Pratama-cek

by Twenty Oktavia Pujiliana

Submission date: 26-Sep-2025 03:32AM (UTC+0100)
Submission ID: 2762311480
File name: Pratama-cek.docx (7.88M)
Word count: 5804
Character count: 38267

A BIBLIOMETRIC ANALYSIS OF INCENTIVES FOR INNOVATION IN PUBLIC POLICY RESEARCH

***M. Rizki Pratama[1)], Ajie Hanif Muzaqi[2)], Safaruddin Hisyam Tualeka[3)], Ni Putu Febi Wulandari[4)], Anisa Maharani[5)]**

Abstrak

Studi ini menganalisis 392 publikasi terindeks Scopus (1975–2025) tentang insentif inovasi dalam kebijakan publik dengan metode bibliometrik melalui bantuan aplikasi Bibliometrix®. Hasilnya menunjukkan pertumbuhan rata-rata 7,66% per tahun, dengan peningkatan yang signifikan pasca tahun 2010 ketika insentif inovasi semakin relevan dalam agenda keberlanjutan dan transformasi digital. Publikasi topik tersebut banyak terkonsentrasi pada beberapa jurnal top—seperti Sustainability (Swiss), Research Policy, dan Journal of Cleaner Production—dengan Research Policy paling berpengaruh. Analisis kata kunci memperlihatkan pergeseran fokus dari insentif fiskal dan regulasi menuju isu yang lebih luas seperti keberlanjutan, tata kelola, dan budaya organisasi. Perkembangan tema juga menunjukkan perubahan dari studi sektoral (misalnya farmasi) ke perspektif sistemik tentang inovasi kolaboratif, transformasi digital, dan pembangunan hijau. Jejaring kolaborasi antarnegara memperlihatkan Amerika Utara, Eropa, dan Tiongkok sebagai pusat utama, sementara negara di Amerika Latin dan Afrika masih terbatas secara regional, menandakan adanya ketimpangan global. Secara keseluruhan, penelitian tentang insentif inovasi berkembang pesat dan bersifat lintas disiplin, akan tetapi masih terfragmentasi terlihat dari integrasi teori yang terbatas dan representasi geografis yang tidak merata. Penelitian ke depan perlu memperkuat kerangka perbandingan, keragaman metodologi, serta kolaborasi Negara-Negara Utara dan Selatan agar dapat menghasilkan teori dan praktik kebijakan yang lebih inklusif dan sesuai konteks.

Kata Kunci: insentif inovasi; bibliometrik; kebijakan publik

Abstract

This study examines 392 Scopus-indexed publications (1975–2025) on innovation incentives in public policy using bibliometric methods through the Bibliometrix® application. Findings show a 7.66% annual growth rate, accelerating after 2010 as innovation incentives gained prominence in sustainability and digital transformation agendas. Research output is concentrated in core journals such as Sustainability (Switzerland), Research Policy, and the Journal of Cleaner Production, with Research Policy leading in scholarly impact. Keyword analysis and thematic mapping indicate a shift from fiscal and regulatory instruments toward broader themes of sustainability, governance, and organizational culture. Thematic evolution further reflects a movement from sector-specific cases, such as pharmaceuticals, to systemic perspectives on collaborative innovation and green development. Conceptual and co-occurrence analyses reveal two dominant orientations: one focused on economic and regulatory tools, the other on governance and sustainability. International collaboration networks highlight North America, Europe, and China as key hubs, while Latin America and Africa remain more regionally confined, underscoring global research asymmetries. Overall, the field is rapidly expanding and interdisciplinary but remains fragmented, with limited theoretical integration and uneven geographic representation. Strengthening comparative frameworks and fostering North–South collaboration are essential for more inclusive and context-sensitive policy insights.

Keywords: *innovation incentives; bibliometric; public policy*

INTRODUCTION

Innovation incentives are increasingly recognized as pivotal levers of public sector transformation, enabling governments to stimulate creativity, enhance service delivery, and improve organizational performance (Demircioglu, 2024; Sørensen, 2012). Unlike the private sector, where incentives primarily revolve around profit maximization, the public sector faces unique barriers such as bureaucratic inertia, risk aversion, and asymmetric reward structures (Dixit, 2002). These dynamics complicate the design of effective incentive systems and raise important questions about their adaptability across institutional contexts.

The landscape of innovation incentives is diverse, including tax incentives, direct subsidies, awards, and organizational mechanisms. Each type operates under different institutional logics and demonstrates varied levels of effectiveness (Crespi et al., 2016; Liu et al., 2019). Research highlights the

context sensitivity of these incentives: while R&D tax credits may increase input expenditures, subsidies often produce more consistent performance outcomes, especially in developing economies (Steinmo et al., 2022). Awards and recognition programs, by contrast, provide symbolic value and reputational legitimacy but risk crowding out intrinsic motivation if poorly designed (Reeson & Tisdell, 2008; Rosenblatt, 2011).

Recent work emphasizes that the effectiveness of incentives is mediated by governance frameworks and organizational culture. Studies of multi-level governance show that central, regional, and local policies interact in complex ways, with coordination and meta-governance proving critical for effective outcomes (Christensen & Serrano Velarde, 2018; Koschatzky & Kroll, 2007). At the organizational level, leadership support, accountability, and innovation-oriented cultures enhance the impact of incentives (Demircioglu, 2024; Tran et al., 2020).

Despite steady growth since 2010, the field remains fragmented, with a lack of unified theoretical frameworks linking fiscal, organizational, and governance dimensions (Cheng & Zhang, 2025). Bibliometric methods provide a systematic way to map this intellectual terrain, identifying thematic clusters, conceptual structures, and global collaboration networks (Aria & Cuccurullo, 2017). Accordingly, this article applies bibliometric analysis to Scopus-indexed publications to examine publication patterns, thematic evolution, and collaboration dynamics in the study of innovation incentives in public policy.

RESEARCH QUESTION

This study is guided by three research questions, each corresponding to a key bibliometric indicator:

1. What are the main characteristics of the topic in documents?
2. How has scientific production, key sources, keywords, and thematic/conceptual structures evolved over time?
3. What does the country collaboration network reveal about global research cooperation?

LITERATURE REVIEW

Research on innovation incentives in the public sector can be organized into four main strands: fiscal instruments, non-fiscal recognition mechanisms, organizational and cultural mediators, and governance frameworks (Figure 1).

2.1 Fiscal Instruments

Tax incentives and subsidies dominate the literature. (Crespi et al., 2016) demonstrated that R&D tax incentives in Argentina stimulated firm-level R&D expenditure but produced mixed performance outcomes. (Liu et al., 2019) showed that fiscal policies improved innovation efficiency in China, though results varied across regions. Comparative studies suggest that subsidies are often more effective than tax incentives in achieving long-term efficiency gains (Steinmo et al., 2022). Evidence from Thailand and India confirms the role of tax credits but highlights their uneven distributional impact ((Kaushik, 2023; Muthitacharoen, 2021).

2.2 Non-Fiscal Incentives

Non-financial incentives such as innovation awards and recognition programs also feature prominently. (Rosenblatt, 2011) found that awards in the public sector influenced both individual and organizational behavior, though their effects depended on context. (Huang et al., 2015) demonstrated that awards can enhance firms' ability to access funding and strengthen innovation capacity. Yet, as (Reeson & Tisdell, 2008)argued, extrinsic rewards may crowd out intrinsic motivation if not carefully balanced with cultural and organizational support.

2.3 Organizational and Cultural Factors

A growing body of work stresses the role of organizational culture and leadership. (Byun, 2022)) showed that intrinsic incentives, reinforced by

corporate culture, can significantly enhance innovation outcomes. (Tran et al., 2020) found that innovation-oriented cultures improve public sector performance, particularly when coupled with strong accountability systems. (Demircioglu, 2024) likewise emphasized leadership support and institutional flexibility as critical enablers of innovation.

2.4 Governance Frameworks

Finally, governance perspectives highlight the importance of multi-level and meta-governance. (Koschatzky & Kroll, 2007) argued that regional governance structures shape how incentives operate, while (Christensen & Serrano Velarde, 2018) stressed the role of advisory bodies and policy learning in aligning innovation incentives. (Zurbriggen & Lago, 2019) showcased how experimental policy labs in Uruguay provided tools for testing and evaluating incentive schemes in real-world contexts.

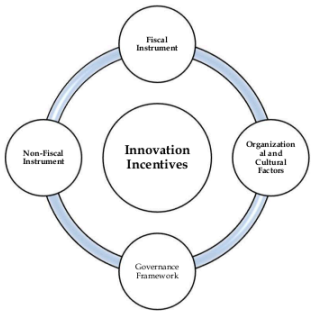

Figure 1. Innovation Incentives Strand
Source: Authors' Elaboration

RESEARCH METHOD

3.1 Data Collection

This study is based on a bibliometric analysis of peer-reviewed documents retrieved from the Scopus database. Scopus was chosen due to its extensive coverage of international journals across public policy, public administration, and public management, as well as its strong indexing of innovation-related publications. The search strategy combined the terms "*innovation incentives*" OR "*incentives for innovation*" OR "*incentives to innovate*") AND "*public sector*" OR "*public organization*" OR "*public policy*" OR "*government*" OR "*bureaucracy*") in titles, abstracts, and keywords. The final query as search strategy employed is:

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TITLE-ABS-KEY ( "innovation incentives" OR "incentives for innovation" OR "incentives to innovate" ) AND ( "public sector" OR "public organization" OR "public policy" OR "government" OR "bureaucracy" ) AND ( LIMIT-TO ( DOCTYPE , "ar" ) ) AND ( LIMIT-TO ( PUBSTAGE , "final" ) ) AND ( LIMIT-TO ( SRCTYPE , "j" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" ) )
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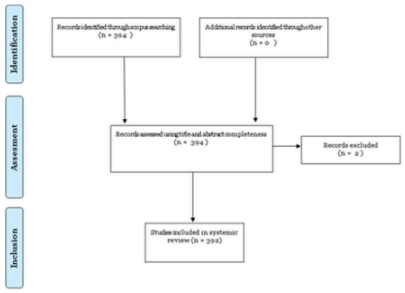
The query returned 394 records spanning the period 1975–2025, encompassing both early conceptual discussions and recent empirical studies. The inclusion criteria limited the dataset to journal articles, conference papers, and book chapters indexed in Scopus. Non-scholarly materials such as editorials, notes, and trade press articles were excluded.



Graph 1. Data Collection Process
Source: By Author

After manual screening to remove irrelevant (metadata completeness) items (graph 1), the final dataset comprised 392 documents published across 261 sources. The metadata included bibliographic

information (authors, titles, sources, affiliations), abstract and keyword data, and cited references.

3.2 Analytical Approach

Bibliometric methods are particularly suitable for mapping fragmented fields such as innovation incentives, where research spans multiple disciplines and publication outlets. Following established bibliometric practices (Aria & Cuccurullo, 2017), the analysis was conducted in two stages:

1. Performance Analysis. This descriptive stage involved quantifying publication output, growth rates, leading sources, influential authors, and country-level contributions. Indicators such as annual scientific production, citation trends, and most productive institutions were generated to assess the overall development of the field.
2. Science Mapping. This second stage focused on mapping the intellectual and conceptual structure of the literature. Co-word analysis was used to identify frequently co-occurring terms in author keywords, generating clusters that represent thematic areas. Thematic maps and thematic evolution diagrams were employed to examine the development of these research fronts over time. Additional analyses included co-citation networks, collaboration networks, and trend topics, which provided insight into the intellectual foundations and emerging directions of the field.

3.3 Tools and Software

All analyses were conducted using the Bibliometrix R-package (Aria & Cuccurullo, 2017), specifically through its Biblioshiny web interface. Bibliometrix is a widely adopted tool for comprehensive science mapping, offering reproducible workflows for bibliographic analysis. The software enables integration of performance metrics and network analysis, and it is well-suited for visualizing the thematic and conceptual evolution of a field.

3.4 Indicators

The following bibliometric indicators were employed based on three research questions: 1) Descriptive Profile: What are the main characteristics of the dataset (time span, sources, documents, authors, keywords)?, 2) Dynamics & Structure: How has scientific production, key sources, keywords, and thematic/conceptual structures evolved over time?, 3) Collaboration: What does the country collaboration network reveal about global research cooperation?:

- Descriptive Overview: This indicator provides the basic profile of the dataset, including the time span covered, number of sources, total documents, authors, and keywords, giving an overview of the size and scope of the literature being studied.
- Annual Scientific Production: This shows the number of publications per year, helping to identify how interest in the topic of innovation incentives has grown or declined over time.
- Three-Field Plot (Authors–Keywords–Sources): This visualization links the most productive authors, the keywords they use, and the journals where they publish, allowing us to understand who is publishing what, and where.
- Most Relevant Sources: This highlights the journals with the highest number of publications on innovation incentives, identifying the main publication outlets in the field.
- Source Local Impact: This shows the journals that are most influential specifically within the dataset based on local citation scores, revealing which journals are central in shaping the field even if they are not the most globally cited.
- Most Frequent Keywords: This identifies the keywords appearing most often in the dataset, highlighting the main themes and concepts studied in the literature.

- Trend Topics: This tracks how keywords or research topics have emerged, peaked, or declined over time, showing the evolution of research focus.
- Keyword Co-Occurrence Network: This maps how often keywords appear together in the same papers, revealing clusters of related concepts and thematic connections.
- Thematic Map: This classifies themes based on relevance (centrality) and maturity (development), showing which themes are well-developed, emerging, or marginal in the field.
- Thematic Evolution: This illustrates how research themes have changed across different time periods, helping to track the continuity, emergence, or decline of themes.
- Factorial Analysis (Conceptual Clusters): This groups documents or keywords into conceptual clusters, identifying the intellectual structure and underlying patterns of the field.
- Country Collaboration Network: This visualizes international co-authorship, showing which countries collaborate most actively and where global research hubs are located.

These indicators provide a multi-layered view of the intellectual landscape, combining quantitative performance data with qualitative insights into thematic development.

RESULT AND DISCUSSION

4.1 Descriptive Overview

The descriptive overview (table 1) highlights that innovation incentive research is a growing and maturing field, with 392 publications from 1975–2025 and an annual growth rate of 7.66%. This reflects the rising importance of innovation in public governance and policy (Demircioglu, 2024). The average of 27 citations per document suggests solid academic influence, though the average document age of eight years shows the field is still consolidating its theoretical foundations (Cheng & Zhang, 2025).

Table 1. Main Information

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	1975:2025
Sources (Journals, Books, etc)	261
Documents	392
Annual Growth Rate %	7.66
Document Average Age	8.08
Average citations per doc	27.29
References	3176
DOCUMENT CONTENTS	
Keywords Plus (ID)	1423
Author's Keywords (DE)	2266
AUTHORS	
Authors	959
Authors of single-authored docs	72
AUTHORS COLLABORATION	
Single-authored docs	73
Co-Authors per Doc	2.54
International co-authorships %	22.96
DOCUMENT TYPES	
article	392

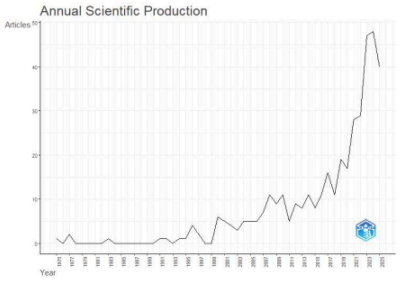
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.

Collaboration patterns indicate an average of 2.54 co-authors per article, with nearly 23% international collaboration, pointing to increasing but still uneven global engagement. As (Crespi et al., 2016) note, much of the evidence remains concentrated in high-income contexts, underscoring the need for greater inclusion of developing regions.

Finally, the dataset's reliance on peer-reviewed journal articles (100%) demonstrates scholarly maturity. Overall, the descriptive overview shows a field that is expanding in volume and collaboration yet still fragmented in theory and geography.

4.2 Annual Scientific Production

The annual scientific production of publications on innovation incentives shows a clear upward trajectory from 1975 to 2025 (Graph 2). In the early decades (1975–1990), research activity was sporadic, with fewer than five publications per year and long periods of inactivity. During the 1990s and early 2000s, the field began to gain momentum, averaging around 5–10 publications annually. A major acceleration occurred after 2010, with annual output consistently exceeding 15 publications and peaking above 45 in the early 2020s. This surge corresponds with the global policy emphasis on sustainability, digital governance, and performance accountability, which placed innovation incentives at the center of reform agendas. The trend reflects not only expanding academic interest but also the growing policy demand for evidence-based tools to stimulate innovation in the public sector.



Graph 2. Annual Scientific Production
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.

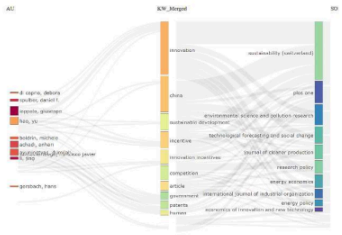
The sharp increase in publications after 2010 underscores how innovation incentives have become a mainstream concern in public policy research. As (Demircioglu, 2024) notes, public sector innovation has gained prominence due to pressures for efficiency and adaptability, while (Crespi et al., 2016) show that fiscal instruments like tax credits are widely evaluated as policy responses. The upward curve also coincides with heightened global debates on sustainability and digital transformation, linking incentives not just to economic growth but also to governance and societal outcomes.

This trajectory suggests that the field is now entering a consolidation stage: it has critical mass, interdisciplinary engagement, and increasing influence, but still requires theoretical integration and broader geographic coverage to mature fully.

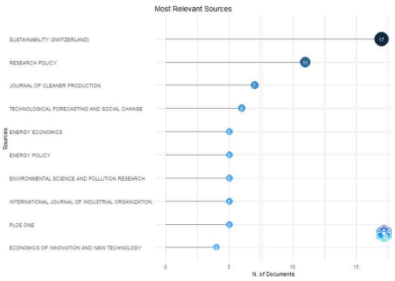
4.3 Three Field Plot (Authors, Keywords, and Sources)

The three-field plot provides important insights into how authors, keywords, and sources interact in shaping the research domain of innovation incentives (Graph 3). First, the visualization confirms the fragmented authorship pattern identified earlier: multiple scholars (e.g., Di Caprio, Spulber, Ioppolo, Hao) contribute to the field, but no single author dominates. This fragmentation reflects the interdisciplinary and dispersed nature of the topic, which draws scholars from economics, management, and public administration (Cheng & Zhang, 2025). Second, the centrality of keywords such as "innovation," "incentive," and "sustainable development" demonstrates that the field is anchored in broad, cross-cutting concepts rather than narrowly defined sub-themes. The prominence of "China" as a keyword highlights the country's rising role in fiscal and sustainability-oriented incentive research (Liu et al., 2019). At the same time, the presence of terms like "government," "competition," and "patents" signals a multidimensional orientation spanning policy design, economic regulation, and organizational outcomes.

Third, the dominance of journals such as *Sustainability (Switzerland)*, *Research Policy*, and *Journal of Cleaner Production* shows that environmental sustainability and governance issues now intersect strongly with the traditional economic literature on R&D subsidies and tax incentives (Crespi et al., 2016). The presence of multidisciplinary journals such as *PLOS One* underscores that the field attracts contributions from both specialized and general outlets, supporting its interdisciplinary identity (Aria & Cuccurullo, 2017).



Graph 3. Three Field Plot
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.



Graph 4. Most Relevant Source
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.

Taken together, the three-field plot highlights both the strengths and limitations of the field: while it benefits from conceptual breadth and cross-disciplinary engagement, it suffers from theoretical dispersion and lack of consolidation around a coherent intellectual core. This reinforces the need for future research to build integrated frameworks that link fiscal incentives, governance structures, and organizational cultures within public sector innovation (Sørensen, 2012).

4.4 Most Relevant Sources

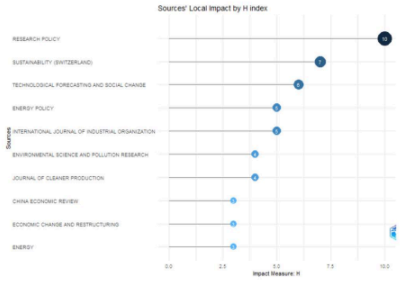
The analysis shows that research on innovation incentives is concentrated in a few core journals. *Sustainability (Switzerland)* leads with 17 publications, followed by *Research Policy* (11) and the *Journal of Cleaner Production* (7), with others like *Technological Forecasting and Social Change* and *Energy Economics* contributing smaller shares (Graph 4).

This concentration highlights two patterns. First, the field has established intellectual hubs: *Research Policy* anchors economic and R&D perspectives, while *Sustainability* reflects the growing integration of incentives into environmental and governance debates. Second, the reliance on a small set of journals also underscores the field's fragmentation—scholarship is split across economics, sustainability, and governance outlets without a unified framework (Cheng & Zhang, 2025).

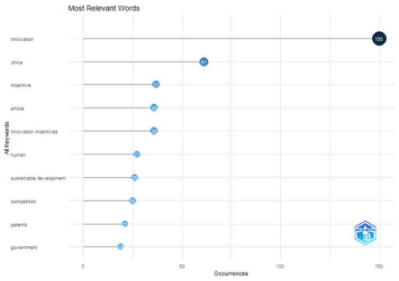
Overall, the prominence of sustainability-oriented journals indicates a thematic shift, with innovation incentives increasingly studied not only as economic tools but also as policy instruments for green and digital transitions (Demircioglu, 2024).

4.5 Source Local Impact

The analysis of sources by local H-index highlights journals with the strongest influence in the innovation incentives literature (Graph 5). *Research Policy* ranks first with an H-index of 10, followed by *Sustainability (Switzerland)* (7) and *Technological Forecasting and Social Change* (6). Other impactful outlets include *Energy Policy*, *International Journal of Industrial Organization*, and *Environmental Science and Pollution Research* (all H = 5). This distribution shows that while *Sustainability* publishes the most articles, Research Policy remains the most impactful outlet, anchoring theoretical and empirical debates on R&D and fiscal incentives (Crespi et al., 2016). Meanwhile, the prominence of *Sustainability* and *Journal of Cleaner Production* demonstrates the field's thematic shift toward sustainability and governance concerns (Demircioglu, 2024).



Graph 5. Source Local Impact
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.



Graph 6. Most Relevant Word
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.

In sum, the impact analysis confirms that innovation incentive research is shaped by a dual core: *Research Policy* provides depth in economic and policy studies, while sustainability-oriented journals expand the agenda toward environmental and governance issues.

4.6 Most Relevant Word

The keyword analysis highlights the conceptual anchors of innovation incentive research (Graph 6). The most frequent term is "innovation" with 150 occurrences, followed by "China" (61), "incentive" (37), "article" (38), "innovation incentives" (38), and "sustainable development" (26). Other frequent terms include "human" (27), "competition" (25), "patents" (21), and "government" (19).

This pattern reflects both the breadth and thematic evolution of the field. While "innovation" and "incentives" remain central, the prominence of "China" underscores the country's growing role in fiscal and green innovation studies. The inclusion of "sustainable development," "government," and "competition" indicates the increasing importance of policy design, governance, and sustainability debates within the literature.

The keyword distribution reveals two key dynamics. First, the dominance of "innovation" and "incentive" confirms the conceptual centrality of these terms, but their broadness also reflects the fragmentation of the field, where studies often lack unified definitions (Cheng & Zhang, 2025). Second, the rise of terms such as "China" and "sustainable development" indicates a thematic shift: research is no longer confined to fiscal instruments but increasingly addresses global challenges such as green transitions and governance reforms (Demircioglu, 2024; Liu et al., 2019). The presence of "government," "competition," and "patents" further demonstrates the interdisciplinary spread across public policy, economics, and innovation management.

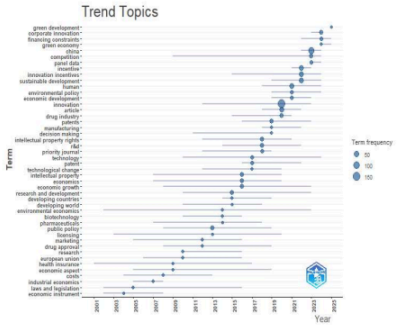
Overall, the keyword analysis reinforces the idea that innovation incentive research is becoming more globally relevant and policy-oriented, though it still lacks theoretical consolidation.

4.7 Trend Topic

The trend topic analysis (Graph 7) illustrates the evolution of themes in innovation incentive research from 2001 to 2025. Early studies emphasized economic instruments, laws and legislation, and industrial economics, reflecting a narrow economic and regulatory orientation. From the mid-2000s to 2015, topics expanded to include R&D, intellectual property, technological change, pharmaceuticals, and public policy, signaling

growing attention to sectoral applications and governance.

In the most recent decade (2015–2025), the focus shifted toward green development, sustainable development, corporate innovation, and the role of China. Terms like competition, financing constraints, and environmental policy also gained prominence, highlighting the link between incentives and broader governance and sustainability challenges.



Graph 7. Trend Topic
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.

The trend topics reveal a clear thematic transition in the literature. Initial research focused heavily on fiscal and regulatory tools, consistent with classical economic views of incentives (Crespi et al., 2016). Over time, the agenda broadened to address governance, intellectual property, and sector-specific applications (Margetts, 2011).

The recent prominence of terms such as "green development" and "sustainable development" reflects the global policy turn toward sustainability and digital governance (Demircioglu, 2024). The frequent appearance of "China" highlights its growing influence as both a research context and a policy laboratory for fiscal and environmental incentives (Liu et al., 2019).

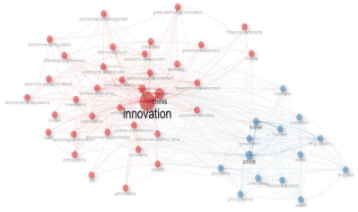
Overall, the trend analysis confirms that innovation incentives have shifted from a narrow economic concern to a multidimensional policy instrument, integrating environmental, organizational, and governance dimensions.

4.8 Keyword Co-occurrence Network

The keyword co-occurrence network (Graph 8) highlights the conceptual structure of innovation incentive research. The largest and most central node is "innovation", tightly connected to terms such as "China," "innovation incentives," "sustainable development," "economic development," and "public policy." Two main clusters emerge:

- The red cluster links fiscal and policy-related terms such as *innovation incentives, R&D, sustainable development, patents, environmental policy, and economic growth.*
- The blue cluster focuses on human- and organization-related terms, including *article, human, government, motivation, and policy*, often tied to social and managerial perspectives.

This structure shows how the field is anchored in economic-policy debates while increasingly incorporating governance, environmental, and organizational themes.



Graph 8. Keyword Co-occurrence Network
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.

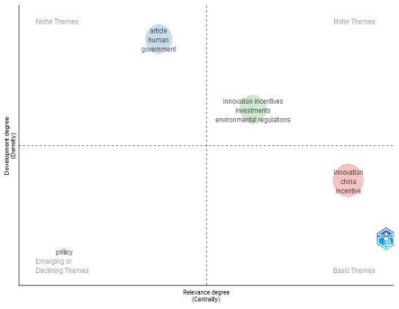
The co-word analysis demonstrates the interdisciplinary spread of the field. The dominance of "innovation" and "incentive" reflects the conceptual core, but the presence of clusters around sustainability and governance suggests the field is broadening beyond fiscal and economic concerns (Crespi et al., 2016). The strong visibility of "China" confirms its growing influence as a research context, where fiscal and environmental incentives are heavily studied (Liu et al., 2019). Meanwhile, the second cluster focusing on "human," "government," and "motivation" indicates a shift toward organizational culture and public management dimensions (Demircioglu, 2024).

In short, the co-occurrence network reinforces that innovation incentive research is fragmented yet expanding, integrating fiscal, governance, environmental, and organizational perspectives without a fully unified framework (Cheng & Zhang, 2025).

4.9 Thematic Map

The thematic map (Graph 9) categorizes research themes in innovation incentive studies based on centrality (relevance) and density (development):

- Motor Themes (central & developed): *innovation incentives, investments, environmental regulations* — well-developed and highly relevant to the field.
- Basic Themes (central but less developed): *innovation, China, incentive* — fundamental but still fragmented, requiring deeper theoretical integration.
- Niche Themes (specialized but peripheral): *article, human, government* — tightly developed areas with narrower relevance, often tied to case studies and methodological debates.
- Emerging/Declining Themes: *piracy* — marginal and possibly declining in relevance.



Graph 9. Thematic Map
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.

The thematic map confirms that fiscal incentives and sustainability regulation form the motor themes, driving much of the scholarship and policy application (Crespi et al., 2016). Meanwhile, broad concepts such as "innovation" and "China" remain basic themes—widely studied but lacking strong theoretical cohesion (Cheng & Zhang, 2025).

The presence of niche themes around governance and human factors suggests growing attention to organizational culture, leadership, and accountability (Demircioglu, 2024), though these remain less integrated into mainstream debates. Finally, the declining position of topics like "piracy" indicates a shift away from narrow regulatory concerns toward systemic governance and sustainability issues.

Together, the map shows a field that is anchored in fiscal and regulatory incentives, but gradually diversifying into organizational and governance-oriented research.

4.10 Thematic Evolution

The thematic evolution analysis (Graph 10) traces the development of innovation incentive research across three periods:

- 1975–2020: Core topics included *China, drug industry, governance approach, innovation policy, technological change,* and *public policy.* These reflect the early focus on sector-specific incentives (e.g., pharmaceuticals) and broad governance debates.
- 2021–2023: The field expanded to themes such as *enterprise innovation, environmental regulations, intellectual property, R&D, and sustainable development,* alongside continuity of *China* and *competition*. This stage marks the transition toward sustainability and regulatory governance.
- 2024–2025: Current themes emphasize *collaborative and corporate innovation, digital transformation, difference-in-differences methods, environmental regulation, and intellectual property rights*. China remains a consistent anchor, while new methodological approaches (e.g., evolutionary games, controlled studies) signal growing sophistication in research design.

Thematic evolution confirms a progressive broadening of innovation incentive research. Early studies emphasized sectoral policies and governance approaches, particularly in pharmaceuticals and trade (Crespi et al., 2016). Over time, the field shifted toward sustainability, intellectual property, and enterprise innovation, reflecting alignment with global policy agendas on green growth and digital governance (Demircioglu, 2024).

The latest phase (2024–2025) highlights the rise of collaborative innovation, digital transformation, and advanced methodologies (e.g., difference-in-differences). This suggests that the field is moving from descriptive analyses toward more rigorous causal approaches (Margetts, 2011) while also integrating organizational and cultural perspectives. In sum, the thematic evolution illustrates how innovation incentives have transitioned from narrow economic and sectoral concerns to systemic, interdisciplinary policy instruments, bridging governance, sustainability, and methodological innovation.

Graph 10. Thematic Evolution
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.

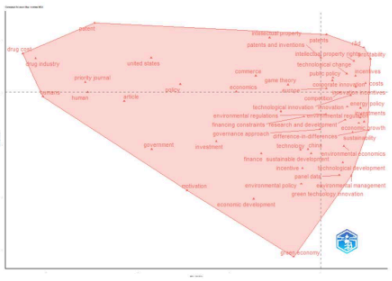
11. Factorial Analysis

The conceptual structure map (Graph 11) uses factorial analysis to visualize how keywords group into conceptual clusters. Two main dimensions emerge:

- On the right side, clusters connect innovation, incentives, sustainability, governance, environmental regulations, technological development, and economic growth. These terms reflect the policy–economic–governance nexus at the core of the field.
- On the left side, clusters include drug industry, patents, human, article, and government, which are more sectoral and methodological themes.

This mapping shows that while the field is broadly unified under "innovation," it is divided into two conceptual poles: one focused on systemic

governance and sustainability, and the other on specific sectors and methodological approaches.



Graph 11. Factorial Analysis
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.

The factorial structure highlights the dual orientation of the field. The right-hand cluster shows how innovation incentives are increasingly studied as systemic governance tools, integrating environmental policy, sustainability, and economic growth (Crespi et al., 2016; Demircioglu, 2024). This aligns with global policy priorities such as climate change and digital governance.

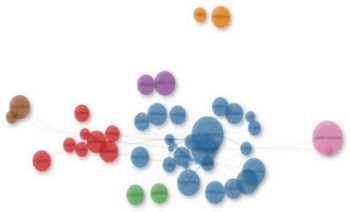
The left-hand cluster reflects a more traditional and sector-specific orientation, especially in pharmaceuticals, patents, and case-based studies. While this provides depth, it also reinforces the field's fragmentation, as noted by (Cheng & Zhang, 2025). Together, the structure suggests that innovation incentive research is in transition: it has moved beyond narrow economic evaluations but still lacks a fully integrated conceptual core bridging the two orientations.

12. Country Collaboration Network

The country collaboration network (Graph 12) highlights patterns of international co-authorship in innovation incentive research. The largest nodes represent the most productive countries, including the United States, United Kingdom, China, Netherlands, and Germany, all of which occupy central positions in the network. Clusters reveal regional research communities:

- Europe (blue cluster): UK, Germany, Netherlands, France, Spain, and Nordic countries, forming the most integrated collaboration hub.
- Latin America (brown cluster): Argentina, Chile, Brazil, and Ecuador, collaborating mainly within the region.
- Asia-Pacific (blue/light cluster): China, Japan, Korea, Malaysia, and Singapore, with growing ties to global hubs.
- Other clusters: Czech Republic appears isolated, while smaller collaborations involve countries such as Tunisia, Ethiopia, and Costa Rica.

The network confirms that North America and Europe dominate global collaborations, consistent with broader trends in public policy and innovation studies (Mongeon & Paul-Hus, 2016). The USA, UK, and the Netherlands act as bridge countries, connecting multiple regional clusters. By contrast, Latin American and African countries appear regionally bounded, suggesting limited integration into global research flows. This (Crespi et al., 2016) observation that while developing countries contribute valuable insights on fiscal incentives, their work is less embedded in global scholarly debates.



Graph 12. Countries Collaboration
Source: Authors' analysis using *Bibliometrix* ® based on Scopus data.

China's strong position, both in productivity and collaborations, underscores its rise as a global hub in innovation incentive research, particularly in

studies of fiscal and environmental policies (Liu et al., 2019). However, the relative isolation of countries like the Czech Republic indicates persistent asymmetries in knowledge networks.

Overall, the collaboration network illustrates that while innovation incentive research is increasingly internationalized, it remains skewed toward high-income countries, highlighting the need for stronger South–South and North–South partnerships to diversify perspectives.

CONCLUSION

This bibliometric study of 392 Scopus-indexed publications (1975–2025) provides a comprehensive mapping of research on innovation incentives in public policy and administration. The results highlight both the growth trajectory of the field and its fragmented intellectual structure, while also revealing geographic and thematic imbalances.

The descriptive overview shows steady growth at an annual rate of 7.66%, with research output accelerating significantly after 2010. Publications appear in 261 sources, yet the field is concentrated in a handful of journals—*Sustainability (Switzerland)*, *Research Policy*, and *Journal of Cleaner Production*. While *Sustainability* dominates in volume, *Research Policy* leads in impact, indicating a dual core of sustainability- and economics-oriented outlets.

Keyword analyses reveal a broad thematic spread, anchored in terms such as *innovation, incentives, sustainable development*, and *China*. Over time, trend topics and co-occurrence patterns show a thematic shift from early emphases on fiscal and regulatory tools toward broader concerns with sustainability, governance, and organizational culture. Thematic maps confirm that while fiscal and environmental incentives serve as motor themes, governance and organizational dimensions remain underdeveloped but increasingly relevant. Thematic evolution highlights a move from sector-specific studies (e.g., pharmaceuticals) toward systemic perspectives on collaborative innovation, digital transformation, and sustainability.

The conceptual structure map underscores the dual orientation of the field—one cluster focused on systemic governance and sustainability, the other on sectoral and methodological niches such as pharmaceuticals and patents. Similarly, the keyword co-occurrence network illustrates the growing role of China as both a key theme and a research hub, alongside enduring links to fiscal and environmental policy debates.

Finally, the country collaboration network reveals that international co-authorship accounts for 22.96% of publications, led by hubs in the USA, UK, Netherlands, Germany, and China. While Europe and North America dominate the global network, Latin American and African countries remain more regionally bounded, and isolated nodes such as the Czech Republic highlight asymmetries in knowledge production. This underscores the need for stronger North–South and South–South collaborations to diversify perspectives.

Taken together, the findings demonstrate that innovation incentive research is a rapidly expanding and increasingly interdisciplinary field, bridging economics, governance, and sustainability. Yet it remains fragmented, with theoretical integration and geographic inclusiveness still lacking. Future research should prioritize cross-national collaborations, comparative frameworks, and methodological diversity to strengthen the field's capacity to inform evidence-based public policy.

However, this study is limited by its reliance on Scopus-only data, English-language publications, and the quantitative focus of bibliometric methods. These factors may underrepresent contributions from non-English and regional contexts. Future studies should use multiple databases, integrate qualitative insights, and broaden coverage to capture a more inclusive global picture.

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