas - Training” and “Social

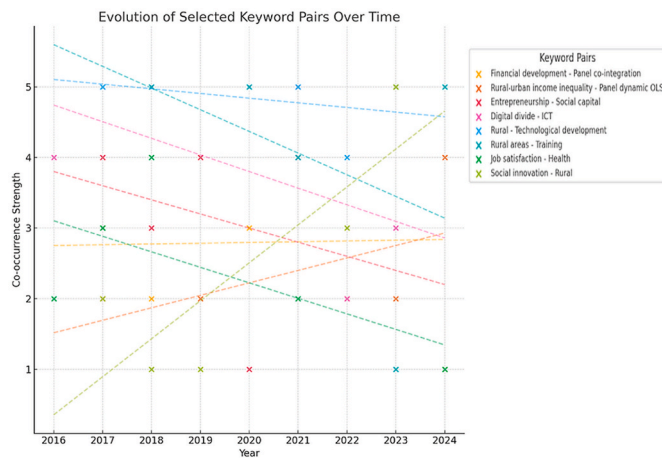


Fig. 8. Evolution of Top Keyword Pairs Over Time (RQ5), created by authors using Python.

innovation - Rural” indicates the importance of skill-building and innovative solutions to address rural issues. Declining emphasis on “Job satisfaction - Health” suggests a shift towards broader socioeconomic indicators, prioritising economic resilience and digital inclusion over individual health metrics. These shifts indicate evolving policy priorities, such as financial sustainability, social capital development, and technological integration in rural areas. Fig. 8 addresses RQ5 by capturing the dynamic evolution of research themes, highlighting how rural sociology adapts to economic, policy, and social changes. It underscores the fluid nature of research priorities, driven by shifting needs and challenges in rural communities. This trend suggests a focus on economic empowerment and financial inclusion in rural settings.

Fig. 9 (Future Research Areas Based on Topic Modelling Using Python) highlights emerging and relevant research areas from 2016 to 2024. Using Python-based topic modelling, we identified key themes such as citizen satisfaction, urban disparities, rural education, and TPACK (Technological Pedagogical Content Knowledge, a framework for integrating technology in teaching). These themes highlight a shift in rural sociology towards broader interdisciplinary concerns. This trend expands beyond traditional focuses like agriculture and water management, as identified in earlier years (e.g., potable water, greenhouse gases, and agricultural development in the niche and emerging themes).

Fig. 10 depicts the top themes in rural sociology. This figure complements the previous two by providing a snapshot of the most prominent themes in current research. It helps answer RQ5 by highlighting the core concerns and concepts that dominate contemporary rural sociology discourse.

The topic modelling results, as presented in Figs. 7–9, offer further

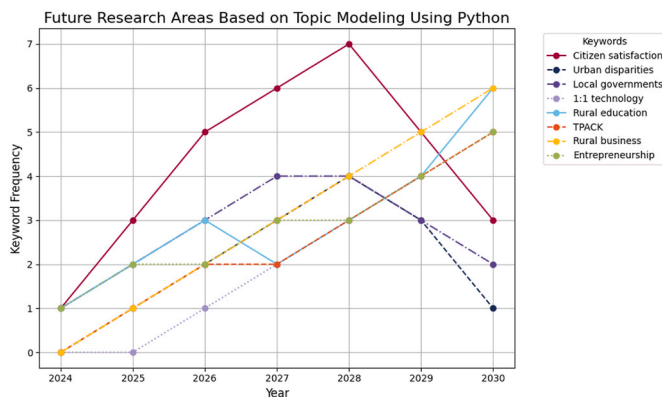


Fig. 9. Future Research Areas Based on Topic Modeling, created by authors using Python (RQ5).

insights into the evolving landscape of rural sociology research. Fig. 8, showing the evolution of top keyword pairs over time, reveals shifting research priorities. This topic modelling approach represents a unique contribution to the literature review process. By leveraging machine learning techniques, we identified latent themes and potential research directions that might not be immediately apparent from keyword analysis alone. This data-driven approach complements traditional literature review methods and provides a more comprehensive view of the field’s trajectory.

5. Discussion

The findings of this study provide an overview of the current trends, influential works, and emerging themes in rural sociology research, revealing significant aspects of its evolution and current state. The use of advanced bibliometric tools and topic modelling provided deep insights into the intellectual structure and thematic progression within rural sociology. This section will discuss these findings in light of the existing literature, provide possible reasons behind these trends, and propose directions for future research.

The evolution of rural sociology (RQ1), as seen from the time span of 2016–2024, reflects a field in transition, influenced by contemporary issues such as globalisation, sustainability, and community resilience. This period, though relatively short, encompasses the rapid rise of artificial intelligence, machine learning, accelerated digitisation, and the societal impacts of the COVID-19 pandemic—all of which have significantly influenced research themes and methodologies in the field.

The decline in the annual growth rate of publications (−7.34%) suggests that the field may be reaching a level of maturity, or it could reflect shifting research priorities towards more pressing global concerns such as urbanisation or technological impacts. Compared to previous studies like Mack et al. (2023), who reviewed broadband internet’s impact on rural development, the current study reveals a continuation but also a diversification of focus areas. Sánchez-Oro and Fernández Sánchez (2017) emphasised digital technologies and women’s empowerment in rural areas, highlighting the impact of digital inclusion on socio-economic development. On the other hand, Riezniak & Lee (2025) focused on the role of community-driven initiatives, demonstrating the importance of local involvement in fostering rural resilience. These findings complement each other by showing both the broader influence of digitalisation and the critical role of grassroots community efforts in rural sociology’s evolution.

The geographic analysis highlights a concentration of research in countries such as the United States and China, which aligns with the findings of Apostolopoulos et al. (2024), indicating strong research infrastructure and funding mechanisms in these regions. However, the underrepresentation of regions in the Global South suggests a disconnect between the areas most affected by rural issues and where academic efforts are concentrated (Salemink et al., 2017). Addressing this gap by encouraging more inclusive research partnerships, especially focusing on underrepresented areas like Sub-Saharan Africa and South America, could enrich the diversity and applicability of rural sociology (Agbenyo et al., 2025; Rincon & Fernandes, 2018).

The analysis of citation impact reveals key influential authors and studies that have shaped the field of rural sociology (RQ2 & RQ3). The work by Raja et al. (2022) on sustainable rural development through entrepreneurial initiatives was the most cited, indicating a growing emphasis on entrepreneurship as a means of empowering rural communities (Dzoghbenuku et al., 2021). The increased focus on digital inclusion reflects broader societal trends towards digitisation, aligning with global development agendas such as the UN’s Sustainable Development Goals (SDGs) (Agbenyo et al., 2025).

While countries like the United States and China dominate publication output, smaller nations like Finland and Singapore were found to have higher citation impacts. This suggests that research from these regions is not only of high quality but also very relevant. This could be

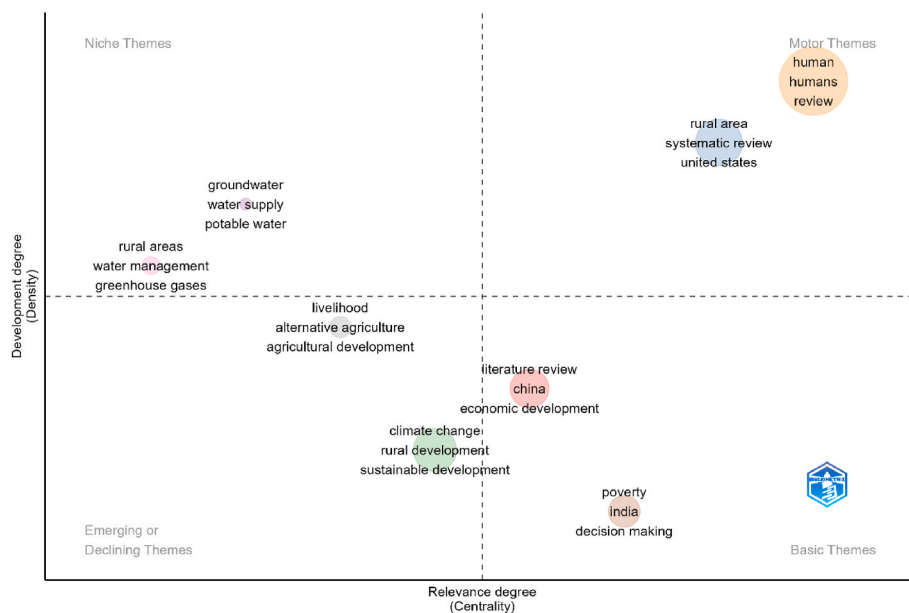


Fig. 10. Top Themes in Rural Sociology (RQ5), created by authors using Bibliometrix

attributed to a focus on niche topics or the use of diverse methodologies that offer more generalisable findings. Similar observations were made by Sánchez-Oro & Fernández Sánchez (2017) and Tillmar et al. (2022), who explored women's entrepreneurship in rural Sweden, underscoring the importance of context-specific yet widely applicable research.

The study also shed light on the trends in collaboration and geographic disparities (RQ4). We found a significant trend towards international collaboration, with 29.13% of documents involving co-authorship from multiple countries. Most collaborations are concentrated among a few countries, suggesting a need for expanding research partnerships to include underrepresented regions (De Guzman et al., 2020; Galvao et al., 2020). Although greater collaboration is directly related to funding and the diverse origin of students in the case of developed countries, greater collaboration could enhance the diversity of perspectives and contribute to a more globally inclusive understanding of rural challenges.

While social capital has long been a central concept in rural sociology—particularly following the influential works of Bourdieu (1986), Putnam (1995), Woolcock (1998), and Etzioni (1993)—its prominence as a research focus peaked in the late 20th and early 21st centuries. Classic debates around social capital's role in shaping community resilience, economic development, and social cohesion remain relevant, but our bibliometric analyses indicate that the field's thematic priorities are shifting toward topics such as digital inclusion, social entrepreneurship, and technological adaptation (Muhamad & Kusuma, 2024). Thus, while social capital continues to inform research on rural community dynamics, its conceptual influence is now complemented by emerging areas that reflect broader transformations in rural life.

The analysis of themes, theories, and methodological approaches (RQ5) revealed a strong focus on economic topics, such as entrepreneurship, digitalisation and rural development (Nulleshi & Tillmar, 2022). This focus reflects ongoing efforts to combat rural poverty and bolster community resilience (Bock, 2016). The trend mirrors the findings of previous works by Salemink et al. (2017), who emphasised unequal ICT availability, adoption, and use in rural areas. The frequent use of keywords like 'entrepreneurship,' 'rural development,' and 'digital inclusion' points towards an increasing focus on economic sustainability and technological integration in rural settings (Deller et al., 2019). Case studies and other qualitative methods remain central in rural sociology as they provide detailed insights into the unique dynamics of rural communities. However, the field's strong reliance on these approaches

can limit generalisability and comparability across contexts. As highlighted by Fig. 9, the rise of machine learning and mixed methods approaches in recent years indicates an evolving landscape but also reveals underutilised opportunities for methodological advancements.

Previous studies, such as those by Apostolopoulos et al. (2024), also highlighted the need for incorporating advanced analytical methods in rural sociology, which could help address complex, multifaceted issues more effectively. For example, topics like climate change adaptation and rural poverty could greatly benefit from the application of big data analytics and longitudinal studies. The current study also supports the call for more participatory research methods, especially in areas like rural governance, to better incorporate local voices and knowledge systems.

Fig. 10 (Future Research Areas Based on Topic Modelling Using Python) highlights key future research areas identified through advanced topic modelling techniques. Recent academic studies underscore the effectiveness of Python-based topic modelling for predicting research trends across various disciplines (Chen et al., 2024). The emerging themes—such as citizen satisfaction, urban disparities, and rural education—suggest a broadening scope of rural sociology, moving beyond traditional agricultural concerns. This shift reflects a growing interdisciplinary focus on addressing rural-urban divides through research on education, governance, and economic development.

In alignment with trends in ecological conservation and urban-rural systems (Eastburn et al., 2024), these themes highlight the increasing relevance of topics like sustainable development and climate change. Furthermore, emerging areas such as 1:1 technology in education, TPACK, and rural business knowledge exchange indicate a rising interest in technology and entrepreneurship within rural settings. The expanding relevance of interdisciplinary themes, as shown by economic development, poverty, and decision-making, reinforces the role of topic modelling in predicting research trajectories and bridging traditional rural issues with global challenges.

Based on the analysis, several future research directions emerge. First, the field can benefit from the integration of mixed methods approaches, particularly in areas like rural entrepreneurship and community resilience, where combining qualitative and quantitative insights could yield richer understandings (Galvao et al., 2020; Polas et al., 2022). While there is a recognized need for more longitudinal studies to understand long-term rural change, such research is often constrained by broader power dynamics in the academic landscape, including limited funding and institutional support for extended projects

in rural settings. (Gretzinger et al., 2018; Sánchez-Oro & Fernández Sánchez, 2017).

The application of advanced analytics, such as machine learning, should also be broadened to include traditional topics in rural sociology, such as agricultural economics and rural health (Molina & Garip, 2019). Finally, addressing the geographic disparity in research contributions by fostering collaboration with scholars from underrepresented regions remains a crucial step towards a more equitable and comprehensive rural sociology field (De Guzman et al., 2020).

This systematic review, while comprehensive, operates within important constraints. The English-language restriction underrepresents non-Anglophone regions and Global South scholarship. Reliance on five global databases excludes regional databases and grassroots research, overrepresenting well-resourced North American and European institutions. The 2016–2024 timespan captures recent transformations but represents a brief snapshot, potentially reflecting transitory fluctuations rather than enduring disciplinary shifts.

Topic modelling and keyword-based indexing primarily rely on surface-level meta-analysis, missing nuanced theoretical debates and conceptual innovations within full texts. High publication volume from the United States and China means field concerns may reflect these nations' rural realities more than global priorities. Additionally, citation counts do not distinguish between positive endorsement and critical contestation, potentially overstating influence. These limitations underscore the importance of complementary regional reviews, qualitative meta-synthesis of non-indexed literature, and direct engagement with underrepresented rural scholars to ensure globally inclusive findings.

6. Conclusion

This study aimed to explore the current trends, influential works, and emerging themes in rural sociology, particularly in the context of globalisation, sustainability, and community resilience. Through a systematic literature review supported by bibliometric tools and topic modelling, key findings were identified that illustrate the evolving focus and methodologies within the field.

The results indicate that rural sociology research is impacted by the integration of digital technologies and the emphasis on community resilience. A significant observation is the diversification of research themes, from economic sustainability to technological integration. Furthermore, the analysis highlights both geographic disparities in research contributions and the growing importance of international collaborations. These insights reveal a need for more inclusive research practices that incorporate underrepresented regions, as well as a methodological expansion to include mixed-methods and advanced analytics.

The conclusions drawn from this study emphasise the importance of fostering diverse research collaborations and methodological innovation to address rural challenges effectively. This systematic review has identified five priority areas meriting investigation to enhance rural sociology's capacity to address evolving challenges and advance geographic equity:

1. Climate Change Adaptation in Global South Rural Contexts: Few longitudinal studies examine how rural communities in Sub-Saharan Africa, South Asia, Southeast Asia, and Latin America adapt farming practices, livelihoods, and migration in response to climate shifts. Research combining qualitative ethnographic methods with machine learning-based climate modelling could illuminate context-specific adaptive strategies and identify generalisable adaptation principles.
2. Gender-Differentiated Impacts of Digital Inclusion: While digital inclusion and entrepreneurship research dominate recent literature, gendered dimensions remain underexplored. Mixed-methods longitudinal research is needed to examine how women and men experience differential access to broadband, digital skill acquisition, online business formation, and economic outcomes—particularly in

lower-income rural regions where gender inequality intersects with digital divides.

3. Participatory Governance and Local Knowledge Systems: Participatory and co-management research methods are underutilised in rural governance studies. Future research should foreground Local Knowledge Systems and community-led decision-making through explicit partnership with external researchers, enriching methodological innovation and generating findings applicable to diverse rural contexts.
4. Longitudinal Digital Infrastructure Impact Tracking: Despite substantial rural broadband investment, few longitudinal studies measure medium- to long-term economic, social, and health outcomes beyond the implementation phase. Comparative studies across developed and developing nations would illuminate whether broadband benefits are sustained and inform policy design.
5. Mixed-Methods Agricultural Economics: Integrating advanced analytics (machine learning, big data analysis) with qualitative farmer perspectives and participatory scenario planning could advance understanding of sustainable agricultural transitions amid market pressures, climate uncertainty, and technological disruption—bridging quantitative agricultural economics and qualitative rural sociology.

Expanding participatory approaches and focusing on longitudinal studies will be crucial in advancing the field of rural sociology, particularly in addressing complex issues such as climate change, digital inclusion, and rural health. The findings of this study lay a foundation for future research, encouraging scholars to explore underrepresented areas and adopt more comprehensive analytical methods to enrich the understanding of rural dynamics.

CRediT authorship contribution statement

Muhammad Rizwan Hussain: Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Omar Hannon:** Writing – original draft, Data curation. **Sándor Kovács:** Writing – review & editing, Methodology, Formal analysis. **Szabolcs Mátyás:** Writing – review & editing, Validation. **Szabolcs Orbán:** Writing – original draft, Data curation. **György Norbert Szabados:** Validation, Supervision, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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