

Structural Landscape of the Indian IPR Research Ecosystem: A Bibliometric and Network Analysis

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Intellectual Property Rights play a critical role in the economic development of any country, particularly in emerging economies like India. The COVID-19 pandemic has further underscored the global importance of IPR, accelerating innovation and intensifying the need for effective protection of intellectual assets. The study will provide an analysis of the scholarly environment in the field of IPR in Indian context by examining it through bibliometric analysis and visual tools which include Biblioshiny and VOSviewer. It particularly focuses on the cognition of the spheres of academic interest in the IPR domain and analysis of the patterns of cooperation between Indian authors in the mentioned fields. The study uses the information in the WoS database that dates back to 2020-24, therefore describing the COVID-19 and transitional era academic reaction. This timeframe can be used to evaluate the current trends, changes in the research priorities, and the increased interest of Indian scholars in IPR studies. This study by establishing several significant themes, influential authors, citation pattern, and co-authorship networks adds new knowledge to the discipline of Intellectual Property Rights. It does not only compile the existing literatures but also suggests where the new directions might be assumed in future. This can be used to the advantage of Academia, as they get a better idea of the unstable research ecosystem within the Indian IPR environment.

Keywords: Intellectual Property Rights, India, Bibliometric, VOS Viewer

Intellectual Property Rights (IPR) is a critical and dynamic discipline that contributes significantly to the present era with knowledge and mind-based economy. This field encompasses a wide range of legal, economic as well as ethical issues that cover patents, trademarks, copyrights and protection of intellectual assets.¹ Although the history of IP could be traced several centuries back, the scholarly interest gained a tremendous academic attention during the last decades.² One of the main issues of IP studies is still the intersection of IP with knowledge systems, asset structures, and regulatory rules. Technological advancement, globalization and changing legal and institutional environments are some of the factors that have contributed to the fast development of the IPR regime.³ These changes have introduced an global environment of competition that has forced organizations to constantly invent and develop new products or services to offer in the market with both great challenges and some real opportunities.⁴ The COVID-19 pandemic is one of the latest occurrences

where this challenge is being encountered, and the World Health Organization declared it a global public health crisis on January 30, 2020. The crisis brought out a strategic application of intellectual capital to respond to new realities such as remote work, quick creation of knowledge and process innovation.⁵ As the information economy has expanded, businesses have been moving off towards more intangible investments and are commonly known as intellectual assets.⁶

IPR plays a significant role in propelling newly formed knowledge economy, entrepreneurship, innovation and scientific development. The effectiveness of the Intellectual Property protection contributes to national technological progress and social-economic growth due to the support of creativity and innovation protection and the expansion of industry sectors.⁷ The reason as to why the global market requires companies to register their intellectual assets is to provide assurance against abuse and infringement of the rights as well as ensure that they retains ownership rights. Duplication of secured content illegally involves a tremendous financial cost even though it is still a hotspot of

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contention.⁸ Universities are another participant in the IP landscape who both file patents and grant licenses. Nevertheless, this shift marks the change in their functions and the funding principles, as an increasing course to commercialization of scientific innovations.⁹ Also in addition to the old school responsibilities, institutions are extending themselves into other fields like technology transfer, academic spin-off, consultancy and start-up development.¹⁰

According to Oliveira and Boente, the advancement of bibliometric research requires technological innovation as its fundamental aspect because this method has become an essential workplace tool for scientific knowledge access and organization.¹¹ The scientific community has relied on bibliometric studies since early times to track publication activity while using technology advancements for progress. While research on IPR in India, especially post-COVID-19, continues to grow, there remains a gap in comprehensive bibliometric evaluations of these developments. The research fills this knowledge gap by performing a scientific review of IPR literature in India from 2020 to 2024. The research investigates current developments and emerging strategies in this area to supply information relevant for academic and governmental policy professionals. This research endeavors to achieve the following objectives:

- i. The longstanding academic interest in IPR, with a need to evaluate scholarly publications to assess their quality; impact; List and organize the main ideas, subjects, and subtopics that have surfaced in intellectual property rights.
- ii. Examine how research patterns have changed over time, considering changes in focus, approaches, and multidisciplinary cooperation especially post-pandemic, necessitating an evaluation of IPR's academic growth and future implications.
- iii. To analyze the thematic focus of Indian scholarly literature on IPR, highlighting areas of academic interest and policy relevance.
- iv. To evaluate the extent and nature of collaboration among Indian authors, and between Indian and international researchers, through co-authorship and citation networks. To examine the intellectual connectivity and influence of Indian authors within the global IPR research landscape using bibliometric methods.

Researchers have turned to bibliometrics, using tools like R Studio and VOSviewer to conduct the

visualization of the networks.¹² This study investigates the academic landscape of IPR in India using the Web of Science (WOS) database, comparing its findings to existing literature. This study seeks to explore the knowledge landscape, map the relevant literature, and identify new research avenues. The primary goal of this research is to conduct a structured bibliometric analysis of recent academic work on intellectual property in India. To achieve this, the article is structured into five parts i.e., introduction to research topic; Literature review of the bibliometrics and intellectual property; research methodology; analysis and discussion of the findings and finally a conclusion section which summarizes the main insights and revisions of what may be done in future research.

The field of intellectual property rights in India is a highly progressive research area due to the solving of scholarly sources, which are concentrated more on regulation strategies, technological formation and its legal practice. As Raza and Malik point out, the Journal of Intellectual Property Rights (JIPR) plays the central role in influencing the discourse about IPR in the second decade of the 21st century.¹³

The adoption of bibliometric tools like Bibliometrix and VOSviewer has enabled researchers to map scientific influence and collaboration networks effectively.¹⁴ Economic policy discussions heavily depend on the understanding of how IP Rights relate to innovation. Acemoglu and Akeguit maintain that proper IP protection systems drive innovation through their ability to maintain competitive markets.¹⁵ The research by Falvey, Foster and Greenaway revealed economic development benefits from strong IPR systems which should guide policy development in Indian contexts.¹⁶ Soni explore how innovation shapes IPR policy development while showing IPR policies can influence innovation direction.¹⁷ Bhattacharya and Saha explains how patent protection directly affects generic prescription drug manufacturing in the Indian healthcare policy domain.¹⁸ Dash, Vaiswade, and Gupta reviewed the Indian patent system's impact on pharmaceutical innovation, underscoring regulatory complexities.¹⁹ Similarly, Correa explored TRIPS-related policy frameworks that have profoundly influenced Indian pharmaceutical patent law.²⁰

Historically, Indian IPR scholarship has been polarized around two distinct socio-legal pillars: the protection of traditional knowledge and the regulation of the pharmaceutical sector (Dutfield²¹ and Venkataraman and Latha²²). The studies by Vinh²³,

Cuts International²⁴ and Sharma and Pradhan²⁵ On one end, India's unique biodiversity has faced threats of biopiracy exemplified by high-profile international legal disputes over Basmati rice and Turmeric patents prompting significant research into defensive mechanisms and equitable access-and-benefit-sharing models

Crucially, this existing equilibrium between public health, traditional knowledge, and industrial innovation faced a massive systemic disruption with the arrival of the COVID-19 pandemic. Peng *et al.*²⁶ examined global IPR evolution using an institutional framework which provides knowledge relevant for Indian policy decisions. Kumari²⁷ offers an extensive evaluation of India's IPR policy development which details its effects on local industries as well as commercial trade activities. The recent trend includes AI alongside digital technologies in IPR analytics systems. Aristodemou and Tietze²⁸ identified the transformative role of AI in managing IP data, while Tietze *et al.*²⁹ discussed its implications during the COVID-19 crisis. Saura, Skare, and Riberio-Navarrete³⁰ explored technology-driven competitive advantages enabled by IPR strategies, a critical focus for India's digital economy.³¹ One of the emerging areas inside IPR research makes Geographical Indications (GIs) its focus. Singh and Bharti³² conducted research on geographical indications in relation to rural sustainable development by focusing on consumer preferences per Zhang *et al.*³³ findings. Ubertazzi³⁴ observes how protection of geographic indicators operates across borders which reflects India's strategy for cultural heritage preservation. According to Reichman and Uhler³⁵ amidst these rapid changes, the mutual relationship between data security measures and accessibility has re-emerged as a repeated subject in discussions about innovative data utilization.

Thus, the available literature on IPR in India shows an intricate, shifting interrelation between traditional knowledge, pharmaceutical innovation, technological changes, and changing policies. However, while separate qualitative studies exist for each of these domains, there remains a critical gap in understanding how the structural shock of the pandemic realigned India's holistic research priorities. A comprehensive bibliometric evaluation is uniquely required to transition from fragmented qualitative assessments to an objective, data-driven synthesis. By quantitatively mapping the literature from this transitional era, this

study establishes the necessary conceptual rationale to determine whether the immediate shock of the pandemic triggered a temporary spike in biomedical and crisis-related research, or initiated a permanent, structural paradigm shift in the Indian IPR ecosystem.

The research paper will use bibliometric analysis to find the quality, type and extent of IPR research done in India. Authors such as Donthu *et al.*³⁶ have pointed out that bibliometric analysis is a useful scientific method for conducting a retrospective of a selected area, and this methodology has been widely used in undertaking literature reviews. This research is structured into two main parts. In the first part, **Biblioshiny** the web-based interface of the *Bibliometrix* package in RStudio was used to perform a comprehensive bibliometric analysis. This included selecting relevant articles on the topic and analysing publication trends, citation counts, keyword frequency, trending research topics, keyword co-occurrence, and thematic clustering through document coupling. The goal was to identify the key areas of interest and emerging themes in which Indian authors have been actively publishing, particularly in the post-COVID-19 period. The second part of the research focuses on analyzing **author connectivity**, using **VOSviewer** to generate network visualizations based on co-authorships, citations, and co-citations. This part examines how Indian authors are connected both within India and globally, providing insight into their collaborative networks and research influence across borders.

The data retrieval is based on web of science core collection (A research archive that extends back to 1864), which is one of the world's leading information, analytical and scientific citation search platform and which provided access to abstracts of scientific articles from more than 22000 international scientific journals published by more than 5000 international publishers. (e-information, n.d). The retrieval was performed, when we have searched the main and core article expressions:” intellectual property rights in India. The bibliographic data has been extracted from WoS database by adopting the Syntax for search within the browser **INTELLECTUAL PROPERTY RIGHTS IN INDIA** (All Fields) and **Patents** (OR – Search within topic) and **Trademark** (OR – Search within topic) and **Copyrights** (OR – Search within topic) and **INDIA** (Countries/Regions) and **ReviewArticle** (Document Types) and **2024** or **2023** or **2022** or **2021**

or **2020** (PublicationYear) and **Openpublisher-invited reviews** (Exclude). The search for articles written in English on 'IPR in India' indexed in the WoS database (All Fields, All Document Type, and All Publication Year) resulted in 49846 records. Thereafter, such papers were limited to only covering the period from 2020 to 2024 and Articles as reviewed articles, which then resulted in 510. thereafter open publisher invited reviews were excluded resulted in 506 articles. Articles having 0 citation in the last five years were excluded for the refined study resulting in 410 articles for the analysis as shown in Fig. 1.

In this study, three software has been used for handling and analyzing the data extracted from WoS database. One is Microsoft Excel, which is common spreadsheet and data-visualization programme while another is BIBLIOSHINY & VOSViewer. This software is used for mapping and clustering of bibliometric networks. These bibliometric techniques are employed for carrying out research to precisely identify how has a particular scientific domain has developed over time? how and where do different scientific topics co-relate to each other? What are the trends of study in any scientific domain? The first part of the study uses the Biblioshiny application to perform a comprehensive bibliometric analysis of IPR research in India, enabling visualization of publication trends, keyword frequency, authorship patterns, and source impact. The second part utilizes VOSviewer to map co-authorship networks, revealing high levels of collaboration among researchers and identifying key

contributors and institutional linkages within the field. All network visualization matrices were normalized using the **Association Strength** method to account for differences in node frequencies, and clusters were determined using a modularity optimization algorithm." (This study intentionally restricts the dataset exclusively to review articles to capture consolidated, high-impact knowledge and eliminate peripheral data noise. This structural filter ensures that the resulting network maps accurately reflect mature academic consensus and macro-level thematic trends.)

Data Analysis

Key bibliometric data on IPR was collected from the Web of Science (WOS) database and analyzed to assess performance and visualize the intellectual structure using keyword co-occurrence analysis. The authors employed RStudio, Biblioshiny and VOSviewer software to codify and execute the procedures for the bibliometric analysis. As depicted in Table 1 the study consists of 410 articles released in the period between 2020 and 2024 in 173 databases, which indicates a wide distribution of research within the field.

The annual growth rate being 12.06, the annual number of publications during 2020 (51 articles) has a gradual rise until 2023 (115 articles) with slight decline in 2024 (82 articles) indicating a stabilization or change in the trend of publications (the observed decline in review articles in 2024 must be interpreted with caution, as it may be partially attributed to database indexing delays and citation filtering protocols typical of recent publication years). The documents' average age of 2.76 indicate that discipline is still in its early stages of development with emphasis on modern matters. The preemption of review articles (407 out of 410) which shows that the field is already in an era of knowledge synthesis and critique rather than primary expansion of knowledge through empirical research. The collaboration with other authors is significant, the average number of co-authors in one document is 5.44, the international co-authorship takes 36.59, which means high interdisciplinarity and international activity. The fact that the number of single-authored papers is only extremely low (2) also serves as an additional piece of evidence proving the collaborative nature of the research. The presence of a large number of keywords 1998 Keywords Plus and 1548 Author's Keywords imply the extensive thematic eclecticism and multi-

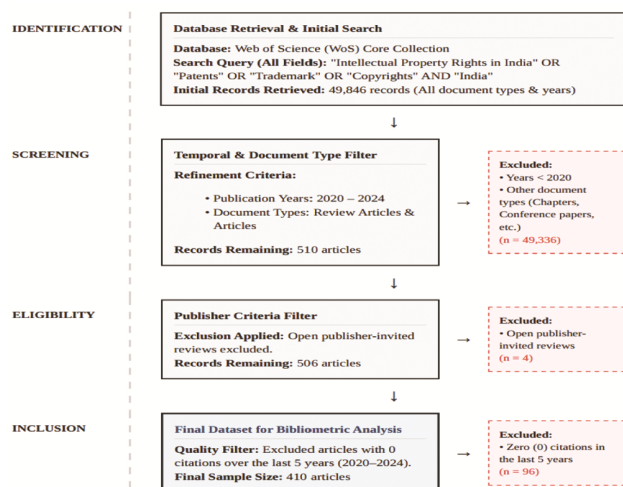


Fig. 1 — PRISMA-style flow diagram of the literature search, screening, refinement, and final selection process of articles from Web of Science core collection for bibliometric mapping of Intellectual Property Rights (IPR) in India

Table 1 — Main Information on IPR, annual production and mean citations, WoS database

Description	Results					
	Years	Articles	Mean TC per article	Mean TC per Year	Citable Years	
Timespan	2020:2024					
Sources (Journals, Books, etc)	173	2020	52	50.27	8.38	6
Documents	410	2021	80	27.82	5.56	5
Annual Growth Rate %	12.06	2022	81	18.09	4.52	4
Document Average Age	2.76	2023	115	10.76	3.59	3
References	53920	2024	82	3.68	1.84	2
Description	Results					
DOCUMENT CONTENTS	Keywords Plus (ID)				1998	
	Author's Keywords (DE)				1548	
AUTHORS	Authors				1486	
	Authors of single-authored docs				2	
	Single-authored docs				2	
AUTHORS COLLABORATION	Co-Authors per Doc				5.44	
	International co-authorships %				36.59	
DOCUMENT TYPES	Review				407	
	review; early access				3	
CITATIONS	Documents				7795	

Source: Elaborated by the authors from data generated by biblioshiny for bibliometrix

dimensionality of the research field. To observe what interests of researchers we shall penetrate in the analysis of key words.

In India, IPR-related research provides a thematic and multi-dimensional range of scientific activity as demonstrated in the analysis of keyword-based search during the last five years (Fig. 2). The words used like “**in vitro**”, “**drug-delivery**”, “**nanoparticles**” and “**solid lipid nanoparticle**” propose a robust focus on pharmaceutical innovation especially in nanomedicine and novel formulation of drugs.

There is a systematic scientific development process in the series of “**formulation**”, “**design**”, “**optimization**”, and “**biological evaluation**” between the idea and the experimental results that is proven. The term “**transdermal delivery**”, “**oral bioavailability**” and “**targeted delivery**” are found in the literature to present the efforts of increasing the performance of drugs in addition to increasing patient compliance to drug treatment hence translational intent. The presentation of such terms of materials science like: “**gold nanoparticles**”, “**polymeric nanoparticles**”, and “**quantum dots**”, indicates interdisciplinary research based on the application of chemistry, biology and engineering. Keywords such as “**cancer**”, “**therapy**” and “**antimicrobial activity**” used in relation to disease, indicate that the product can be applied in fields of community health and controlling diseases. Such a trend implies not just



Fig. 2 — Word Cloud on IPR, web of Science

a wide research base but also an increased conformity to industrial and clinical-oriented innovations, which contributes to the evidence that IPR generation and technology transfer in India may occur.

The frequency and temporal distribution of the key research terms which were utilized in the IPR related studies carried out in India within the past five years are presented in the Table 2 and Fig.2 (a). The most common ones are “**in-vitro**” (83) and “**drug-delivery**” (55), although the activity is concentrated in recent years (Q1-Q3: 2022-2024), which reflects the current trends in research (Table 2). There is also a uniform use of “**design**” (35), “**formulation**” (29), and “**biological evaluation**” (25) during the period of 2021-2023; the latter demonstrates continued attention. The highest frequency of “**nanoparticles**” (43) occurred in 2023, whereas the lowest frequency

Table 2 — Trending topics on IPR in India, Web of Science

Term	Frequency	Year (Q1)	Year (Median)	Year (Q3)
Antioxidant Activity	5	2020	2020	2021
In-Vitro Evaluation	13	2021	2021	2023
Breast-Cancer	10	2020	2021	2023
Management	9	2020	2021	2023
Design	35	2021	2022	2023
Formulation	29	2021	2022	2023
Biological Evaluation	25	2021	2022	2023
In-Vitro	83	2022	2023	2024
Drug-Delivery	55	2022	2023	2024
Nanoparticles	43	2021	2023	2023
Co-Delivery	8	2023	2024	2024
Nf-Kappa-b	8	2022	2024	2024
Apoptosis	7	2022	2024	2024

Source: Elaborated by the authors from data generated by biblioshiny for bibliometrix

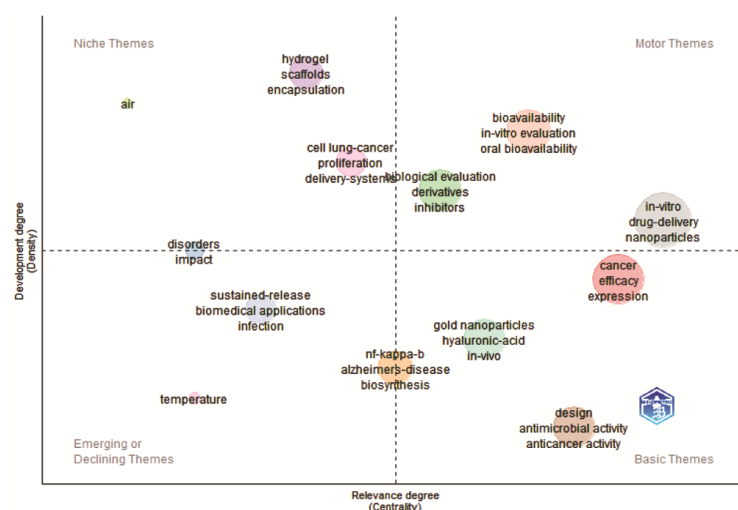


Fig. 3 — Thematic Map diagram organizing research concepts into Motor, Basic, Niche, and Emerging/Declining quadrants based on their structural centrality and density

of in-vitro evaluation is 2021-23, which means that it could be considered a mid-term term. Such earlier terms as “**antioxidant activity**” and “**breast-cancer**” had a peak usage of 2020-2021. Future directions related to 2023-2024 in research were “**co-delivery**” and “**NF-kappa-B**” and “**apoptosis**” since they were experiencing increased usage as keywords. The research findings prove that the use of keywords has shifted to use of molecular definition and delivery strategies in recent years. The trend topic analysis assists in monitoring research term frequency change with time yet it lacks statistical relationships between topics because it establishes thematic relationships. Centrality evaluation can be paired with density assessment thematic mapping to provide better information regarding the process of developing science research fields as well as most significant issues within the research body.

The above thematic map divides the themes into four quadrants with each corresponding to a new degree of development and significance. "The thematic landscape is visualized via a strategic matrix structured along two methodological axes: **Centrality** (representing the relevance degree or the strength of external links to other clusters) and **Density** (representing the development degree or the internal cohesion of the cluster). Motor-themes, including “**drug-delivery**”, “**in-vitro**” and “**nanoparticles**” are well-developed and central point to IPR-related studies as shown in Fig. 3. Simple topics such as “**design**”, and “**anti-cancer**” activity have a very wide connection that is yet to be fully developed. Niche themes, such as “**hydrogel**” and “**encapsulation**” are developed and specialized yet not at the center of the research network. After the analysis of the themes, it is necessary to comprehend

The above co-occurrence map represents the visualization of interactions between the keywords, as the tightly-knit clusters can be seen, which reflect the intersection of the research domains. Key keywords such as “**drug delivery**”, “**cancer**”, “**patents**”, and “**nanoparticles**” will play the central role as major nodes (Fig. 4). The green cluster is centered around nanomedicine, bioavailability, and drug carriers—indicates a high level of research on the use of nanoparticle-based systems of drug delivery systems. The cluster in red obsessing over patents is connected

Figure 5 explains how clusters occur due to document coupling, whereby the topic is grouped based on common references across publications. The x-axis is centrality, i.e. the extensiveness of a topic within various realms, and the y-axis is impact, i.e. the impact of those groups in the research world. In the upper-right quadrant, one can find such key terms

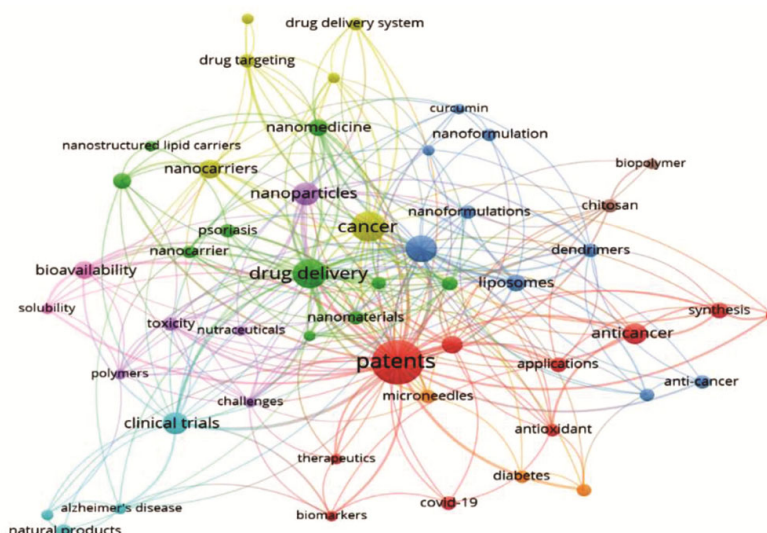


Fig. 4 — Author's Keyword co-occurrence network map illustrating interconnected research clusters

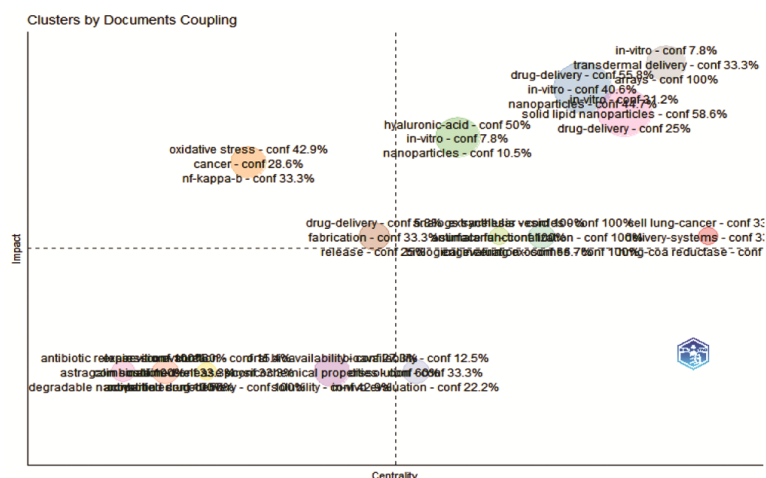


Fig. 5 — Clusters by documents coupling mapped according to their centrality and impact metrics to evaluate thematic relevance and development

as drug-delivery, in-vitro, and nanoparticles, which are characterized by high centrality and impact. These are influential and well-integrated topics of the field. Conversely, clusters such as oxidative stress, cancer and nf-kappa-b appear higher in terms of impact though lower on the centrality, indicating that they are impactful but niche or narrow in terms of scope. The definition of antibiotic release and oral bioavailability is in the lower-left quadrant that is characterized in terms of low impact and centrality and that indicates their newness to the discipline. The general organization of the map indicates the knowledge flow of the domain that refers to the core and fringe research areas. The next visualizations developed based on the previous keyword and thematic analysis, but this time, the window is switched to thematic dynamics of research collaboration, namely, the co-authorship and international collaboration patterns of the Indian scholarly community.

The network map (Fig. 6) provides a clear image that India has a wide range of bilateral research relations which are united by a firm bond between Saudi Arabia, USA, Australia, many European and Asian nations. Thick connections in the network are the regular co-authorship practice and prolonged research partnership between institutions that are placed internationally. The scope of relationships underscores the integrative contribution that India has in the international scientific society.

As shown in the map (Fig. 7), the co-authorship network of Indian scientists has been significant as the key players, Kesharwani Prashant, Kaushik Deepak, and Dua Kamal are interlocked into co-authorship hubs. The network structures of research groups show interrelation since collaborative practices in various areas enhance the output of the research. Research groups are well-constituted and constitute a component of the visualized collaborative ecosystem

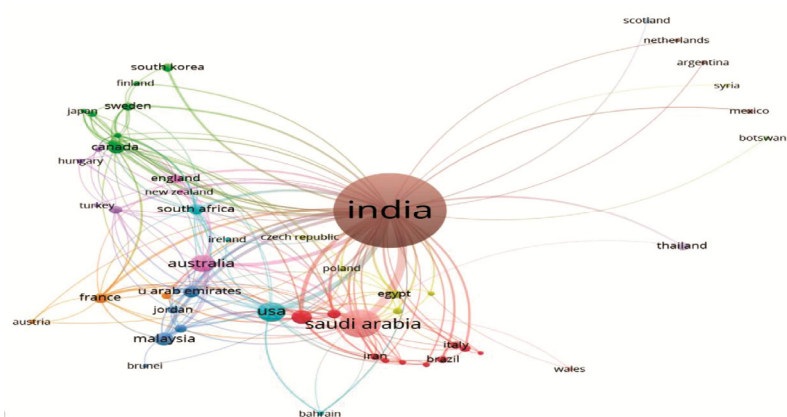


Fig. 6 — Co-Authorship (INDIA'S) maps the structural connections between various nations demonstrating varying degrees of centrality and partnership strengths across international borders

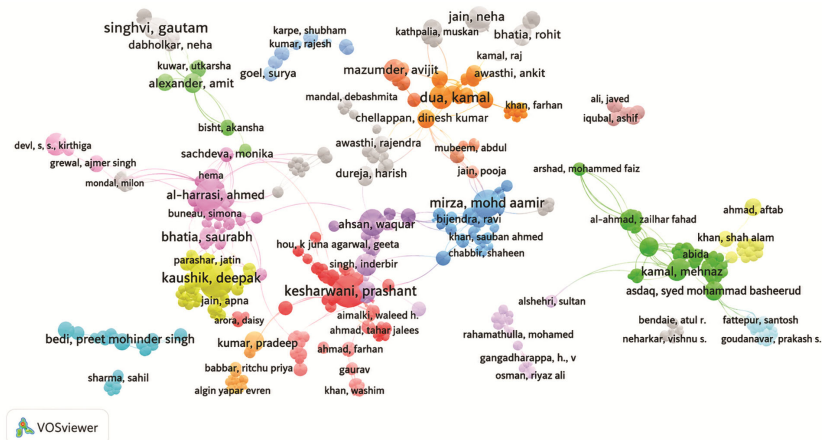


Fig. 7 — Co-Authorship (Authors) highlighting key research clusters, academic partnerships, and central co-authorship hubs within the dataset

of the Indian scholars who not only contribute to the national stream of knowledge but also ensure the global academic exchange. The structural view gives more insights to the thematic analysis by supplementing knowledge of the bibliometric domain of India.

Having studied the co-authorship practices of Indian scientists, it is important to proceed to the next level of bibliography to evaluate the intellectual connectivity and common patterns in citations. The map (Fig. 8) shows there are evident collaborative clusters with good interconnections showing the establishment of tightly knit research groups. Prashant, Copernicus: Several authors such as Pandey, Parijat, Dua, Kamal and Kesharwani take a central position and connect several groups, which demonstrates their endeavour to establish cooperation across the groups. The notable networks connecting

the researchers like Sharma, Neelam, Mirza, Mohd Aamir, and Ahmad, Farhan indicate that there is active involvement in sharing of intellectual information and even leadership within their networks. The high level of interconnection especially on the red, blue, and green clusters is an indication of the collaborative vigor and multidisciplinary approach of IPR studies in India.

The map in (Fig. 9) builds on the preceding studies of co-authorship and bibliographic coupling; it carries the study of the research landscape of India forward by addressing the co-citation relationship of the authors. Although visualizations presented above have been utilizing collaborative networks and shared citation practices, in pinpointing the intellectual core of the field, this map reveals the most often cited authors coexisting. The co-citation map above displays a more scientific understanding of the

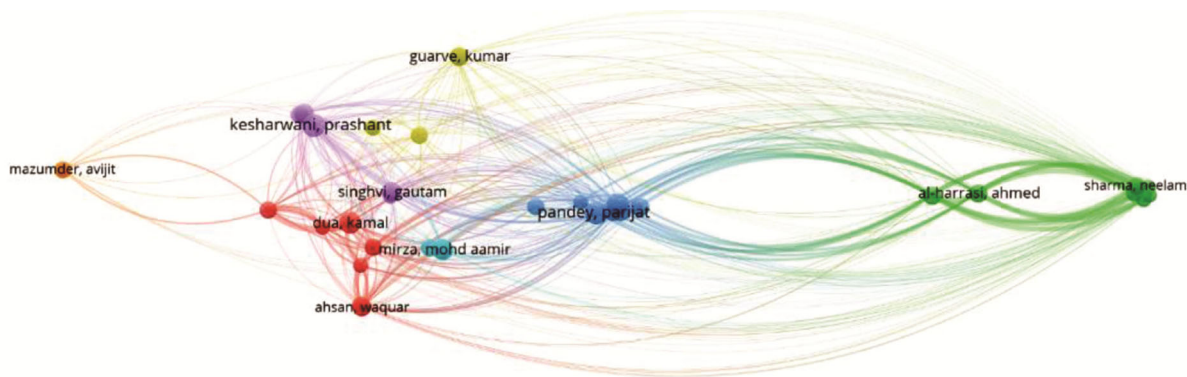


Fig. 8 — Bibliometric Couplings (Author's)

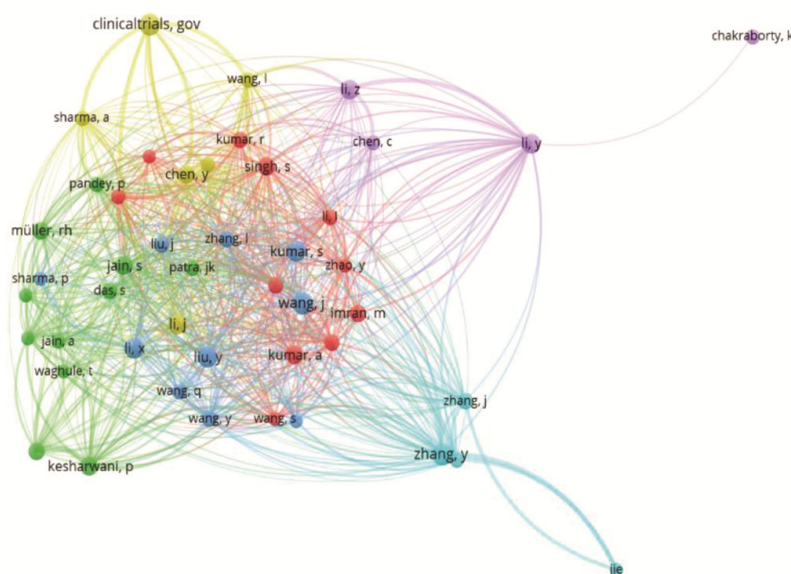


Fig. 9 — Co-Citation (Author's)

intellectual organization of the IPR-related studies by showing how often authors are co-cited, as opposed to how they are co-operating, co-authoring, etc. A co-citation analysis is an indicator of a more enduring and permanent impact compared to co-authorship network or bibliographic coupled network, and it assimilates the conceptual proximity of authors in the discipline. According to this map, there are highly connected clusters with the interconnections which implies a high level of citation alignment and mutual scholarly basis. The existence of individual nodes such as Chakraborty K also shows the existence niche but possibly emerging viewpoints. The breadth and overlap of the clusters indicate that the presence of the multidisciplinary effect on the Indian IPR studies is particularly found in pharmaceutical, biomedical, and technological fields.

Conclusion

The overall review of the Indian IPR studies between 2020 and 2024 represents dynamic and changing environment with a high level of collaboration, thematic focus and strategic globalized integration. The discipline is highly biomedical and pharmaceutical in terms of orientation (recursive keywords include drug-delivery, nanoparticles, and in vitro). The prevalence of review articles and the appearance of such themes as nanotechnology and advanced drug formulation indicate a unifying but initial promising scholarly climate. Although the growth in publications has reduced in the recent past, the research output has remained stable, exhibiting increased involvement and quality. Drug-delivery and nanoparticles are motor themes found in thematic mapping, which are central to academic literature and practice. At the same time, the presence of more focused and new areas such as niche and emerging such as hydrogel, encapsulation, and COVID-19 indicate innovation at the leading edge of the research. Nevertheless, there is a significant bias in the academic field as scientific disciplines are overrepresented with humanities and arts as well as commerce underrepresented thus more academic disciplines should be introduced. The commonality of biomedical keywords along with the relationship between the documents indicate that the importance attributed to biomedical concerns is primary and that there is a strong relationship between developmental technology and protecting intellectual property rights. Other topics, like oxidative stress and cancer, are effective but lower in the structural composition indicators of specialization with high citation potential. Peripheral words provide the

opportunities of research in the future in less studied fields such as of oral bioavailability and release of antibiotics. *While the study captures research outputs from 2020–2024, this timeframe spans both the acute phases of the COVID-19 pandemic and the early transitional period. Consequently, the observed dominance of pharmaceutical, biomedical, and nanotechnology themes likely reflects the immediate, high-priority scholarly mobilization in response to the global health crisis, rather than a permanent post-pandemic paradigm shift.* The network analyses indicate that there is structurally cohesive ecosystem of collaboration. Based on co-authorship patterns, strong bilateral relations can be identified with such countries as the USA, Saudi Arabia and Australia and central Indian researchers constitute thick inter-disciplinary assemblies. The bibliography coupling method shows intellectual association amongst scholars such as Pandey and Parijat via connecting the essential research groups. The co-citation mapping tool proves that Zhang Y and Kumar S are the key figures that share similar research concepts and whose contributions are similar. The thematic and structural integration of research domain on Indian intellectual property rights shows a form of strength in terms of rich thematic depth as well as structural integration and still retains the interconnections that are based on research throughout the world and biomedical power and technological potential. According to the research findings, the fields of intellectual property rights in India are progressing in the direction of innovation-driven growth despite disclosing novel prospects of further cooperation between academic spheres and the areas of study.

The present research is about the progress of Intellectual Property Rights (IPR) in India, providing a concise and precise scope of work regarding the areas that the Indian researchers have been experiencing an active contribution. This study is an essential tool to a newcomer, as it maps dynamic scholarly topics in addition to new trends in the market and primary academic concerns in IPR in India. The research study provides a necessary foundation to find partners that are possible to publish with as well as critical players in the domain based on network analysis of their work. By mapping specific key words and the use of network identification of authors this methodology makes the study efficient with reduced student and expert time taken to comprehend the area.

Additionally, revealing the most referenced literature and co-citation patterns, the research enables

the reader to recognize the literature to base on, as well as the hotspots in the current research of the field of IPR. The information may also be useful in facilitating research studies since it shows research directions that are worth pursuing that are in line with what is already known regarding India IPR field and thus act as an effective tool that can be used by the researcher to suit his or her research work to the requirements of the policy and academic field.

The current paper refers only to the data related to India, paying attention to the thematic issues and cooperation network of Indian writers concerning the scientific field of Intellectual Property Rights (IPR). Though this country specific lens is informative on the research patterns in this country, it has one major limitation. The article does not compare IPR-related studies between India and China as China demonstrates impressive development in the aspect that undermines the applicability of the study globally. By securing a bibliometric analysis of several nations, this study would be of more value because it would help in identifying similar challenges to innovation in different places as well as in identifying uniqueness of policies adopted by various regions. Meanwhile, this study is limited to research pattern among scholars in India. The research results in the areas of global author connectivity and institutional benchmarking, and international citation dynamics were not included in the scholarly contribution. The references to such comparative dimensions would allow placing the IPR research in India in the context of the global academic ecosystem and provide a more comprehensive picture of its scientific, strategic position. The other limitation in terms of methodology is the fact that only the database of Web of Science was used to collect data. Although WoS is a reliable source, one should not rely on it only since other sources of literature such as Scopus, Dimensions, and Google Scholar track down more sources of an article and also local journals. The sampling could have been made more comprehensive considering the inclusion of several databases that would have been more representative and strengthened the analysis. Future studies are advised to look at a wider and more comparative conceptualization since IPR is dynamic, multidisciplinary and of international significance. The author urges scholars to further this bibliometric question by including information on more than two nations and databases, and with the aid of such tools

as Biblioshiny and VOSviewer not only to evaluate national trends but also to trace global trends, level of collaboration, institutional performance, and global dispersion by the changing world of Intellectual Property Rights. The study is also restricted to the English-language literature (to prioritize global research impact over regional/ local analysis) and possibly missed out on other worthwhile studies that are published in other languages like the Spanish, Chinese, or Japanese. During a more comprehensive and inclusive interpretation, non-English articles should be considered in the future research. Also, bibliometric procedures are limited in determining research logic I and II as well as the interaction of variables. Narrative literature review or systematic literature review methodologies could be regarded as the appropriate choice in the research of researchers who wish to discuss conceptual frameworks and connect theoretical foundations of their future work.

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