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Global Research Patterns in Intellectual Property Rights: A Comprehensive Bibliometric Analysis

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ABSTRACT

Various research work has been done on Intellectual Property Rights but very marginal work has been done to present bibliometric analysis on IPR. Hence, the present research has made an attempt to show the prominent, authors and knowledge structure in IPR domain through bibliometric analysis using Bibliophagy application (Aria & Cuccurullo, (2017). For the analysis, 1098 documents were from Scopus database for the time span ranging from 2018 to 2024 (9th August 2024). Results show significant Authors. Some evolving themes like Density Functional Theory and Copyrights branching out from Intellectual Property rights (2018-2021), thus suggesting broadening of research field.
Keywords: Bibliometric, IPR, Intellectual Property, Patent, Bibliophagy

1.INTRODUCTION

Intellectual Property is intangible in nature which represents product of human creativeness and innovation and has commercial value (Pawar & Sagar, 2019). Intellectual Property right is very important for the growth of business. IPR not only safeguard individuals' intellectual property but also provide them various ways in which they can implement their inventions or creativeness so as to expand their venture without botheration of concept being coped or stolen (Unnisa, 2022).Every creativity or invention requires time, energy, real capital and effort. The time invested may vary and also requires knowledge. Thus, it is necessary to recognise the intellectual creation done by creator. PR is of intangible nature and provides creator or inventor exclusive rights for valuable invention or creation. Patent is of three types: a)Utility Patent which includes creation of brand new or improvised beneficial tool, process or item and duration is 20 years from the filing date, b) Design Patent which covers appearance , structure and arrangement of an object, c) Plant Patent which prevent others from using or copying a novel and distinctive plants important characteristics (Tamboli et al., 2023). Trademarks includes distinguished symbols , signs , Industrial Design includes products aesthetics or formal appearance Trade secrets provides strategic advantage to a company over its competitors and copyright protects original work of authorship (Tamboli et al., 2023)

Figure 1 :Types of Intellectual Property (Tamboli et al., 2023)

IP laws main forces is to promote the creation or innovation of various intellectual product (Tamboli et al., 2023)..IPR also provides solution to global challenges especially faced by developing countries like poverty reduction, new products by farmers and low-cost drugs etc. IPR encourages fair trade and also stimulates economic growth. Bibliometric analysis provides evaluation and complete picture of periodical literatures in a specific domain subject ((Davarpanah & Aslekia, 2008). (Swain & Panda, 2002), (Chandran, 2013), (Kaur & Librarian, 2015), (Nascimento et al., 2019), (Oliveira et al., 2020.),(Chauhan & Singh, 2023))

1.2. Research Objectives

1. To identify the prominent Authors in the IPR domain
2. To elicit the Trends in the area of IPR.
3. To investigate the Knowledge Structure in the IPR domain.

2. RESEARCH METHODOLOGY

The undertaken research taken the Scopus database for the analysis and followed PRSIMA (Preferred Reporting Items for Systematic Reviews and Meta Analyses) for doing the systematic review (Moher et al., 2009).

3 DATA ANALYSIS

3.1 Descriptive Analysis

3.1.1. **Authors**: Figure 2 displays the most relevant authors and ranked them based on the number of documents published. It displays that Wang X is the most relevant author with 15 documents followed by Liu Y with 11 documents then Zhang H, Zang X and Zang Y with 9 Documents each. Figure 3, Author impact evaluates an author's influence and contribution to the academic community based on various bibliometric metrics. H Index is a metric which is used to assess academic research impact which considers both productivity and citation impact of the publications. Figure 3 indicates that Wang C and Wang X have the highest impact with the h-index of 6 which indicates that these authors have at least 6 papers each that have been cited 6 times.

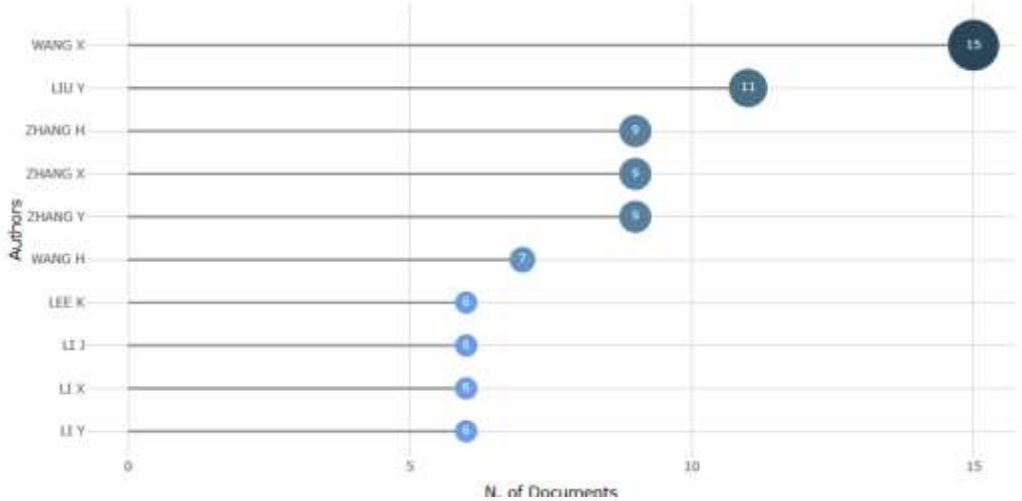

Figure 2 : Most Relevant Authors

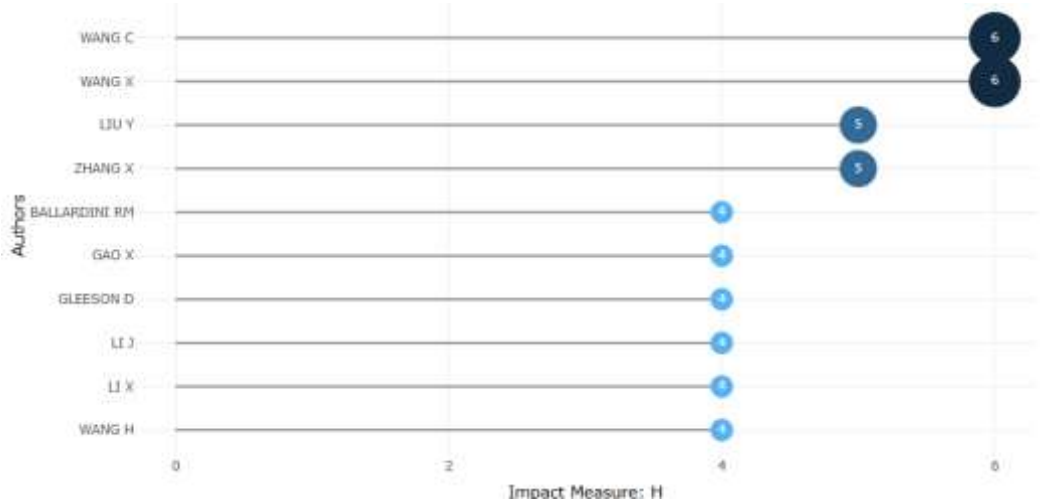

Figure 3: Author Impact

3.1.2 Geographical wise Distribution Countries Scientific Production analysis shows the number of research publication contribution from the research field of IPR coming from which countries along with citation impact. Table 1 shows that China is the prominent country with 662 publications, hence influence research directions, followed by India with 293 publications then USA with 238 publications. Table 1 Total citation shows that China leads with 1708 TC, followed by USA with 1149, then UK with 540 TC.

Table 1 Countries' Production and Citations

Region	Freq	Country	TC	Average Article Citations
CHINA	662	CHINA	1708	8.30
INDIA	293	USA	1149	15.10
USA	238	UNITED KINGDOM	540	9.30
UK	187	KOREA	456	11.70
INDONESIA	128	INDIA	277	2.90
SOUTH KOREA	106	GERMANY	266	12.70
ITALY	93	NETHERLANDS	249	19.20
GERMANY	82	FRANCE	235	11.80
UKRAINE	72	FINLAND	200	11.10
AUSTRALIA	69	ITALY	199	8.00

USA has the highest average article citation rate (15.10) suggesting higher impact, followed by Itay with 19.20 average citation rate then Germany with 12.70. It is observed that China dominates in terms of productivity and total citation but countries like Italy and Germany with smaller in quantity of productivity have highly impactful articles. From the analysis it is observed that the research contribution from the research domain of IPR is geographically diverse and also it would guide researchers and policymakers when seek for collaborations.

3.1.3 **Documents**: Figure 34analysis helps in identifying which documents received the highest number of citations per year across the world. Document by Liu Y, 2023 in Tech novation, being the recent publication has received the highest global citation of 43.5 per year and which indicates its significant impact followed by Roh T, 2021 and 2022 in Journal of Cleaner Production received 39.5 and 32.66 citations per year. Such analysis helps in identifying key research studies in the domain of IPR helpful in giving direction to the future research endeavours. SLI analysis shows the significance and influence of sources within an extracted dataset on research domain of IPR, measured by h-Index which measures the productivity and citation impact of publications within a specific source.

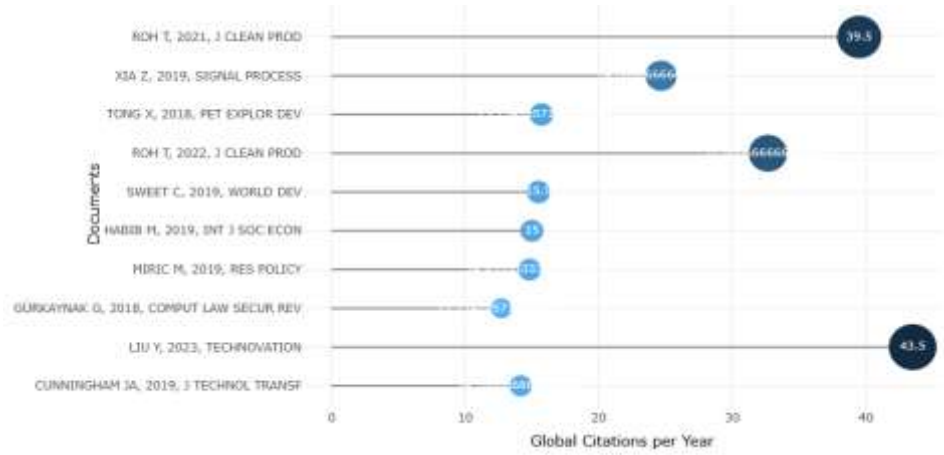

Figure 4: Most Global Cited Documents

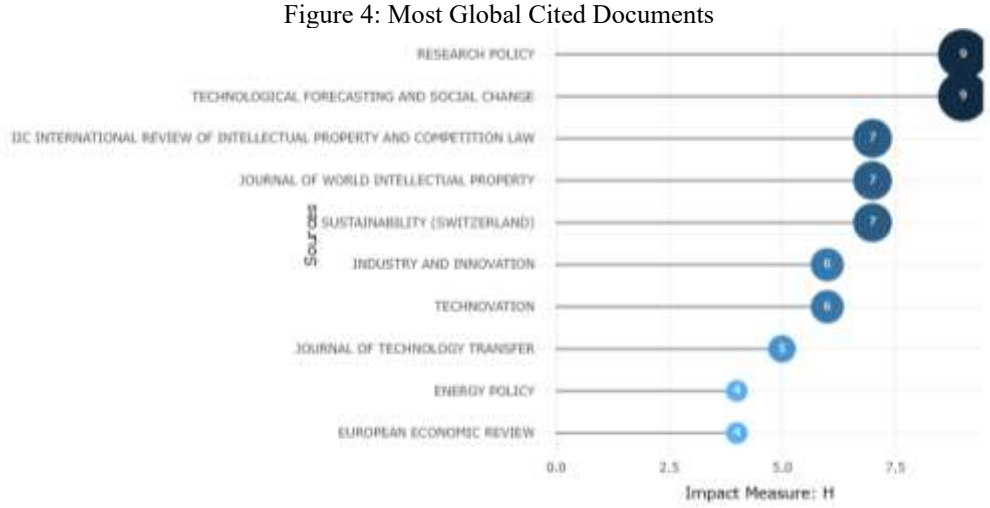

Figure 5: Source Local Impact

Figure 5 indicates that Research Policy and technological forecasting and Social Change have 9 as h-Index which means that these sources have published 9 documents which have been cited at least 9 times , thus indicating that these sources are the most influential journals in the dataset, followed by IIC International Review of Intellectual Property and Competition Law, Journal of World Intellectual Property and Sustainability (Switzerland) with 7 as h- Index indicates significant influence of Journals , rest Journals with 6 and 4 as h-Index indicates moderate influence. Thus, this analysis has relevance in the research field.

3.1.4 **Keywords**: Figure 6 shows the most frequently occuring terms in the extracted database of research field IPR ranging from 2018 to 2024. Analysis shows that Intellecual property rights (297), Intellectual property(199), Innovation(114) are the central theme followed by Patent(92) and Copyrigts(78). This analysis guide the research community regarding the most significant terms in IPR reaerch field .

Figure 6 : Word Cloud

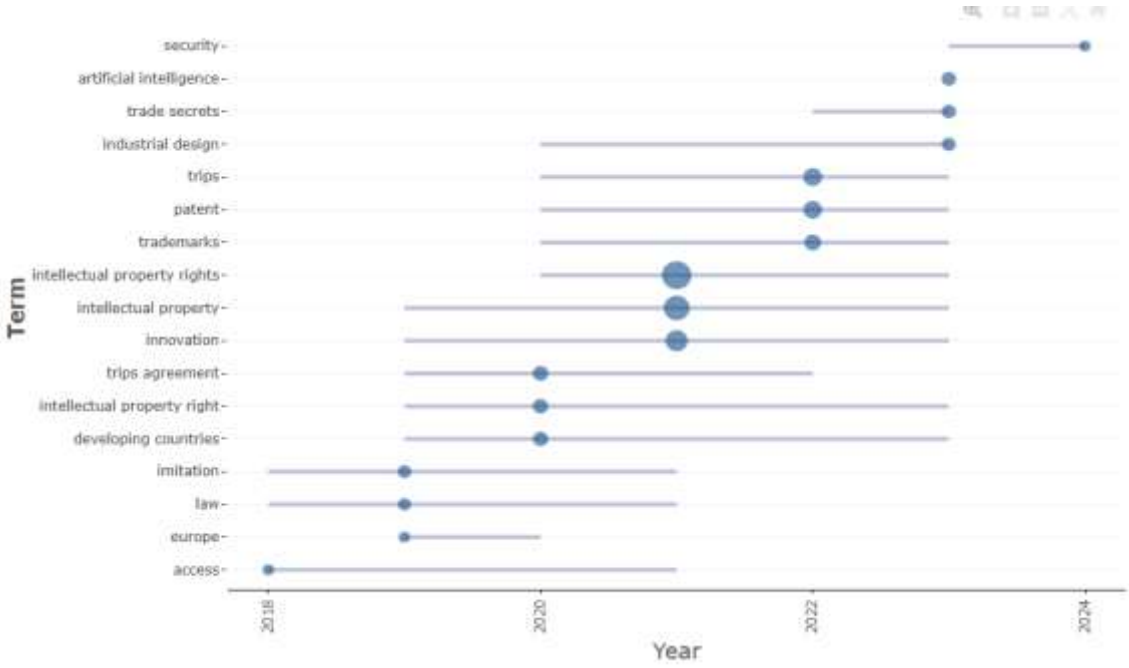

Figure 7: Trend Topics

3. 2 Trend Topics: Trend Topics shows the evolution and prominent keywords within the extracted database over time. Figure 7 analysis shows the topic trend. Intellectual property and Innovation topics have been the central themes since 2019 and continued receiving attention till 2023. Intellectual Property Rights topic been a key area of focus from 2020 to 2023, Trips, Patent and trademarks topics remained relevant and continued interest up to 2023, Artificial Intelligence, Trade Secrets and security are the newer topics and received attention in recent years i.e. 2023(former topics) and2024 (latter one) indicating emerging area of interest in research field of IPR. Figure 7 analysis provided the information about shift, emerging and persistent topics from 2018 to 2024.

3.3.**Conceptual Network**: The undertaken study has gained research focus over the years. This section displays data visualisation with co-occurrence network, and thematic evolution.

3.3.1. Co-Occurrence Network: This network is used to explain how different keyword or terms appear together in a set of documents.

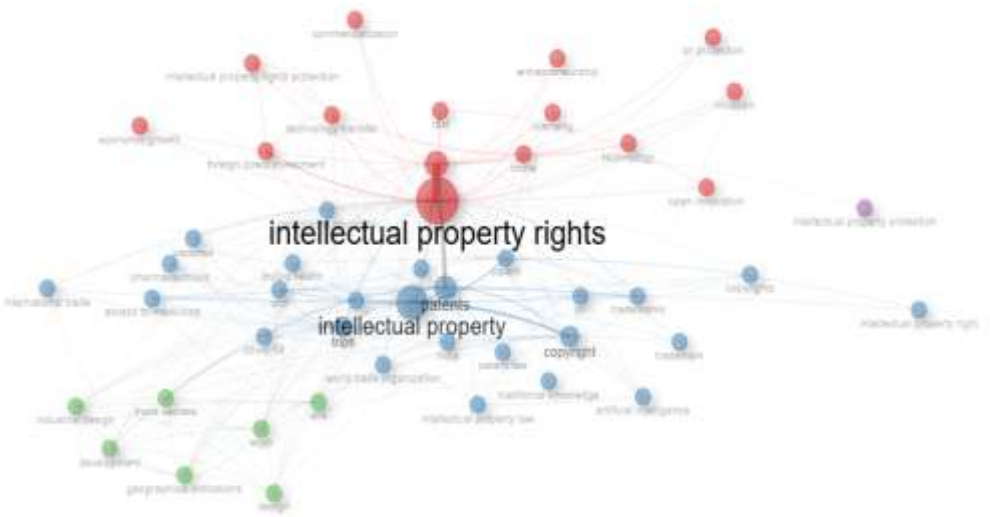

Figure 8

In figure 8, larger nodes (circles) like Patent, Commerce, Human, means that specific keyword is frequently mentioned in the documents which are analysed. Largest nodes represent prominent terms which are most influential in the extracted dataset and often positioned centrally. Intellectual Property and Intellectual Property Rights are the prominent terms(central) and are widely used with other terms. intellectual Property being the key theme appearing with keywords. This network helps to map out the conceptual structure of a research field of IPR. It suggests researchers in identifying the most prominent keywords (topic) and how they get connected with other keywords. It also indicates emerging trend.

3.3.2 Thematic Map: Figure 9 indicates how author's keywords were used to create thematic map. This map plots themes on two axes- Centrality (Relevance) and density (Development). Centrality represents high voume of work done in a specific theme whereas density shows significance of a particulat theme. categorize into four quadrants : motor themes (on the top rigt) , niches theme (on the left top), emergeing or declining themes (on the left bottom), Basic (on the lower right bottom). Each theme is represented by a circle in a map.. Figure 9 indicates that motor themes such as patent, article and human are well developed and highly significant in the IPR domain. These themes are considered strong and mature and are central to the IPR resaerch domain.

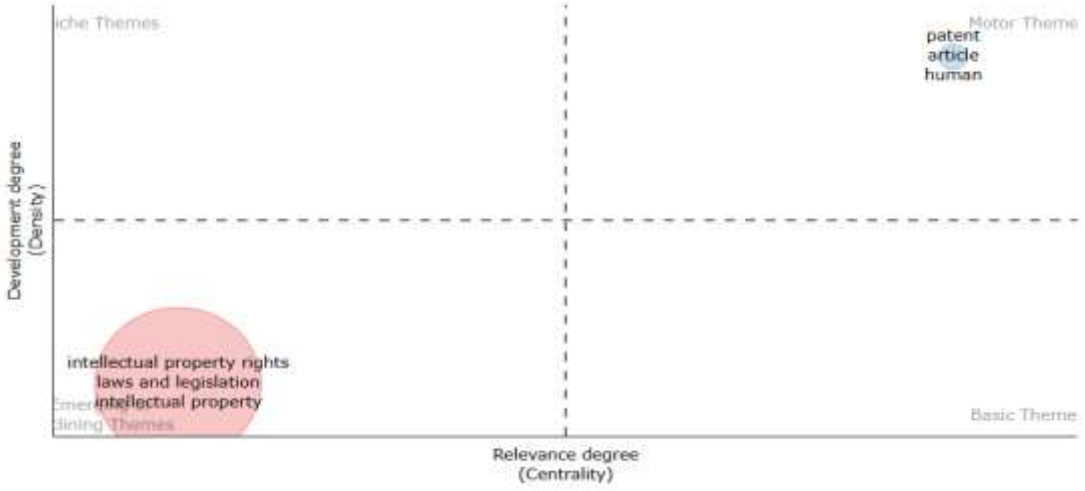

Figure 9 :Thematic Map

The theme intellectual property rights, laws and legislation, intellectual property which appears in the left bottom quadrant indicates that these themes areweakly developed and is of less significance . It repsresents that wether these themese are emerging and gaining traction or may be declining (fading themes).

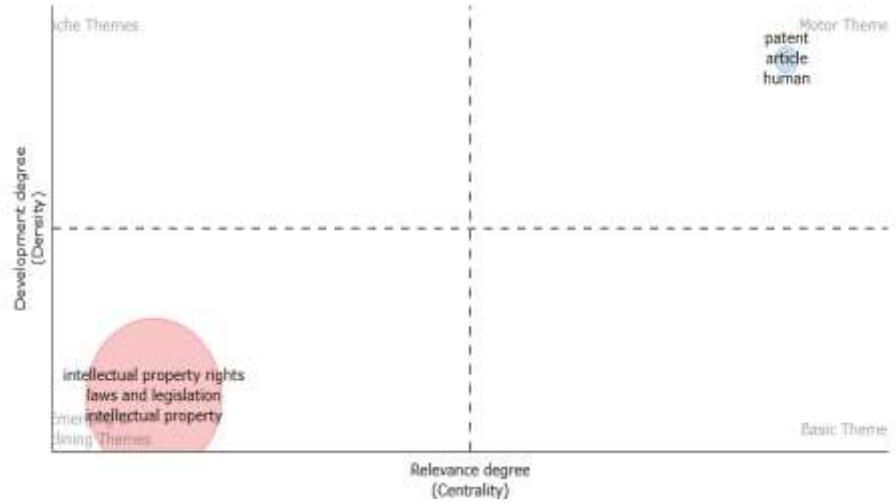

Figure 10: Time Slice 1

3.3.3.Thematic Evolution : Figure 10, on the basis of centrality and density shows how themes have emerged, evolved or declined over a period of time divided (Chen et al.,2019) into different time slices, taken 2021 as a cutting point. "Patent," "Article," and "Human" although are the central theme but a niche area showing potential to growth in Figure 10. Themes such as "Intellectual Property Rights," "Laws and Legislation," and "Intellectual Property are underdeveloped but attracting attention, potential to grow. The strategic diagram provides insights into the thematic structure of the research field.

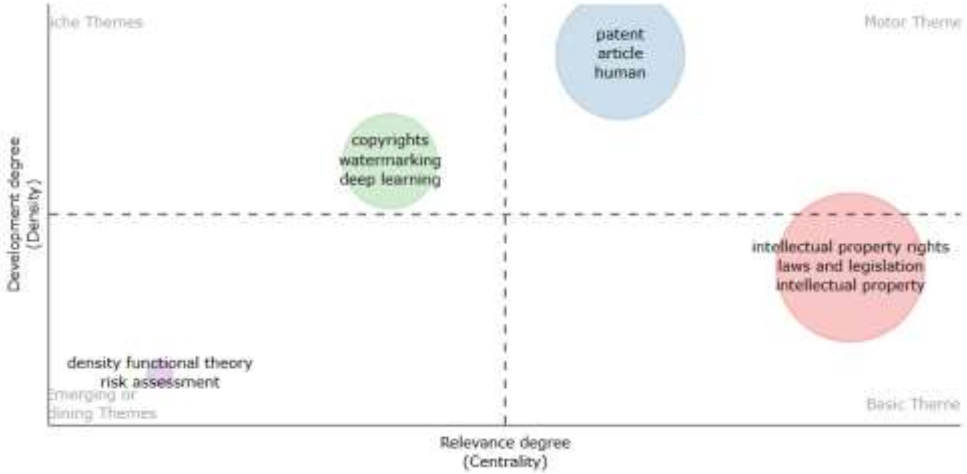

Figure 11: Time Slice 2

Figure 11 shows that “Patent," "Article," and "Human." are well developed and cohesive but shift of motor theme is towards niche theme suggests less central to the broader research field and more specialized. "Copyrights," "Watermarking," "Deep Learning. “Are niche themes indicating specialized arear of research.

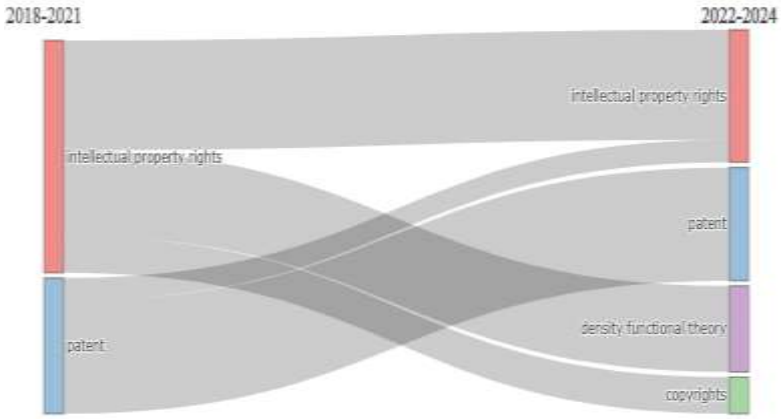

Figure 12 : Thematic Evolution

Basic themes such as "Intellectual Property Rights," "Laws and Legislation," "Intellectual Property" are significant to the research field but less developed. **Themes such as** "Density Functional Theory," "Risk Assessment" are emerging or declining, thus indicating new area of reach or lose relevance.
Figure 12 shows time frame division into two time periods which depicts flow and development of research themes across two-time span: 2018-2021 and 2022-2024. Figure 12 indicates the themes evolving from 2018-2021 to 2022-2024 which shows either continuity, deviation or emergence of new themes. In 2018-2021, Intellectual Property Rights and Patent are the main themes and indicated significant focus of research, whereas in 2022-2024 transition in themes are witnessed, Intellectual Property Rights theme continued in 2022-2024 which suggests consistent presence, Patent theme also marked its presence in 2022-2024 but branching out which suggests linking with Intellectual Property Rights theme. Observing some evolving themes like Density Functional Theory and Copyrights branching out from Intellectual Property rights (2018-2021), thus suggesting broadening of research field.

4 CONCLUSIONS

The Undertaken research shows the comprehensive analysis of Intellectual Property Rights by using Bibliophagy application. Analysis displays that Wang X is the most relevant author followed by Liu Y then Zhang H, Zang X and Zang Y. Majorly research work in this field is coming from China which is influencing research directions, followed by India then USA with 238 publications. On the other hand, analysis shows that China leads in TC, followed by USA then UK. USA with highest average article citation put higher impact on research community, followed by Itay and then Germany. Thus, China dominates in terms of publication output and total citation but witnessed that entry of Western European countries with smaller in quantity of productivity have highly impactful articles. The study observed some evolving themes like Density Functional Theory and Copyrights branching out from Intellectual Property rights (2018-2021), thus suggesting broadening of research field. This paper has made an attempt to build knowledge base and identifying unexplored areas in IPRs, thus would help in giving direction to future researches in this area.

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