http://dx.doi.org/10.18623/rvd.v23.5806

GOVERNING RESEARCH COLLABORATION AND KNOWLEDGE NETWORKS IN HIGHER EDUCATION: A BIBLIOMETRIC ANALYSIS (2015–2025)

A GESTÃO DA COLABORAÇÃO EM PESQUISA E DAS REDES DE CONHECIMENTO NO ENSINO SUPERIOR: UMA ANÁLISE BIBLIOMÉTRICA (2015–2025)

Article received on: 12/16/2025
Article accepted on: 3/17/2026

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The authors declare that there is no conflict of interest

Abstract
In recent years, research collaboration has increasingly emerged as a key mechanism shaping knowledge production within higher education systems, particularly under conditions influenced by globalization and digital transformation. Despite this growing attention, the existing literature remains somewhat fragmented, often providing only partial insights into how collaboration networks evolve and how knowledge structures are formed. From this perspective, a more integrated and systematic examination appears necessary. Building on this premise, the present study adopts a bibliometric approach to explore the development of research collaboration in higher education. The analysis is based on 1,883 publications indexed in Scopus over the period 2015–2025. A combination of techniques is employed, including descriptive statistics, co-authorship and co-citation analyses, keyword co-occurrence, and thematic mapping, allowing for a multi-dimensional understanding of collaboration patterns and intellectual structures. The findings indicate a noticeable acceleration in research output, particularly after 2020, alongside a highly interconnected yet uneven global collaboration network dominated by countries such as the United States and China. At the author level, collaboration tends to concentrate within a limited number of core groups, while many scholars remain at the periphery. In addition, the field draws on diverse intellectual streams, and thematic analyses reveal emerging research directions, although several areas remain underexplored. Taken together,

Resumo
Nos últimos anos, a colaboração em pesquisa tem se destacado cada vez mais como um mecanismo fundamental na formação da produção de conhecimento nos sistemas de ensino superior, especialmente em um contexto marcado pela globalização e pela transformação digital. Apesar dessa crescente atenção, a literatura existente permanece um tanto fragmentada, oferecendo frequentemente apenas uma visão parcial sobre como as redes de colaboração evoluem e como as estruturas de conhecimento se formam. Dessa perspectiva, parece ser necessária uma análise mais integrada e sistemática. Partindo dessa premissa, o presente estudo adota uma abordagem bibliométrica para explorar o desenvolvimento da colaboração em pesquisa no ensino superior. A análise baseia-se em 1.883 publicações indexadas no Scopus no período de 2015 a 2025. É empregada uma combinação de técnicas, incluindo estatística descritiva, análises de coautoria e cocitação, coocorrência de palavras-chave e mapeamento temático, permitindo uma compreensão multidimensional dos padrões de colaboração e das estruturas intelectuais. Os resultados indicam uma aceleração notável na produção científica, particularmente após 2020, juntamente com uma rede de colaboração global altamente interconectada, mas desigual, dominada por países como os Estados Unidos e a China. No nível dos autores, a colaboração tende a se concentrar em um número limitado de grupos centrais, enquanto muitos acadêmicos

these findings provide a more comprehensive mapping of research collaboration in higher education. Beyond offering a structured overview, the study also generates policy-relevant insights for higher education governance, particularly in fostering more inclusive and sustainable collaboration networks.

Keywords: Research Collaboration. Higher Education. Bibliometric Analysis. Co-Authorship. Co-Citation. Keyword Co-Occurrence. Knowledge Networks.

permanecem na periferia. Além disso, o campo se baseia em diversas correntes intelectuais, e análises temáticas revelam direções de pesquisa emergentes, embora várias áreas permaneçam pouco exploradas. Em conjunto, esses resultados fornecem um mapeamento mais abrangente da colaboração em pesquisa no ensino superior. Além de oferecer uma visão geral estruturada, o estudo também gera insights relevantes para políticas de governança do ensino superior, particularmente no fomento de redes de colaboração mais inclusivas e sustentáveis.

Palavras-chave: *Colaboração em Pesquisa. Ensino Superior. Análise Bibliométrica. Coautoria. Cocitação. Coocorrência de Palavras-Chave. Redes de Conhecimento.*

1 INTRODUCTION

In recent years, research collaboration has become an increasingly central feature of knowledge production in higher education. As academic systems expand and diversify, the generation of new knowledge is no longer confined to individual researchers or isolated institutions. Instead, it is increasingly shaped by collaborative networks that span disciplines, organizations, and national boundaries (Katz & Martin, 1997; Wagner & Leydesdorff, 2005). From a broader perspective, collaboration can be understood not only as a mechanism for sharing expertise, but also as a strategic response to the growing complexity of contemporary research problems (Adams, 2012).

The rise of research collaboration is closely linked to processes of globalization and digitalization. Advances in communication technologies and the expansion of international research funding have facilitated interactions among scholars across different regions (Altbach & Knight, 2007; Marginson & Rhoades, 2002). As a result, higher education institutions are becoming more interconnected, forming global knowledge networks that influence both the direction and the impact of research activities. To some extent, this transformation has redefined the way academic knowledge is produced, disseminated, and evaluated (De Wit, 2011).

A growing body of literature has examined various aspects of research collaboration in higher education, including co-authorship patterns, international

partnerships, and institutional cooperation (Bozeman & Corley, 2004; Lee & Bozeman, 2005). These studies generally suggest that collaborative research tends to produce higher-quality outputs, as it enables the integration of diverse perspectives and resources. At the same time, existing research also highlights significant disparities in collaboration patterns, with a small number of countries and institutions playing a dominant role in the global research landscape (Kwiek, 2018). This uneven distribution raises important questions about the inclusiveness and sustainability of current collaboration systems.

Despite these contributions, the existing literature remains fragmented in several respects. Many studies focus on specific dimensions of collaboration, such as international co-authorship or institutional performance, without providing a comprehensive understanding of how these elements interact within a broader knowledge system. In addition, the increasing emphasis on interdisciplinary research has further complicated the structure of knowledge production, making it more difficult to capture the dynamics of collaboration through conventional approaches (Porter & Rafols, 2009).

While bibliometric approaches have been increasingly adopted in higher education research, relatively limited attention has been paid to systematically mapping the intellectual structure and thematic evolution of research collaboration in this field (Zupic & Čater, 2015; Donthu et al., 2021). From this perspective, there is a need for an integrative analysis that combines structural, relational, and thematic dimensions, particularly through advanced knowledge mapping techniques (Yu et al., 2021).

Bibliometric analysis offers a useful methodological approach to address this gap. By analyzing large-scale publication data, bibliometric techniques make it possible to uncover patterns of collaboration, identify influential contributors, and map the development of research themes over time (Aria & Cuccurullo, 2017; van Eck & Waltman, 2010). In particular, tools such as co-authorship networks, co-citation analysis, and keyword co-occurrence enable a multi-dimensional exploration of the field, providing insights that go beyond traditional narrative reviews (Cobo et al., 2011). However, the potential of these approaches has not yet been fully realized in the context of research collaboration in higher education.

Against this background, the present study aims to provide a comprehensive bibliometric analysis of research collaboration in higher education. Specifically, the study seeks to examine the evolution of publication trends, identify collaboration patterns

among countries and authors, uncover the intellectual structure of the field, and analyze its thematic development. By integrating multiple bibliometric techniques, this study contributes to a more systematic understanding of how research collaboration is structured and how it evolves over time.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature and formulates the research questions. Section 3 outlines the data sources and methodological approach. Section 4 presents the empirical results, including collaboration networks, co-citation structures, and thematic analyses. Finally, Section 5 discusses the implications of the findings and suggests directions for future research.

2 LITERATURE REVIEW AND RESEARCH QUESTIONS

2.1 Research collaboration in higher education

Existing studies have examined research collaboration from multiple angles, including international co-authorship, institutional partnerships, and interdisciplinary cooperation (Glänzel & Schubert, 2004; Newman, 2001). These studies generally suggest that collaborative research tends to produce higher-quality outputs, as it allows for the integration of diverse perspectives and resources (Lee & Bozeman, 2005). At the same time, collaboration patterns are often unevenly distributed, with a limited number of countries and institutions dominating the global research landscape (Wagner & Leydesdorff, 2005).

It is worth noting that higher education institutions play a critical role in facilitating collaboration. Universities function as key nodes within the global knowledge network, where collaborative relationships are formed, maintained, and expanded (Marginson & Rhoades, 2002). In practice, these relationships are influenced by factors such as research funding, institutional capacity, and policy environments. As a result, research collaboration in higher education can be understood as both a scholarly and an organizational phenomenon.

2.2 Bibliometric approaches to higher education research

Bibliometric analysis allows researchers to examine large-scale publication data and identify patterns related to authorship, citation, and thematic development (Donthu et al., 2021). Several studies have demonstrated the usefulness of tools such as co-authorship networks, co-citation analysis, and keyword co-occurrence in revealing the underlying structure of research domains (Zupic & Čater, 2015; Cobo et al., 2011).

In particular, co-citation analysis provides insights into the intellectual structure of a field (Small, 1973; White & Griffith, 1981), while keyword co-occurrence analysis helps identify thematic patterns and emerging topics (Callon et al., 1991). Furthermore, recent advances in science mapping tools, such as Bibliometrix and VOSviewer, have enhanced the ability to visualize complex knowledge networks (Aria & Cuccurullo, 2017; van Eck & Waltman, 2010).

However, while bibliometric approaches have been widely used, their application to research collaboration in higher education remains relatively fragmented. Many studies focus on specific aspects, such as international collaboration or institutional performance, without providing a comprehensive mapping of the intellectual and thematic structure of the field. To some extent, this limits the ability to fully understand how research collaboration evolves and interacts with broader academic systems.

2.3 Research gap and research questions

Although prior studies have contributed valuable insights into research collaboration and higher education, a systematic understanding of the field's intellectual structure and thematic evolution remains limited. In particular, there is a lack of integrative bibliometric analyses that simultaneously examine collaboration patterns, knowledge networks, and thematic development within a unified framework.

From this perspective, a comprehensive bibliometric analysis is needed to map the structure of research collaboration in higher education and identify its key dimensions. Such an approach not only provides a descriptive overview but also offers deeper insights into the dynamics of knowledge production and the evolution of research themes.

Based on this gap, the present study aims to address the following research questions:

i. RQ1: How has research on collaboration in higher education evolved over time?
ii. RQ2: What are the main collaboration patterns among countries, institutions, and authors?
iii. RQ3: What is the intellectual structure of the field based on co-citation analysis?
iv. RQ4: What are the main research themes and their evolution based on keyword co-occurrence and thematic mapping?

3 METHODOLOGY

3.1 Data source and search strategy

This study adopts a bibliometric approach to systematically examine the intellectual structure and collaboration patterns in research on higher education. The data were retrieved from the Scopus database, which is widely regarded as a reliable and comprehensive source for bibliometric analysis.

To ensure both relevance and sufficient coverage, a structured search strategy was developed using a combination of keywords related to higher education and research collaboration. The search was conducted in the TITLE-ABS-KEY fields to capture publications with explicit thematic alignment. The query included terms such as *"higher education," "university," "research collaboration," "scientific collaboration,"* and *"co-authorship."*

The data collection was performed in March 2026 and limited to the period from 2015 to 2025 in order to capture recent developments in the field. In addition, only peer-reviewed articles and review papers published in English were included to ensure academic quality and consistency. Following this procedure, a total of 1,883 documents were retained for analysis.

3.2 Data screening and refinement

The initial dataset was further refined to enhance its relevance to the research objectives. First, document types such as conference papers, book chapters, and editorial materials were excluded. Second, the remaining records were screened based on titles and abstracts to confirm their focus on research collaboration within the context of higher education.

Although the search strategy was intentionally designed to be broad, this approach is consistent with bibliometric best practices, where an initial wide dataset is subsequently refined through analytical procedures. To some extent, this strategy helps avoid premature exclusion of potentially relevant studies while preserving the structural integrity of the knowledge network.

3.3 Bibliometric analysis techniques

The analysis was conducted using a combination of Bibliometrix and VOSviewer, which are widely used tools for quantitative science mapping.

Several complementary techniques were employed to provide a multi-dimensional understanding of the field:

i. Descriptive analysis was used to examine publication trends, leading journals, and influential contributors.
ii. Co-authorship analysis was applied to identify collaboration patterns among countries, institutions, and individual researchers.
iii. Co-citation analysis was conducted to uncover the intellectual structure and foundational knowledge of the field.
iv. Keyword co-occurrence analysis was used to identify major research themes and emerging topics.
v. Thematic mapping was performed to classify research themes into motor, basic, niche, and emerging categories based on centrality and density.

Together, these methods enable a comprehensive exploration of both the structural and thematic dimensions of research collaboration in higher education.

3.4 Visualization and parameter settings

To enhance the interpretability of the results, threshold values were applied during network construction. For example, in keyword co-occurrence analysis, only terms exceeding a minimum occurrence threshold were included to reduce noise and ensure thematic relevance. Similarly, co-authorship and co-citation networks were constructed using minimum thresholds for documents and citation counts.

Network visualization was performed using VOSviewer, which allows for the identification of clusters, link strengths, and network density. The clustering algorithm is based on association strength normalization, enabling the detection of meaningful groupings within the data.

3.5 Analytical framework

Rather than imposing predefined theoretical categories, this study adopts a data-driven approach, allowing key themes and structures to emerge from the dataset. This perspective aligns with the "science of science" approach, which emphasizes understanding the dynamics of knowledge production through empirical patterns.

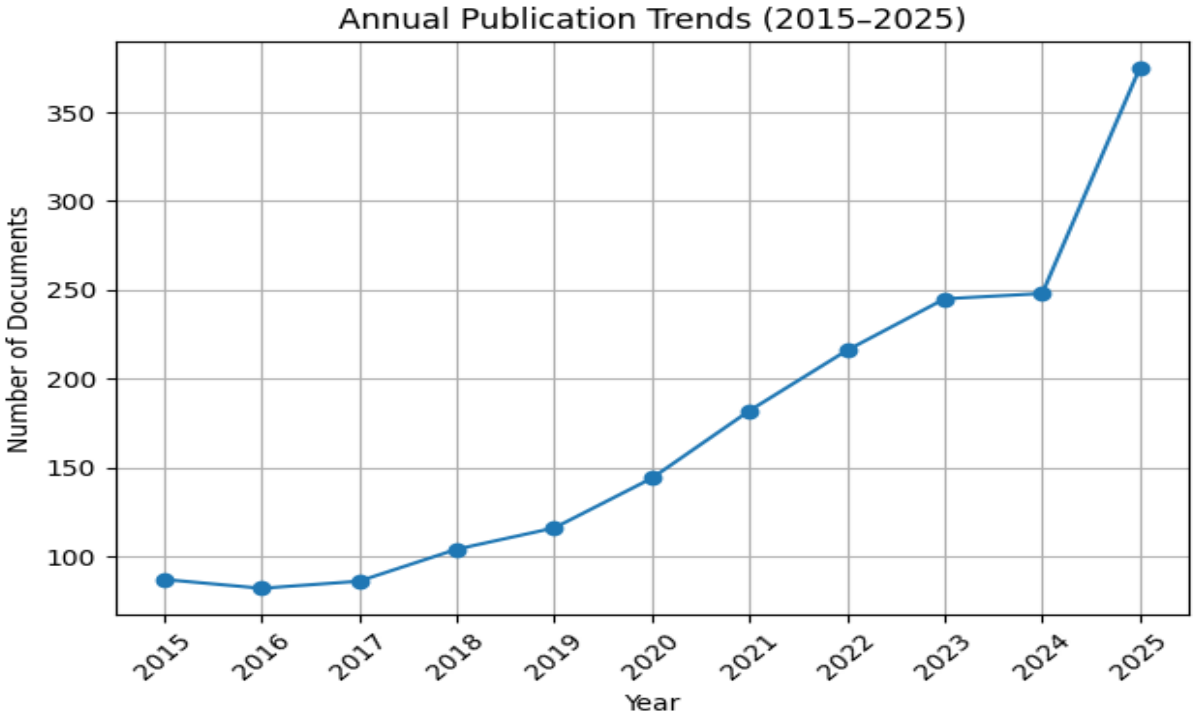
The analytical process integrates quantitative mapping with interpretative analysis, thereby linking bibliometric findings to broader discussions on research collaboration, knowledge diffusion, and institutional dynamics in higher education systems.

4 RESULTS

4.1 Publication trends over time

Figure 1

Annual publication trends in research collaboration in higher education (2015–2025)



Source: Authors' elaboration based on Scopus data

As illustrated in Figure 1, the number of publications on research collaboration in higher education exhibits a clear upward trajectory over the period from 2015 to 2025. In the early stage, spanning from 2015 to 2017, the volume of publications remains relatively stable, fluctuating slightly around a modest level. This pattern suggests that, at that time, scholarly attention to collaboration within higher education had not yet reached a critical mass.

From 2018 onwards, however, a more consistent growth trend begins to emerge. The number of publications increases steadily from just over one hundred documents in 2018 to approximately 144 in 2020. To some extent, this gradual rise reflects the growing recognition of collaboration as a key mechanism for knowledge production in increasingly complex academic environments.

A more pronounced acceleration can be observed after 2020. Between 2021 and 2024, the annual output continues to expand at a faster pace, reaching nearly 250 publications by 2024. This period coincides with intensified global academic interactions, which may have further reinforced the importance of collaborative research practices.

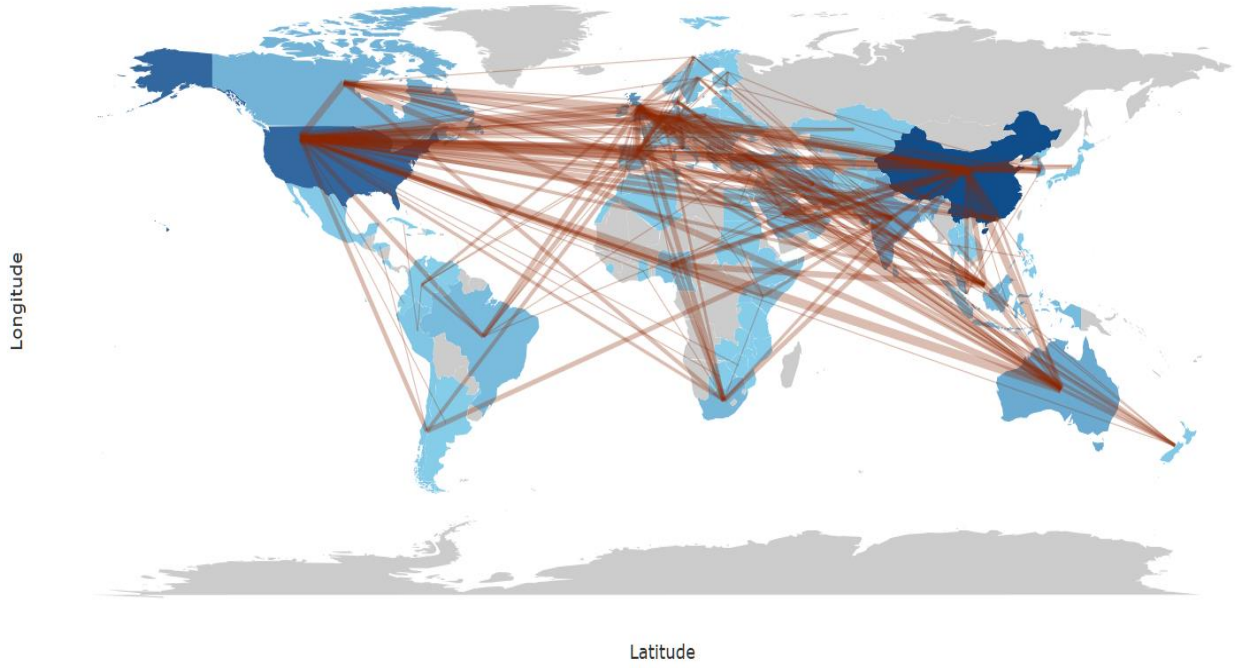
Notably, the most significant increase occurs in 2025, where the number of publications rises sharply to 375 documents. From this perspective, the recent surge suggests that research collaboration in higher education has evolved into a rapidly expanding area of scholarly inquiry. It is worth noting that this sharp increase may also reflect both the maturation of the field and the growing availability of large-scale collaborative research networks.

Overall, the observed trend indicates a transition from a relatively stable early phase to a period of accelerated growth, highlighting the increasing centrality of collaboration in shaping the research landscape of higher education.

4.2 Global research collaboration network

Figure 2

Global research collaboration network in higher education (2015–2025)



Source: Authors' elaboration based on Scopus data

As illustrated in Figure 2, the global research collaboration network in higher education demonstrates a highly interconnected structure, with several dominant hubs playing a central role in shaping international scholarly exchanges. The network is characterized by dense linkages across continents, indicating that research collaboration in this field has evolved into a strongly globalized system.

A closer examination reveals that countries such as the United States and China emerge as the most prominent nodes within the network. These countries not only exhibit high publication outputs but also maintain extensive collaborative ties with a wide range of international partners. From this perspective, their centrality suggests a leading role in both knowledge production and the coordination of global research activities.

In addition to these major hubs, several European countries, including the United Kingdom, Germany, and other Western European nations, appear to function as important intermediaries within the network. Their position reflects a bridging role, facilitating

connections between different regions and contributing to the diffusion of knowledge across the global academic system.

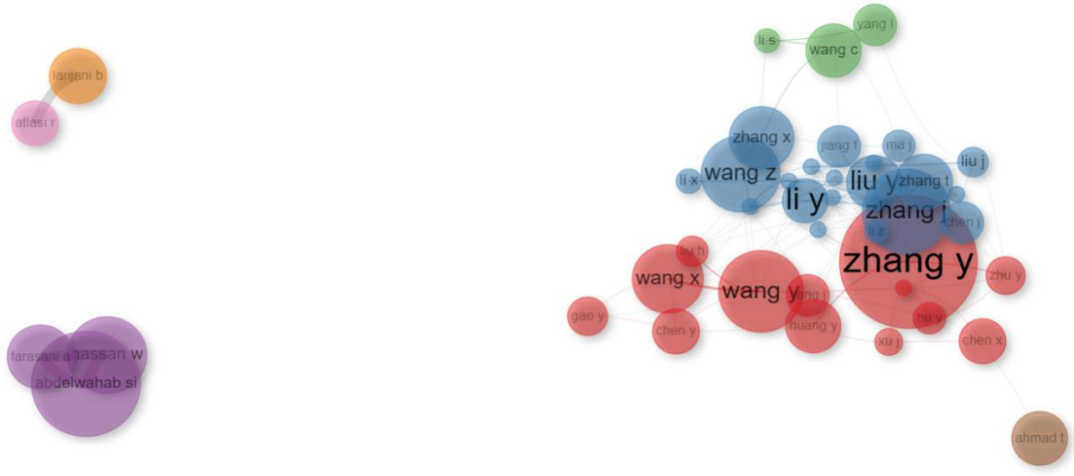
It is also worth noting that collaboration patterns extend beyond traditional academic centers. Countries in regions such as Asia-Pacific, Africa, and South America are increasingly integrated into the network, although their connections tend to be less dense. To some extent, this uneven distribution highlights the persistence of structural disparities in global research collaboration, where a limited number of countries continue to dominate the network.

Overall, the observed structure suggests that research collaboration in higher education is not only expanding in scale but also becoming more complex and interdependent. The prominence of key hubs, combined with the growing participation of emerging regions, reflects an evolving landscape in which knowledge production is increasingly shaped by international partnerships.

4.3 Author collaboration analysis

Figure 3

Co-authorship network of authors in higher education research collaboration (2015–2025)



Source: Authors' elaboration based on Scopus data

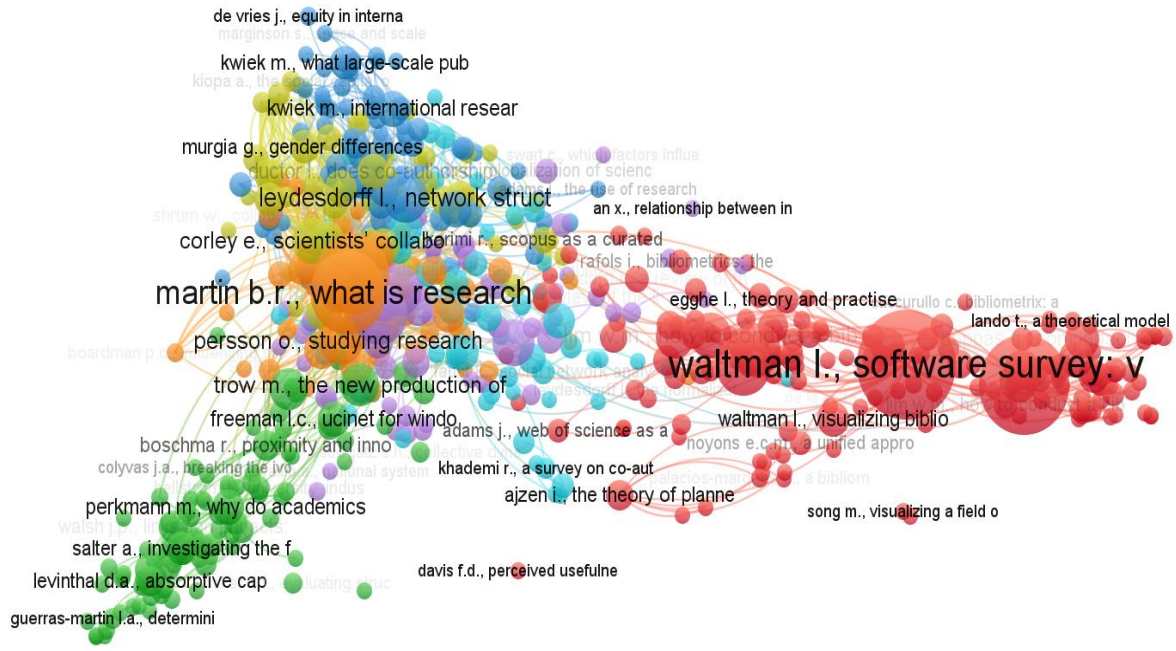
As shown in Figure 3, the co-authorship network reveals a clearly structured collaboration pattern, characterized by a dominant central cluster surrounded by several smaller groups. The largest cluster, centered around key authors such as Zhang Y, indicates a high level of internal collaboration and a strong influence within the research field. In contrast, other clusters appear more loosely connected or even isolated, suggesting limited interaction with the core research network.

To some extent, this pattern reflects the concentration of collaborative activities among a relatively small group of researchers, while a number of peripheral groups remain less integrated into the broader academic community. This uneven structure highlights the coexistence of both dense collaborative cores and fragmented research sub-networks within the field.

4.4 Co-citation analysis

Figure 4

Co-citation network of authors in research collaboration studies (2015–2025)



Source: Authors' elaboration based on Scopus data using VOSviewer

The co-citation analysis reveals a well-structured intellectual landscape composed of multiple interconnected clusters. A prominent cluster is centered on methodological contributions, particularly the work of Waltman et al., highlighting the importance of bibliometric tools such as VOSviewer in shaping the analytical approaches of the field.

In parallel, another major cluster is associated with foundational discussions on the nature of research, represented by influential works such as Martin's "What is research." This suggests that conceptual reflections on research practices continue to play a significant role in the literature.

Additionally, clusters related to innovation and management theories, including contributions from Freeman and Levinthal, indicate the integration of strategic and organizational perspectives into the study of research collaboration. Meanwhile, the presence of network science scholars such as Leydesdorff reflects the adoption of network-based approaches to understanding knowledge production.

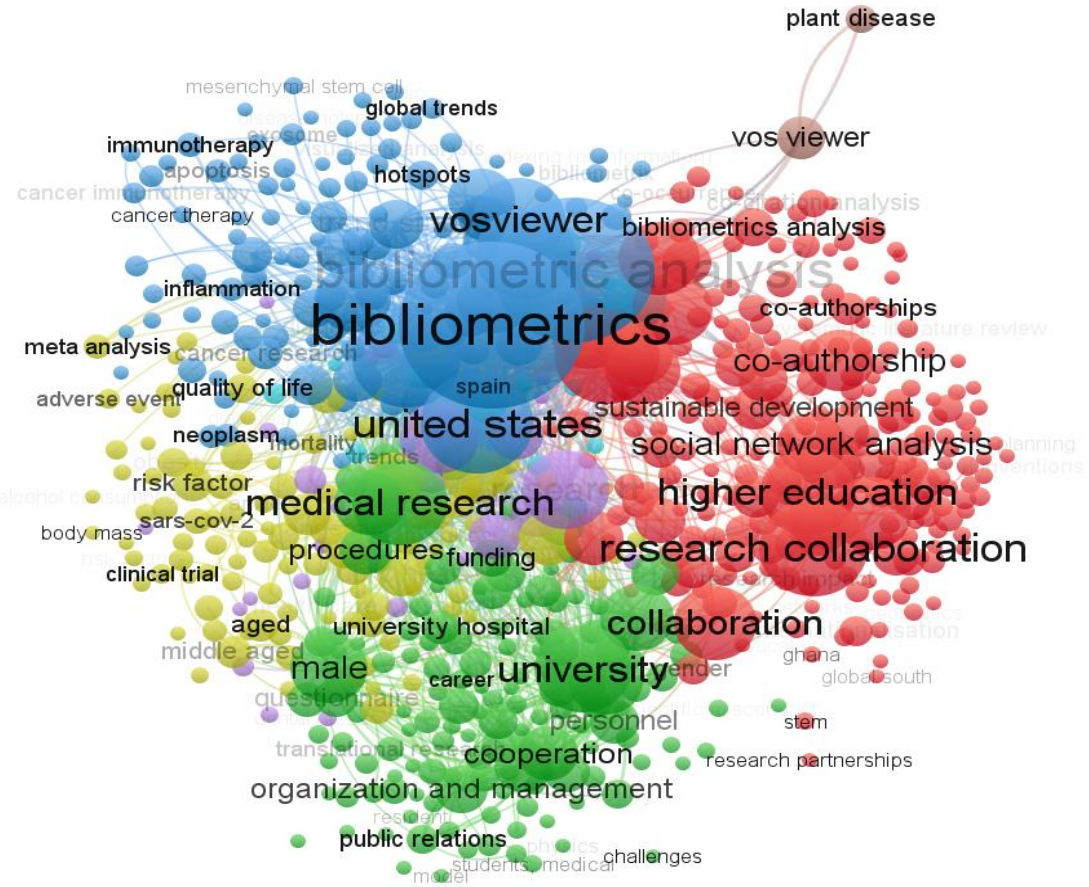
Taken together, these clusters illustrate an interdisciplinary intellectual structure, where methodological, conceptual, and theoretical streams converge to shape the development of the field.

4.5 Keyword co-occurrence

As illustrated in Figure 5, the keyword co-occurrence network reveals a multi-cluster structure that reflects the core thematic directions of research collaboration in higher education. The network is characterized by the presence of several interconnected clusters, indicating that the field has evolved into a multidisciplinary domain combining methodological, institutional, and collaboration-oriented perspectives.

Figure 5

Keyword co-occurrence network in research collaboration and higher education (2015–2025)



Source: Authors' elaboration based on Scopus data using VOSviewer

A dominant cluster is centered on "research collaboration" and "higher education," which occupy a central position within the network. This suggests that these concepts constitute the primary focus of the field, serving as the foundation for most research activities. The high density of connections within this cluster indicates a well-developed and cohesive body of literature.

In parallel, another prominent cluster is associated with "bibliometrics" and related analytical approaches, including "bibliometric analysis" and "VOSviewer." The positioning of this cluster highlights the increasing reliance on quantitative science mapping techniques to examine collaboration patterns and knowledge structures. This

finding is consistent with the results of the co-citation analysis, where methodological contributions also play a central role in shaping the intellectual foundation of the field.

A third cluster is linked to institutional and organizational dimensions, represented by keywords such as “university,” “cooperation,” and “organization and management.” This cluster underscores the importance of institutional contexts in facilitating and structuring collaborative activities, suggesting that research collaboration is not only a scholarly phenomenon but also an organizational process.

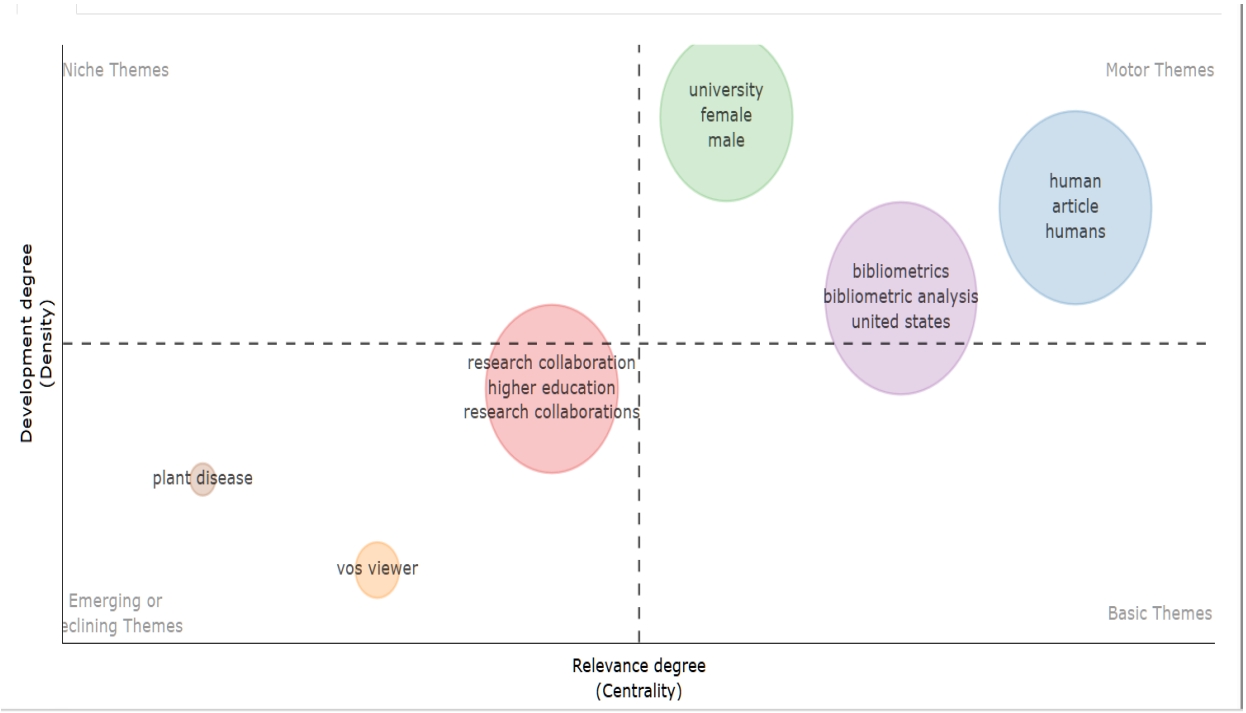
It is also worth noting that some general or cross-disciplinary keywords, such as “human” and “medical research,” remain present within the network. To some extent, this reflects the interdisciplinary nature of the dataset and the influence of database indexing practices, rather than the core conceptual focus of the field. However, their relatively peripheral positioning indicates that they do not dominate the thematic structure.

Overall, the keyword co-occurrence network demonstrates a convergence of three major dimensions: collaboration-focused themes, methodological approaches, and institutional contexts. This structure aligns with the findings from the thematic map, where core themes related to collaboration and bibliometric analysis occupy central positions, while emerging and niche topics remain less integrated. Taken together, these results suggest that the field is transitioning toward a more consolidated and methodologically driven research landscape.

4.6 Thematic structure of the research field

Figure 6

Thematic map of research collaboration in higher education (2015–2025)



Source: Authors' elaboration based on Scopus data

As illustrated in Figure 6, the thematic map provides a structured overview of the conceptual landscape of research collaboration in higher education, based on the dimensions of centrality and density. The distribution of themes across the four quadrants reflects varying degrees of development and relevance within the field.

In the upper-right quadrant, representing motor themes, the cluster related to "bibliometrics" and "bibliometric analysis" appears to be both highly developed and central to the research domain. This suggests that methodological approaches based on quantitative science mapping play an increasingly important role in shaping the literature.

It is important to note that certain generic terms, such as "human", "article", and "humans", also appear prominently in this quadrant. However, these terms are likely associated with database indexing practices rather than representing meaningful conceptual themes. Therefore, they should be interpreted with caution and do not reflect the core intellectual structure of the field.

Moving to the upper-left quadrant, which corresponds to niche themes, the cluster centered on “university” appears to be relatively well-developed but less central. This indicates that institutional perspectives have achieved a certain level of internal cohesion, although their integration into the broader research agenda remains limited.

In contrast, the lower-right quadrant, representing basic themes, includes clusters that are highly relevant but not yet fully developed. These themes serve as essential building blocks for the field and may evolve into more central topics over time.

Particularly noteworthy is the cluster located near the center of the map, containing “research collaboration” and “higher education”. Positioned at the intersection of moderate centrality and density, this cluster can be interpreted as a core but still evolving theme. From this perspective, it reflects a transitional area of research that continues to gain importance while undergoing conceptual consolidation.

Finally, themes located in the lower-left quadrant, such as “VOSviewer”, can be considered emerging or specialized topics. Their relatively low centrality and density suggest that they are either at an early stage of development or represent more technical and method-oriented research directions.

Overall, the thematic map highlights a field characterized by the growing centrality of bibliometric methodologies, the continued importance of collaboration-focused themes, and the presence of evolving institutional and analytical perspectives. This structure reflects both the increasing maturity and the ongoing transformation of the research landscape.

5 DISCUSSION

The findings of this study provide a comprehensive understanding of the evolving landscape of research collaboration in higher education. By integrating results from publication trends, collaboration networks, co-citation structures, and keyword co-occurrence analysis, a more nuanced picture of the field emerges.

First, the observed growth in publication output reflects a steadily increasing scholarly interest in research collaboration within higher education. While early contributions remained relatively limited, the sharp rise after 2020 suggests that collaboration has become a central concern in academic research. This trend may be

associated with the growing complexity of knowledge production, as well as the increasing importance of international cooperation in addressing global challenges.

Second, the global collaboration network highlights a highly interconnected yet uneven structure. The dominance of countries such as the United States and China indicates a concentration of research capacity and influence within a limited number of leading nations. At the same time, the presence of emerging regions in the network suggests a gradual expansion of participation. To some extent, this dual structure reflects both the globalization of academic collaboration and the persistence of structural inequalities in access to research resources.

Third, the author-level collaboration network reveals a similar pattern of concentration. A small number of highly connected authors form the core of the network, while many others remain on the periphery. This indicates that collaboration tends to be clustered within specific research groups rather than evenly distributed across the field. From this perspective, the development of more inclusive and diverse collaboration networks may represent an important direction for future research and policy.

Fourth, the co-citation analysis demonstrates that the intellectual structure of the field is strongly influenced by methodological and interdisciplinary foundations. The prominence of bibliometric tools, particularly those associated with VOSviewer, suggests that quantitative approaches play a key role in shaping research practices. At the same time, the integration of theoretical contributions from management, innovation, and network science indicates that the field draws upon multiple disciplinary traditions. This interdisciplinary nature may help explain the rapid expansion and diversification of research themes observed in recent years.

Fifth, the keyword co-occurrence and thematic analyses further reinforce this interpretation. The central positioning of themes related to research collaboration and higher education confirms their foundational role in the field. Meanwhile, the presence of methodological, institutional, and interdisciplinary themes highlights the convergence of different research streams. It is worth noting that some cross-disciplinary keywords remain visible, which may reflect both the broader scope of the dataset and the influence of database indexing practices.

Taken together, these findings suggest that research collaboration in higher education is evolving toward a more interconnected, interdisciplinary, and

methodologically sophisticated domain. However, the persistence of core–periphery structures at both the country and author levels indicates that collaboration remains unevenly distributed.

From a practical perspective, these results imply that policymakers and academic institutions should pay greater attention to fostering inclusive and diversified collaboration networks. Strengthening international partnerships, supporting emerging research communities, and promoting knowledge exchange across disciplines may contribute to a more balanced and sustainable research ecosystem.

Finally, this study also points to several directions for future research. Further studies may explore the dynamics of collaboration at more granular levels, such as institutional strategies or disciplinary differences. In addition, combining bibliometric approaches with empirical methods may provide deeper insights into the mechanisms underlying research collaboration in higher education.

6 CONCLUSION

This study provides a comprehensive bibliometric analysis of research collaboration in higher education, offering a systematic understanding of its structural and thematic evolution. Based on a dataset of 1,883 publications from the Scopus database (2015–2025), the findings reveal a rapidly expanding research field characterized by increasing scholarly interest, particularly in recent years.

The results highlight a highly interconnected yet uneven collaboration landscape. At the global level, research activities are concentrated in a limited number of leading countries, while emerging regions are gradually integrating into the network. Similarly, at the author level, collaboration tends to be clustered within a core group of researchers, with many others remaining on the periphery. These patterns suggest that, despite the growth of collaboration, structural imbalances persist.

In addition, the study demonstrates that the intellectual structure of the field is inherently interdisciplinary, drawing on bibliometric methodologies, management theories, and network science. Thematic analyses further indicate that research collaboration and higher education remain central themes, supported by methodological and institutional dimensions.

From a practical perspective, these findings suggest that policymakers and higher education institutions should prioritize the development of more inclusive and diversified collaboration networks. Strengthening international partnerships and supporting emerging research communities may contribute to a more balanced and sustainable research ecosystem.

Nevertheless, this study is subject to certain limitations. The analysis is based solely on the Scopus database and English-language publications, which may not fully capture regional or non-English contributions. Future research could extend this work by incorporating multiple databases or combining bibliometric approaches with empirical methods to provide deeper insights into the mechanisms of research collaboration.

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Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

How to cite this article (APA)

Thong, T. Q., & Hai, P. V. (2026). GOVERNING RESEARCH COLLABORATION AND KNOWLEDGE NETWORKS IN HIGHER EDUCATION: A BIBLIOMETRIC ANALYSIS (2015–2025). *Veredas Do Direito*, *23*(6), e235806. https://doi.org/10.18623/rvd.v23.5806