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MAPPING INEQUALITY IN ACCESS TO R&D: A DUAL BIBLIOMETRIC ANALYSIS OF THE GLOBAL RESEARCH LANDSCAPE

Abstract

This study examines how inequality in access to research and development (R&D) is represented within the global research landscape and why it remains weakly consolidated as an independent analytical category. Drawing on bibliographic records retrieved from Scopus and the Web of Science Core Collection for 2014 – 2025, the study applies author – keyword co – occurrence analysis to examine the thematic structure of research related to regional innovation, spatial inequality, economic geography, and research capacity. The integrated dataset contains 7,592 records. Using a minimum occurrence threshold of five, 106 author keywords were retained and organized into nine thematic clusters. The resulting network is dominated by established themes such as regional development, peripheral regions, core – periphery relations, regional innovation, and spatial inequality, while terminology explicitly referring to R&D access appears comparatively weak and fragmented. The findings therefore provide bibliometric evidence of limited thematic consolidation around R&D access rather than establishing it as an empirically validated dimension of inequality. Building on this pattern, the study proposes R&D access as a distinct analytical dimension of regional inequality and outlines three conceptual forms – material, cognitive, and institutional access-for future empirical investigation.

Keywords: R&D access, regional inequality, regional innovation systems, economic geography, bibliometric analysis, research infrastructure.

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Introduction

R&D is considered one of the most important factors of economic growth, technological advancement, and the increasing competition of regions in a knowledge-based economy, where knowledge is a major factor of production [1]. From a regional perspective, the majority of recent studies in innovation have started to focus on the processes of creation and diffusion of knowledge, and the innovation systems that govern the regional development [2]. In this context, Regional Innovation Systems (RIS) have become a popular framework for understanding regional differences in innovation and for analyzing the interplay of institutions, networks, and knowledge in a particular territory [3].

Despite the existing abundance of literature on this topic, the uneven distribution of knowledge and the opportunities to create knowledge have received relatively little attention. Access to R&D resources (research, scientific, and institutional capacity, as well as funding) is much more unevenly distributed across regions [4]. These differences reinforce the cumulative advantages of the central regions and limit the innovative potential of the peripheral ones, most of which are underdeveloped.

When innovation – based socioeconomic systems are viewed from a knowledge perspective, they can be understood as multilayered and open networks through which knowledge flows and innovation occurs. This perspective, accordingly, explains why most discussions on innovation processes and outcomes exclude the unequal distribution of research resources [5]. While on one hand, the RIS literature studies the institutional frameworks that foster innovation, economic geography studies the spatial or regional concentration of innovation and explains the innovative systems from the perspective of agglomeration and core–periphery [3]. However, the analysis of the global research framework is in its infancy when it comes to the representation of the inequality of access to R&D.

The widening gap in this context may be due to a region's inability to participate in the innovation process because of the structural inequities pertaining to the research capacity of the region. A lack of research-related infrastructure and institutional research capacity may be one of the more significant factors that contributes to the inequities of a region but one that has been largely overlooked.

This study addresses the following research question: How is inequality in access to R&D represented in the global research landscape, and why does it remain conceptually underdeveloped? The aim of this study is to examine how inequality in access to R&D is represented in the global research landscape and to assess the extent to which it is consolidated as an independent analytical theme through a bibliometric mapping approach combining broad and focused levels of interpretation.

The research significance is three-fold. First, the study contributes methodologically by combining an examination of the dominant thematic structure of the field with a focused assessment of the position of R&D – access – related concepts within the same bibliometric network. Second, this study proposes the conceptualization of R&D access as a distinct analytical dimension of regional inequality, rather than treating it solely as a derivative component of innovation-system performance. Third, this research brings to the fore an empirical contribution that the global research ecosystem has an underexploited and fragmented body of literature, which remains undeveloped, relating to the inequitable access to R&D. To fill this research gap, one must deeply analyze the leading theoretical traditions that inform the dialectics of regional innovation and inequality. The next section critiques primary lines of thought – especially the knowledge-based paradigm, RIS, economic geography, and institutional theory – with particular attention paid to their limitations in terms of explaining the uneven distribution of access to R&D.

Theoretical background

To grasp modern innovation research, one must start from the knowledge – based paradigm, which posits knowledge to be the core constituent of the economy. In this paradigm, RIS have constituted a prevailing analytical framework. However, while offering valuable perspectives regarding the workings of innovation systems, these approaches have largely disregarded the structural inequalities in the access to research resources.

As a result of the rising value of knowledge as a major economic resource, the knowledge-based paradigm, which regards innovation as a driving force of economic growth, has emerged [6]. In this paradigm, innovation is a cumulative, interactive process of knowledge creation, diffusion, and application, as determined by the individual and collective actors comprising the institutional framework [7].

One of the dominant theoretical models explaining the variation in the innovation performance of regions is the RIS approach [8]. In focus is the role of institutional frameworks, knowledge relations and the interactions among firms, academia, and public institutions in fostering innovation [3].

It is in the described framework that the innovation potential of a specific region is primarily attributed to the structural quality of the institutional frameworks and overall capacity to produce and process new knowledge. In this context, emphasis is placed on efficiency of the system, learning processes and knowledge spillovers [9].

Nevertheless, in the RIS paradigm, the various layers of inequity in the access to scientific and research resources are not sufficiently treated as a specific, analytically structured phenomena; inequity in innovation is primarily attributed to the disparity in the embedded institutional system, the degree of collaboration, or the level of absorptive capacity. This ensures that the problem of inequitable distribution of research and scientific resources is subsumed in the overall system-oriented approaches.

Although the RIS framework stresses institutional interactions and the performance of the system, it overlooks the inequality of spatial dimensions. To solve this issue, one must look toward economic geography, which emphasizes the spatial distribution of economic processes and imbalances among regions.

Kim (2008) analyses spatial inequalities in economic development and innovation-related processes from the perspective of economic geography [10]. Theories of agglomeration focus on the importance of spatial proximity, externalities, and cumulative causation in the uneven development of regions [11]. According to core-periphery theory, economic activity tends to be concentrated in a particular region, as core regions have more developed infrastructure, a better-educated workforce, and stronger institutional frameworks. The core regions obtain cumulative advantages, whereas the peripheral regions tend to be structurally constrained in ways that limit their growth opportunities [12].

The spatial distribution of knowledge-based industries, research institutions, and universities explains the inability of many regions to fully develop their innovative capacity, as well as why certain regions develop more than others. The presence of a well-established scientific infrastructure within a region translates to the region developing additional investment and talent, furthering spatial inequities [13].

Although economic geography provides a clear explanation of the structural disparity between regions, it tends to neglect the dimension of spatial inequity that relates to the uneven distribution and access to R&D. A lot of the time, a region's spatial disparities are seen because of agglomeration, whereas they can be a result of the region's restricted access to research capacity.

While economic geography has its strengths in describing spatial concentration and regional divergence, it generally views inequality because of agglomeration processes. It seldom regards it as a structural constraint. Economic geography combined with the institutional approach provides more insights. For example, the theory of the state and institutional theory can highlight the different structural barriers that determine the uneven distribution of knowledge and technology.

Institutional theory maintains that there are structural obstacles that hinder access to certain knowledge and technological opportunities. Barriers that impede the adoption of technologies and the diffusion of knowledge can account for the disparities in productivity that exist among different countries and regions [14].

Desmet, Greif, and Parente (2020) discuss institutional and spatial mechanisms that shape uneven technological and economic development [15].

In terms of how regions can innovate, available research infrastructure, scientific capabilities, and funding mechanisms to carry out research are not available equally, which creates disparities and can improve or inhibit a region's ability to engage in knowledge production. This means that institutional constraints are responsible for explaining why research capacity building for certain regions is so consistently uneven.

Regional disparities are a problem that is primarily attributable to institutional barriers. Such a conclusion, however, is rarely articulated when examining the access to R&D and how it is restricted, especially in the context of innovation systems, regional development, and technological advancements, which is where the discourse primarily remains.

Each theoretical perspective review contributes to understanding regional inequality, but none of them engages with R&D access as a separate analytical dimension. This indicates a significant theoretical gap that should be addressed. The literature advocates that the leading paradigms of knowledge concentrate on the analysis of knowledge, systems, performance, and innovation networks, whereas the unequal research capacity connectivity and distribution of conceptual frameworks are less analyzed.

The RIS literature analyses the system structure and interrelations of system actors, but not the unequal distribution of system resources. The economic geography literature analyses the uneven distribution of knowledge and its geographic concentration through agglomeration but does not treat R&D as an analytical dimension of the uneven distribution of knowledge. The institutional theory literature analyses barriers to knowledge diffusion but does not address these barriers in the context of the uneven distribution of research capacity.

Consequently, the research traditions have largely considered the issue of access to R&D as an embedded structure, the essence of which is the significant and weakening structural disparities of research capacity and its critical role in region development. It is assumed that defining access to R&D as an independent dimension of the innovation process will elucidate the overall situation of spatial imbalance in the process of innovation.

Existing theoretical traditions on regional development and the dynamics of innovation remain useful but have a salient limitation in the existing literature: the structural condition of access to R&D (research and development) is absent. Although the RIS approach is system-oriented in its considerations of interaction and system dynamics, it hardly questions the distribution of resources. From the vantage point of Economic Geography, spatial concentrations of economic activities arise through specializations of agglomeration and clustering, but inequality is considered an unintended outcome of the system as opposed to a condition of differential access to research capacity. Barriers are identified by the Institutional Theory, but they are not integrated into a systematic, locational, or spatial dimension of R&D access.

On the basis of the theoretical synthesis, this study proposes a three-part conceptual framework for the future analysis of R&D access. Material access refers to research infrastructure, laboratories, and the availability of research funding; cognitive access refers to scientific capacity, skilled human resources, and knowledge networks; and institutional access refers to policies, governance arrangements, and inclusion in research systems. These dimensions are proposed as an analytical agenda for subsequent empirical research rather than as categories directly tested by the present bibliometric analysis.

By conceptually distinguishing R&D access from the broader innovation value chain, the proposed framework shifts attention from innovation outcomes toward the structural conditions that shape participation in knowledge production. Such approach helps better understand the worrying persistence of regional disparities and expand interpretation of structural biases which have been identified through bibliometric methods.

Materials and methods

This study's methodological contribution stems from the lack of an analytical framework considering the differences in access to R&D. Traditionally, bibliometric analyses in the fields of innovation and economic geography focus on dominant trajectories and formalized structures. Those approaches overlook underdeveloped themes, such as 'access to R&D' as a theme in Research and Development.

This study addresses this gap through a bibliometric mapping approach that combines broad and focused levels of interpretation. The broad level identifies the dominant thematic structure of the research field, whereas the focused level examines how concepts related to R&D access and inequality are positioned within that structure. Rather than treating these levels as two independent bibliometric datasets, the study uses them as complementary analytical perspectives within the same

integrated corpus. This approach makes it possible to distinguish between well-established thematic domains and comparatively weak or fragmented access-related themes.

The methodological value of this design lies in moving beyond the identification of dominant themes toward the examination of comparatively underrepresented thematic positions. In this study, the approach is used to assess whether R&D access appears as a consolidated research stream or remains dispersed across broader traditions in regional innovation, economic geography, and inequality research.

Figure 1 presents the analytical logic of the study as a sequence of broad and focused interpretive stages. The terms “baseline mapping” and “refined mapping” refer to two analytical levels applied to the same integrated bibliometric corpus rather than to two independently generated bibliometric datasets. The baseline stage identifies the dominant thematic configuration of the field, while the refined stage focuses on the relative position of R&D – access – and inequality – related concepts within that same network. The comparative stage therefore represents an interpretive comparison of thematic prominence rather than a comparison of two separate maps.

The research design follows a structured multi-stage approach:

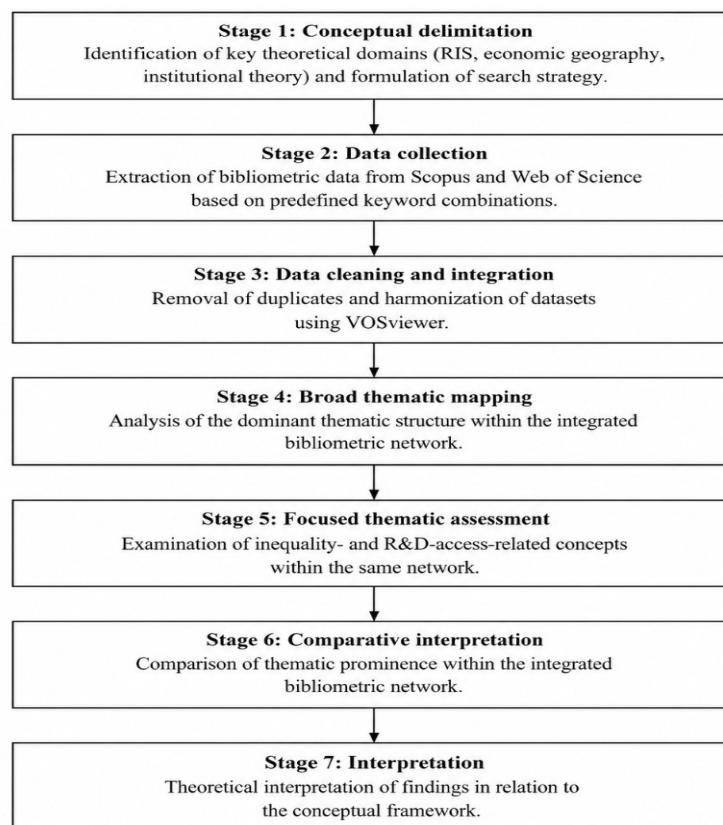


Figure 1 – Research design and stages of analysis

Creating a complete bibliometric dataset reflecting the main and developing research themes is essential to put the research design into practice.

To maintain breadth in the analysis of the scientific literature, bibliometric data were retrieved from the Web of Science Core Collection and Scopus databases. The search strategy was developed to place the focus analytically on the R&D and innovation literature, without the literature seeking to overshadow the issue of R&D and innovation inequities.

In accordance with the research design, the search query was formulated based on a combination of keywords associated with research, accessibility, and spatial inequality. The primary reasoning

behind the construction of the search was focused on the interaction of the concepts of access and inequality, and the associated regional or spatial dimensions. The search included combinations of keywords such as “R&D inequality”, “research inequality”, “access to R&D”, “research infrastructure”, “scientific capacity”, “territorial inequality”, “spatial inequality”, “core-periphery”, and “peripheral regions”. These terms were combined with spatial descriptors including regional, spatial, territorial, geography, and disparity.

To ensure transparency and reproducibility of the search procedure, database-specific search strings were formulated in accordance with the keyword combinations described above. For Scopus, the search was conducted in the title, abstract, and keyword fields using the following query:

Scopus: TITLE-ABS-KEY ((“R&D inequality” OR “research inequality” OR “access to R&D” OR “research infrastructure” OR “scientific capacity” OR “territorial inequality” OR “spatial inequality” OR “core-periphery” OR “peripheral regions”) AND (regional OR spatial OR territorial OR geography OR disparity)).

For the Web of Science Core Collection, the corresponding topic search was conducted using:

Web of Science: TS = ((“R&D inequality” OR “research inequality” OR “access to R&D” OR “research infrastructure” OR “scientific capacity” OR “territorial inequality” OR “spatial inequality” OR “core-periphery” OR “peripheral regions”) AND (regional OR spatial OR territorial OR geography OR disparity)).

In both databases, the search results were subsequently limited to the 2014–2025 publication period, English-language peer-reviewed journal articles, and subject areas relevant to economics, regional studies, geography, development studies, and the social sciences. Records predominantly associated with engineering and the natural sciences were excluded.

To enhance coverage and mitigate potential database-specific bias, bibliographic records were retrieved from both Scopus and the Web of Science Core Collection. The initial search yielded 6,588 records from Scopus and 1,072 records from Web of Science, producing a combined pool of 7,660 records. Following database merging, screening, and harmonization of the bibliographic records, the analytical dataset contained 7,592 records. The archived materials available for the present revision do not preserve a sufficiently detailed stage – by – stage screening log to distinguish with certainty between records removed through duplicate identification and records excluded during bibliographic harmonization. Accordingly, the difference of 68 records is reported here as the total reduction during dataset integration rather than being attributed exclusively to duplicate removal. Duplicate identification and bibliographic harmonization were based on available bibliographic metadata, including publication titles and other matching record information. Because the original screening protocol and software-version record are no longer available, the precise matching hierarchy (for example, DOI-based versus title – and – year matching) cannot be reconstructed with confidence. Because the original item – level screening log is no longer available, the exact number removed by each individual screening criterion cannot be reconstructed retrospectively. For this reason, only the verified aggregate counts before and after dataset integration are reported.

After data is compiled and prepped, analysis centers on understanding the conceptual framework of the discipline by evaluating occurrence of keywords.

For identifying the conceptual framework of the research domain, a co-occurrence analysis was performed using VOSviewer on the keywords of authors. Author keywords were used because they encapsulate the focus of the research as articulated by the authors. Before interpretation of the keyword network, the retained keyword set was reviewed for obvious non-conceptual and duplicated entries. Classification codes appearing as keywords, including JEL – type codes, were treated as non-substantive metadata and excluded from conceptual interpretation. Singular and plural variants referring to the same concept were treated as equivalent during interpretation (for example, “peripheral region” and “peripheral regions”, “university” and “universities”). Geographic names were retained only as contextual indicators of the spatial orientation of the literature and were not

interpreted as independent conceptual themes. Because the original VOSviewer thesaurus file is not available in the archived materials, the present revision does not claim a fully re-generated thesaurus-cleaned network; instead, the analysis explicitly distinguishes substantive conceptual terms from classification and geographic labels when interpreting the maps. A minimum occurrence threshold of five was applied, resulting in the inclusion of 106 author keywords in the final network. The archived analytical output does not preserve the total number of distinct author keywords prior to application of the threshold or the item-level occurrence and total link strength statistics; therefore, these values are not reconstructed retrospectively. These keywords formed 9 thematic clusters, which denote the principal intellectual structures in the literature. The use of keyword co-occurrence analysis and VOSviewer follows established bibliometric mapping procedures and methodological guidelines [16–18].

Literature network visualization reveals the organizing themes around central concepts of regional development and peripheral regions, which serve as bridging nodes for the integration of multiple thematic streams.

Results

The results of the bibliometric study reveal the structural organization of the research domain and the positioning of inequality related to access to R&D in the field. The network visualization gives a snapshot of the major thematic groupings that articulate the field's intellectual framework. The network visualization (Fig.2) illustrates the major thematic clusters that structure the intellectual organization of the field.

Regional innovation policy and economic geography are the focus of Cluster 1 which includes RIS, innovation policy, smart specialization, SMEs, path creation, and regional disparities, among others. This cluster showcases the prevalent policy-oriented viewpoint among regional innovation researchers.

Taking on the themes of territorial inequality and spatial justice, Cluster 2 captures the concepts of place-based policy, uneven development, spatial structure, regional policy, and social capital. This cluster represents the rising concern for pronounced structural inequality within territories.

Regional development processes and the respective institutional frameworks are what Cluster 3 concerns itself with, looking at geography, collaboration, institutions, sustainability, and urban development. The core-periphery and global production network theories, including concepts of globalization, strategic coupling, and governance, along with the semi-periphery concept, are captured within Cluster 4. This cluster retains the structural viewpoints on regional inequality within global systems.

Cluster 5 encompasses peripheral regions and encompasses concepts of evolutionary economic geography, including path development, agency, and spatial analyses. Included in Cluster 6 are concepts of socio-economic inequality, including poverty, inequality, and social mobility in association with regional growth, linking social outcomes to spatial disparities.

The presence of inequality, both regionally and spatially, is represented by Cluster 7 as a distinct research avenue. Regional innovation, university linkages, and clustering approaches are included in Cluster 8's integration of innovation & competitiveness literature and regional innovation. The basic theoretical perspectives on the spatial concentration of economic activity are represented by agglomeration theory and the new economic geography, which Cluster 9 pertains to. The nine-cluster structure is described qualitatively based on the thematic composition visible in the network. Because the archived materials available for this revision do not contain item-level VOSviewer statistics, quantitative cluster totals, occurrence counts, and total link strength values cannot be reported reliably and have therefore not been reconstructed retrospectively.

The resulting network is dominated by broader concepts such as regional development, peripheral regions, core-periphery relations, and spatial inequality rather than by explicit R&D – access terminology. This pattern is analytically important because it indicates that, even within a corpus constructed around research, inequality, accessibility, and spatial descriptors, the literature tends to articulate these issues through established regional-development and economic – geography vocabularies rather than through a consolidated terminology of “R&D access”. Accordingly, the absence of a prominent access – specific node is interpreted here as an indication of terminological and thematic fragmentation rather than as evidence that the underlying substantive issue is absent from the literature.

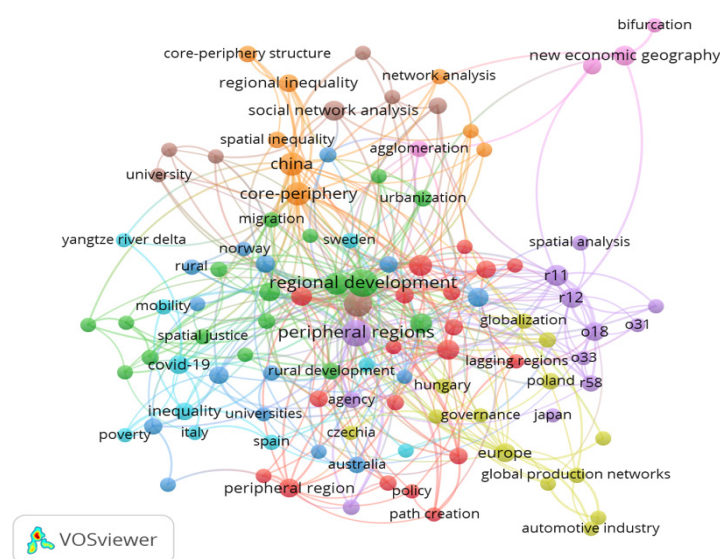


Figure 2 – Network visualization of author-keyword co-occurrence based on the integrated Scopus and Web of Science dataset (2014–2025)

The nine clusters identified in the network are described and interpreted in the accompanying text; the color coding in the visualization corresponds to the cluster structure generated by VOSviewer. Although the network map captures the structural configuration of the field, it does not reflect its temporal dynamics. To overcome this limitation, the overlay visualization is examined.

Fig. 3 illustrates the evolution of the field over time, showing that earlier contributions are closely associated with foundational concepts in economic geography, such as agglomeration and core-periphery models. The colour scale in the overlay visualization represents the average publication year of each keyword rather than the full temporal coverage of the dataset. Therefore, although the bibliometric dataset covers 2014 – 2025, the displayed colour range is narrower because the average publication years of the keywords included in the network fall predominantly within this interval.

Recent works, however, begin to pay attention to spatial and territorial inequality, regional resilience, and place-based policies. Other recent works on spatial justice, accessibility, and research infrastructure, illustrate a growing focus on the more explicit consideration of the mechanisms involved in the unequal distribution of resources.

The visualization suggests that themes directly related to inequality in access to R&D are less visibly consolidated than dominant themes such as regional development, peripheral regions, and core-periphery relations. In the absence of archived item-level occurrence and total link strength statistics, this pattern is interpreted as a qualitative bibliometric indication rather than as a quantitative ranking of thematic importance.

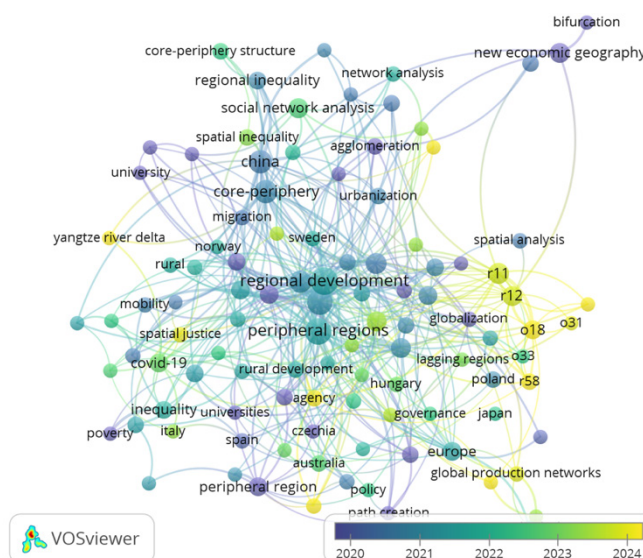


Figure 3 – Overlay visualization of the same author-keyword network according to average publication year

Beyond structural and temporal analyses, density visualizations offer supplementary insights into research activity intensity across different thematic domains.

As illustrated in Fig. 4, the density map indicates that research activity is most strongly concentrated around regional development and peripheral regions, which function as central integrative frameworks within the field. By contrast, themes related to inequality and access to research resources occupy medium-density areas, suggesting that while the topic remains insufficiently consolidated, it is gradually gaining traction in the literature.

Research infrastructure, spatial inequality, and territorial inequality appear within the broader thematic structure, but their relative prominence cannot be established quantitatively from the archived visualization alone. Their position is therefore interpreted cautiously as evidence of a comparatively weakly consolidated thematic area.

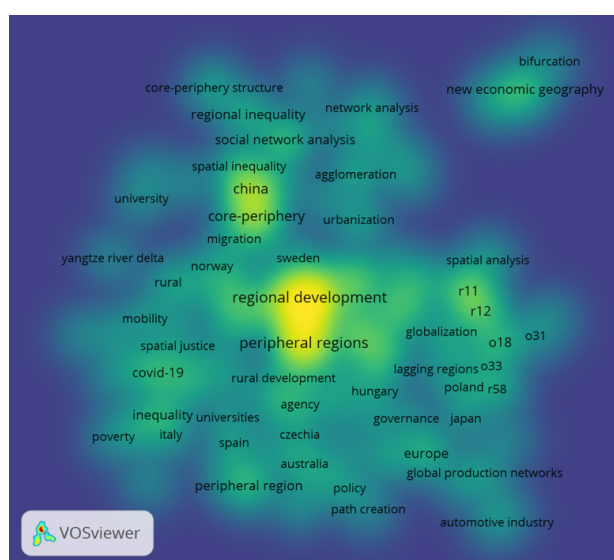


Figure 4 – Density visualization of the same author-keyword network, highlighting areas of relatively higher keyword concentration

Discussion

The results of this research show that insufficient R&D access-related inequalities do exist in the scientific debate. These structural inequalities are in theories that replace the problem. This brings us to the question, why do these theories remain so poorly developed? In some measure, this is due to the emphasis in the knowledge-centered paradigm which considers knowledge development, dissemination, and collaboration as the main processes. In this paradigm, the concern is directed to the performance of the system and the dynamics of the network. The mobility of research capacity is presumed to be critically underappreciated. Therefore, it is presumed that throughout the process, the system, and the structure, the inequalities of the system which are outcomes of system inefficiencies are the end results. This focus is reinforced by the unbroken prevalence of the RIS framework. Innovation Systems RIS literature describes the way innovation systems work. It explains the systemic interaction and the system cohesion. However, the literature does not describe the distribution of access to these systems. This leads to an imbalance where access to fundamental resources is seen as differences in the overall quality of the system. The same is seen in economic geography where inequalities and disparities are accounted for agglomeration and cumulative causation. However, this perspective gives less explicit attention to inequalities in the distribution of R&D capacity and to the cumulative disadvantages that may arise from unequal access to research resources. Finally, the placement of R&D on the bibliometric maps shows a marginal position. The research positions are floating. Fragmentation of the research is seen throughout the multi-disciplinary, multi-tradition branches of research.

The implications of this conceptual gap are pronounced. First, it reduces the effectiveness of current theories to account for long-standing regional inequalities. Second, it limits the range of policies to those aimed at the improvement of system efficiency rather than the alleviation of structural imbalances of the research capacity. Third, it continues the process of cumulative advantage by strengthening the hold of existing developed regions in the global research arena.

Recent studies similarly demonstrate persistent inequalities in scientific participation and the cumulative concentration of scientific capacity across regions and research systems [19, 20].

This study posits that access to R&D should be framed as a separate dimension. This will enhance the understanding of regional disparities, not simply as a difference in the result, but as an imbalance of the underlying conditions in the production of knowledge.

Limitations

This study has several limitations that should be considered when interpreting its findings. First, the analysis relies on author – provided keywords. A concept related to unequal access to R&D may therefore be present in an article without being expressed through the exact terminology visible in the bibliometric network; related ideas may appear under alternative labels such as research capacity, scientific capacity, research infrastructure, or science funding. Second, the use of Scopus and the Web of Science Core Collection and the restriction to English-language peer-reviewed journal articles introduce database and language coverage biases, which are particularly relevant in a study of global research inequality. Third, the minimum occurrence threshold of five affects which keywords are included in the final network and may exclude rare but conceptually important terms. Fourth, keyword co-occurrence analysis primarily reflects the vocabulary and relational structure of a research field rather than its full conceptual substance. Accordingly, the comparatively weak visibility of explicit R&D – access terminology should be interpreted as evidence of limited thematic consolidation rather than as proof that the underlying substantive issue is absent from the literature.

Conclusion

Inequality in access to R&D represents an underdeveloped area within research on the regional dimensions of the global knowledge landscape. Most research has focused on innovation systems, the spread of knowledge, and the uneven allocation of economic outcomes. The uneven distribution of research capacity is a gap in the literature that has yet to be explicitly defined as a field of inquiry.

Using a bibliometric mapping approach with broad and focused levels of interpretation, this study identifies patterns of thematic underrepresentation in the coverage of research topics. The most dominant knowledge – centered paradigms tend to privilege systems interactions and knowledge flow, and the distributive side of research capacity is less explicitly defined. The structure of the research suggests that the inequality of access to R&D is embedded within the RIS, economic geography, and institutional theory, yet lacks a defined research trajectory.

This research contributes to the literature by providing bibliometric evidence supporting the conceptualization of inequality in access to R&D as a distinct analytical dimension of regional inequality. By defining the inequities of the research environment, the scientific knowledge, and the institutional support as structural weaknesses of an innovation system, it enhances and enriches the existing frameworks on the regional development dynamics.

The analysis also illustrates the value of examining both dominant and comparatively weak thematic positions within a bibliometric network. This approach helps identify research topics that may be present in the literature but remain fragmented or insufficiently consolidated relative to established research streams.

From a conceptual and policy perspective, the findings suggest that regional innovation strategies may benefit from greater attention to the territorial distribution of research capacity and access to R&D resources. This implication follows from the conceptual argument developed in the study rather than from a causal effect demonstrated by the bibliometric analysis. Addressing structural barriers to research infrastructure, scientific capacity, and institutional participation may therefore represent a relevant direction for future regional innovation policy and empirical investigation.

The research emphasizes the need to improve the inclusion construct in innovation research and opens the door for the analysis of the structurally embedded inequities in the knowledge production processes. More in-depth studies could analyze the interconnections between the distribution of research facilities, the presence or absence of institutional hindrances, and regional innovation performance.

Author Contributions. The authors contributed to the conceptualization, methodology, analysis, interpretation of results, and preparation of the manuscript. All authors reviewed and approved the final version of the manuscript.

Conflict of Interest. The authors declare no conflict of interest.

Data Availability. The bibliographic data analyzed in this study were retrieved from Scopus and the Web of Science Core Collection. The processed item-level bibliometric dataset and VOSviewer network files are not publicly archived. The methodological parameters required to understand the search and analytical procedure are reported in the manuscript.

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ҒЗТҚЖ-ҒА ҚОЛЖЕТІМДІЛІКТЕГІ ТЕҢСІЗДІКТІ ҚАРТАЛАУ: ЖАҒАНДЫҚ ЗЕРТТЕУ ЛАНДШАФТЫНА ҚОС БИБЛИОМЕТРИЯЛЫҚ ТАЛДАУ

Аңдатпа

Бұл жұмыс жаһандық зерттеу ландшафтындағы ҒЗТҚЖ-ға қол жеткізу теңсіздігінің көрінісін қарастырады және оның жеке аналитикалық категория ретінде тұжырымдамалық тұрғыдан дамымау себептерін бағалайды. Аймақтық инновациялық жүйелер (RIS), экономикалық география және институционалдық теория салаларында көптеген зерттеулер жүргізілгенімен, қолданыстағы еңбектер жүйедегі үдерістер мен шарттарға және білім өндірісіне кімнің қатыса алатынына емес, инновация нәтижелері мен оның түпкілікті өнімдеріне бағытталған. Ғылыми-зерттеу инфрақұрылымындағы, ғылыми әлеуеттегі, ғылыми зерттеулер жүргізуге арналған қаржылық ресурстардағы және ғылыми зерттеулерді қаржыландырудағы теңгерімсіздік теориялық тұрғыдан жеткіліксіз негізделген және көп жағдайда қолданыстағы басым теорияларда тиісті деңгейде қарастырылмаған. Бұл зерттеу 2014–2025 жж. Scopus және Web of Science деректеріне негізделген библиометриялық карталаумен бекітілген қосарлы зерттеу әдістемесін пайдалану арқылы осы бағытта ілгерілеуге ұмтылады. Зерттеуде қолданылған әдістеме негізгі зерттеу салаларының картасы мен қол жеткізу және теңсіздікке қатысты әртүрлі тұжырымдамалардың неғұрлым бағдарланған картасын біріктіреді, бұл басым және шеткері тақырыптық бағыттарды анықтауға мүмкіндік береді. ҒЗТҚЖ-ға қол жеткізудің маңыздылығы мойындалғанымен, тең емес жағдайларда ҒЗТҚЖ-ға қол жеткізу мәселесі көптеген зерттеу салалары мен бір-бірінен ажыратылмаған шеткері зерттеу бағыттары арасында шашыраңқы қарастырылған. Зерттеу библиометриялық теорияны жетілдіреді, ҒЗТҚЖ-ға қол жеткізуді аймақтық теңсіздіктің зерттеу өлшемі ретінде қарастырады және жаһандық зерттеу жүйесіндегі қосарлы теңгерімсіздікті айқындайды.

Түйін сөздер: ҒЗТҚЖ-ға қол жеткізудегі теңсіздік, аймақтық инновациялық жүйелер, экономикалық география, библиометриялық талдау, қосарлы кескіндеу, ғылыми-зерттеу инфрақұрылымы, кеңістіктік теңсіздік, білімді өндіру, аймақтық теңсіздік.

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КАРТИРОВАНИЕ НЕРАВЕНСТВА В ДОСТУПЕ К НИОКР: ДВОЙНОЙ БИБЛИОМЕТРИЧЕСКИЙ АНАЛИЗ ГЛОБАЛЬНОГО ИССЛЕДОВАТЕЛЬСКОГО ЛАНДШАФТА

Аннотация

В данной статье рассматривается представление неравенства в доступе к НИОКР в глобальном исследовательском ландшафте и оцениваются причины отсутствия его концептуального развития как самостоятельной аналитической категории. Несмотря на значительную работу в области региональных инновационных систем (РИС), экономической географии и институциональной теории, существующие исследования сосредоточены на результатах инноваций и конечных продуктах инноваций, а не на процессах и условиях внутри системы и на том, кто участвует в производстве знаний. Дисбаланс в исследовательской инфраструктуре, научном потенциале, финансовых ресурсах для проведения исследований и финансировании научных исследований плохо теоретизирован и в большинстве случаев некорректно рассматривается в существующих доминирующих теориях. Данное исследование направлено на достижение прогресса в этой области с использованием двойной методологии исследования, основанной на библиометрическом картировании на основе данных Scopus и Web of Science за 2014–2025 гг. Методология, использованная в данном исследовании, сочетает в себе картирование основных исследовательских областей и более целенаправленное картирование различных концепций, связанных с доступом и неравенством, что позволяет выявить как доминирующие, так и маргинальные тематические структуры. Признана возможность доступа к НИОКР; однако доступ к НИОКР на неравных условиях, по-видимому, фрагментирован по многим исследовательским областям и неразличимым периферийным областям исследований. Исследование расширяет библиометрическую теорию, рассматривает доступ к НИОКР как исследовательский аспект регионального неравенства и проливает свет на двойной дисбаланс в глобальной исследовательской системе.

Ключевые слова: неравенство в доступе к НИОКР, региональные инновационные системы, экономическая география, библиометрический анализ, двойное картирование, исследовательская инфраструктура, пространственное неравенство, производство знаний, региональное неравенство.