Technological Disclosure Research: A Bibliometric Analysis WEB OF SCIENCE 2015/2024

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Abstract:
This paper does a bibliometric analysis of technology disclosure research from 2015 to 2024, utilizing data from the Web of Science and Scopus databases to identify significant trends, prominent authors, and major research domains. The findings indicate an increasing scholarly interest in this domain in recent years, with China and the United States at the forefront of research output, and Nanyang Technological University and Harvard University rising as notable institutions. Researchers Yimin Chen and Khaled Hussainey are distinguished for their substantial academic achievements and significant citation effect. The journal Technological Forecasting and Social Change is recognized as the preeminent publication in the subject. Simultaneously, business economics is the primary research emphasis owing to its intrinsic link with innovation management, intellectual property, and market strategies. Moreover, the study encompasses environmental sciences, computer science, and public administration, underscoring the multidisciplinary character of technology disclosure investigations.

Keywords: Technological Disclosure; Bibliometric Analysis; WEB OF SCIENCE.
JEL Classification Codes : O33, C80

ملخص:
تتناول هذه الدراسة تحليلًا ببليومتري لأبحاث الإفصاح التكنولوجي خلال الفترة من 2015 إلى 2024، بالاعتماد على بيانات من قاعدتي Web of Science وScopus، بهدف تحديد الاتجاهات الرئيسة والمساهمين المؤثرين والمجالات البحثية البارزة. تكشف النتائج عن تزايد الاهتمام الأكاديمي بهذا المجال مؤخرًا، مع تصدر الصين والولايات المتحدة في حجم المساهمات البحثية، وبرزت جامعتا نانيانغ التكنولوجية وهارفارد كمؤسسات رائدة. كما تميز الباحثان ييمن تشين وخالد الحسيني بإنتاج علمي غزير وتأثير استشهادي مرتفع. وأظهرت النتائج أن مجلة Technological Forecasting and Social Change هي الأكثر تأثيرًا، بينما يشكل مجال اقتصاديات الأعمال المحور الرئيس للأبحاث، لما له من ارتباط وثيق بإدارة الابتكار والملكية الفكرية والاستراتيجيات السوقية. كما تشمل الأبحاث مجالات متعددة مثل العلوم البيئية وعلوم الحاسب والإدارة العامة، مما يعكس الطابع متعدد التخصصات لأبحاث الإفصاح التكنولوجي.

كلمات مفتاحية: الإفصاح التكنولوجي، تحليل ببليومتري، بوابة علوم
تصنيفات JEL: C80،O33

1. Introduction

Technology disclosure refers to the public dissemination of information about technological breakthroughs, advances, or research findings by firms, organizations, and individuals. This disclosure can appear in several forms, including patents, scientific articles, and company reports, and is crucial for knowledge distribution, collaborative innovation, and competitive strategy (Hall et al., 2014). The parameters and attributes of technology disclosure are influenced by strategic, regulatory, and economic considerations, making it a vital area of investigation in innovation studies and corporate strategy (Huang et al., 2022). With the increasing interest in intellectual property (IP) management and open innovation, technological disclosure has become a vital factor in assessing companies' technological capabilities and innovation patterns across industries (Arora et al., 2016).

Evaluating technology disclosure is crucial to understanding its impact and effectiveness. Various bibliometric techniques, such as citation analysis, co-word analysis, and network mapping, are commonly employed to assess and investigate disclosure in academic and corporate settings (Moed, 2017). Patent databases, scientific literature repositories, and corporate disclosure reports serve as primary data sources for these assessments (Wang & Li, 2021). These measurement approaches aid scholars in recognizing trends, key contributors, and the distribution patterns of technological information. Advanced bibliometric methods, including text mining and machine learning, improve the precision and thoroughness of evaluations, rendering them increasingly relevant in contemporary research (Chen et al., 2019).

The determinants of technology disclosure are complex and include firm-, industry-, and regulatory-specific factors. Organizational strategy, intellectual property rights policies, competitive dynamics, and research and development intensity significantly influence a firm's choice to disclose technological information (Hagedoorn & Zobel, 2015). Moreover, institutional contexts, including governmental legislation and industry standards, affect disclosure practices by providing incentives or imposing restrictions on information distribution (Zuniga & Guellec, 2009). A company's innovation strategy often dictates the balance between transparency and proprietary control, requiring an optimization of information spillovers while maintaining a competitive edge (Laursen & Salter, 2006).

The consequences of technical disclosure extend beyond the benefits to particular firms, affecting both industry-wide and societal outcomes. The disclosure of augmented technology facilitates the spread of innovation, fosters collaborations, and advances technology by allowing knowledge spillovers across businesses and institutions (Griliches, 1990). At a micro level, organizations that effectively disseminate technology-related information may enhance their reputation, bolster

investor confidence, and achieve superior market placement (Gerpott, 2005). Excessive disclosure can lead to competitive concerns, such as information appropriation by rivals or reduced patent protection (Harhoff et al., 2003). At the macroeconomic level, transparent technological disclosure promotes economic growth by accelerating technological advancement and fostering an environment conducive to innovation (Jaffe et al., 1993).

This bibliometric analysis meticulously investigates the measures, determinants, and ramifications of technology disclosure. It employs quantitative bibliometric techniques to discern prominent research trends, impactful works, and nascent issues within this domain. It offers critical insights for researchers in technical and innovation management, policymakers, and practitioners.

This study examines the subsequent research question:

RQ1 What has been the annual distribution of research on Technological Disclosure over the past decade?

RQ2 Which nations have spearheaded Technological Disclosure over the past decade?

RQ3 Which educational institutions have made the most significant contributions to Technological Disclosure in the past decade?

RQ4 Which writers have made the most significant contributions to technical disclosure in the past decade?

RQ5 Which journals have exerted the most significant influence on Technological Disclosure in the past decade?

RQ6 What are the most essential domains of Technological Disclosure?

2. Methodology

This study employs a bibliometric methodology to examine scientific output on Technological Disclosure from 2015 to 2024. The methodology seeks to discern publication trends, prominent authors, important institutions, and critical theme areas that characterize the development of this research domain.

2.1 Sources of Data

Data were obtained from two prominent international databases: the Web of Science Core Collection (WoS). These databases were chosen for their extensive coverage of peer-reviewed scientific literature and their dependability in citation and authorship monitoring.

2.2 Search Methodology and Selection Criteria

The term "Technological Disclosure" served as the principal search criterion in titles, abstracts, and keywords. The criteria for inclusion were as follows:

- Publication duration: 2015–2024
- Language: English
- Document category: Articles exclusively
- Discipline: Technology, economics, and associated domains
- Following the retrieval of 1,377 entries, a screening process was implemented to remove duplicates and unnecessary research. Applying the inclusion and exclusion criteria yielded 880 relevant papers for analysis.

2.3 Analytical Instruments and Methodologies

The bibliometric data were exported in compatible forms, specifically CSV and RIS, for analysis. Quantitative analysis was performed utilizing Microsoft Excel for descriptive statistics and VOSviewer software for network visualization and mapping. The subsequent analytical dimensions were analyzed:

Yearly dissemination of articles (to assess development patterns)

Prominent nations and organizations (to ascertain geographic and institutional contributions)

Preeminent and impactful authors (determined by publication volume, citation frequency, and h-index)

Premier journals and academic disciplines (to elucidate the intellectual framework of the domain)

Keyword co-occurrence analysis for the identification of topic groupings and research hotspots.

2.4 Research Framework The methodological framework adheres to the PRISMA 2020 principles for systematic data identification and screening, hence assuring transparency and reproducibility. The procedure had four primary phases: identification, screening, eligibility evaluation, and incorporation of pertinent studies.

This analytical framework facilitates a thorough and impartial understanding of technological disclosure over the past decade, providing insights into its academic, institutional, and thematic developments.

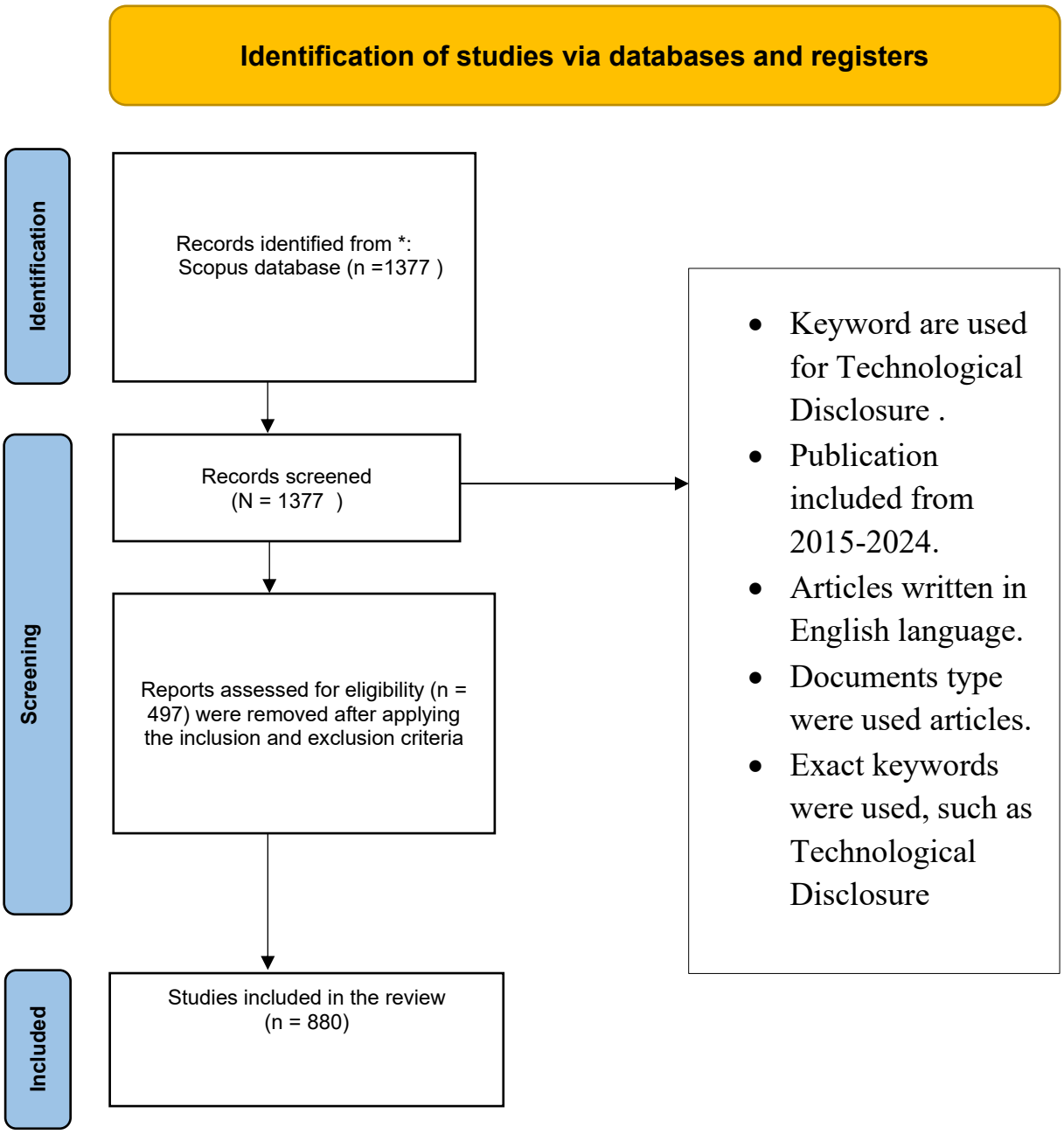


Figure 01 PRISMA 2020 for this review

4. Results and Discussion

Research on technical disclosure has gained significant attention over the past decade, underscoring its growing importance for innovation, intellectual property management, and competitive market strategies. The yearly distribution of publications from 2015 to 2024 demonstrates a steady upward trend. The number of papers rose steadily from 35 in 2015 to 68 in 2019, indicating a sustained expansion in research efforts. This was followed by a period of significant development, with publications reaching 83 in 2020, 106 in 2021, and 126 in 2022, likely driven by advancements in digital transformation, changes in intellectual property legislation, and trends in open innovation. The most significant increase occurred in 2023 and 2024, with the publication count rising to 136 and peaking at 184, respectively. This notable increase may be ascribed to emerging technologies, regulatory modifications, or a heightened academic focus on technology-driven innovation. The trend emphasizes the increasing academic and professional focus on technical disclosure, underscoring its vital role in fostering modern innovation ecosystems and knowledge-sharing practices.

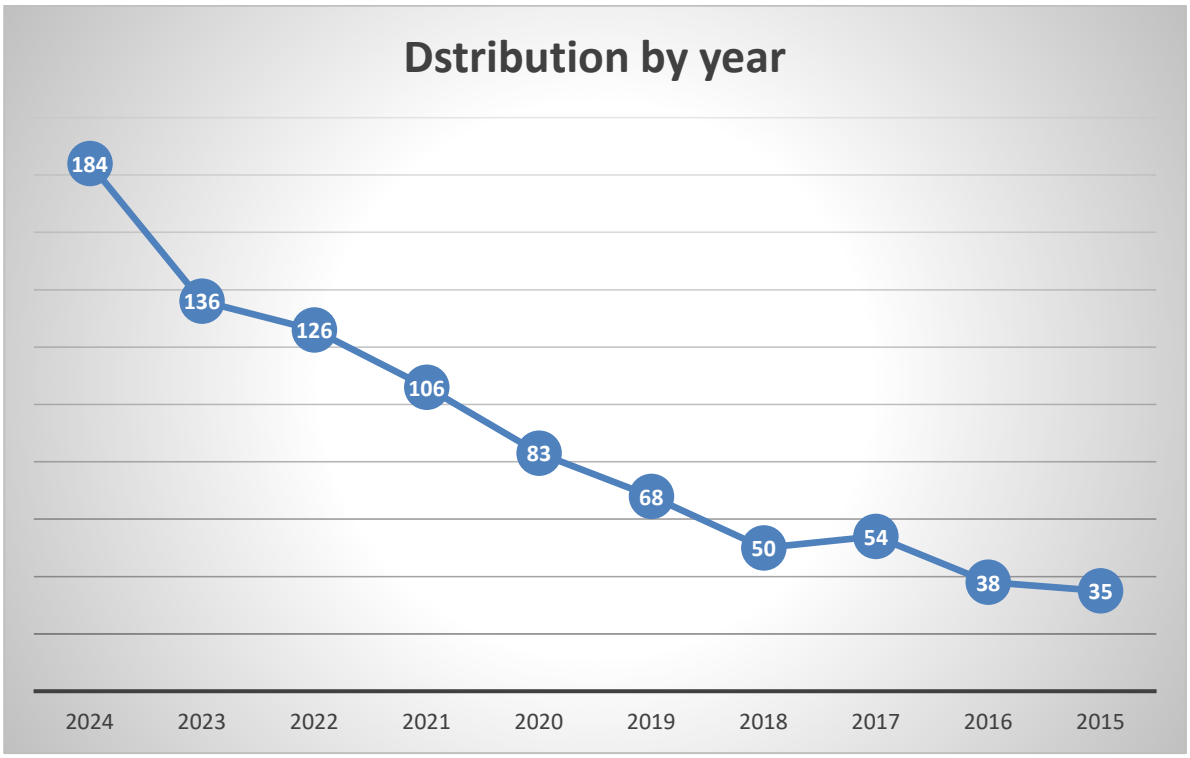
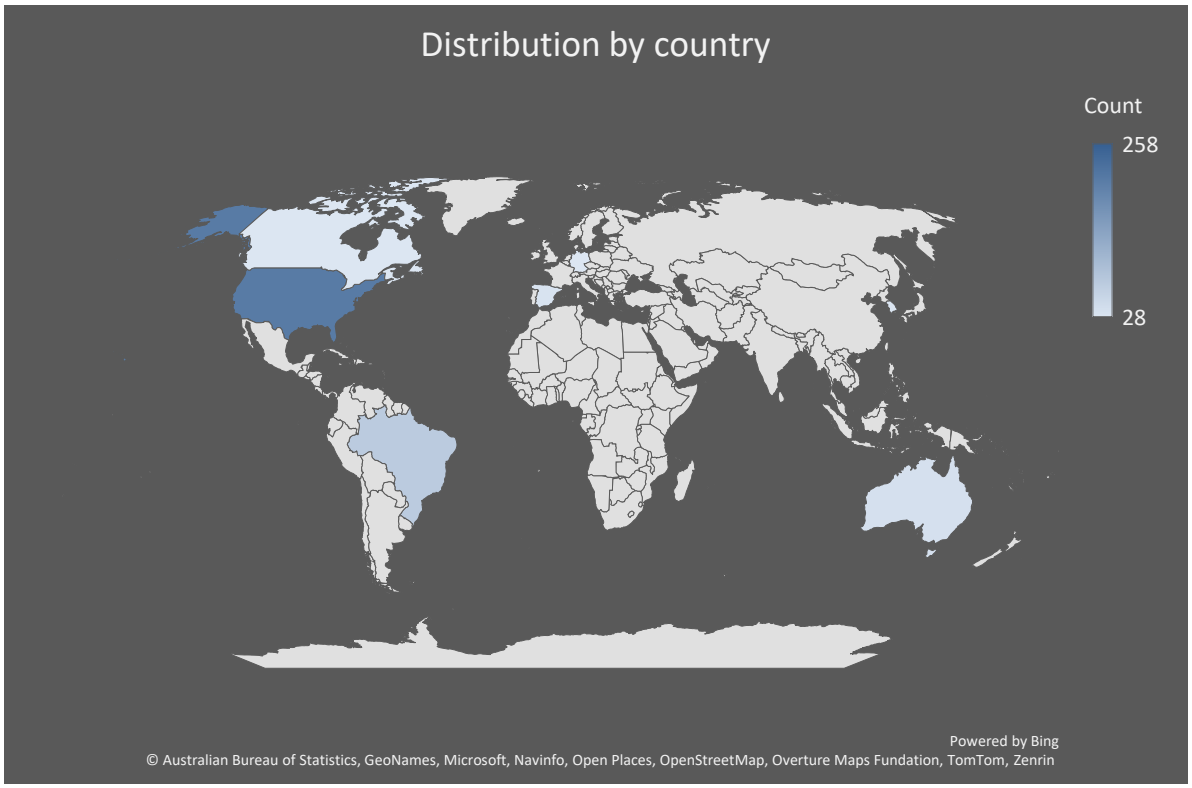


Figure 2: Distribution by year, source Web of Science

Research on technical disclosure has benefited significantly from efforts by several countries over the past decade, with certain nations standing out as key contributors. China leads with 258 publications, demonstrating its strong commitment to technological innovation, intellectual property management, and digital

transformation. The United States is closely followed by 212 articles, signifying its continued dominance in advanced technology research, development, and commercialization. Alongside these two global leaders, Brazil (74) and England (70) have made substantial contributions, underscoring their growing importance in the discourse on technical disclosure. Australia (38) and Singapore (38) have emerged as prominent innovation hubs, particularly in artificial intelligence, finance, and cybersecurity. Spain (33), South Korea (30), Canada (28), and Germany (28) markedly enhance research and technical disclosure protocols. This distribution highlights a notable geographical concentration of research output in leading economies. China and the United States prevail, but numerous emerging and established innovation-centric nations strengthen the global technological landscape.



Source: Web of Science **Figure 3: Distribution by country**

Table 01: Top 10 Educational Institutions

#	Educational institutions	TP
1	HARVARD UNIVERSITY	09
2	NANJING UNIVERSITY	09
3	NANYANG TECHNOLOGICAL UNIVERSITY	30
4	PENNSYLVANIA COMMONWEALTH SYSTEM OF HIGHER EDUCATION PCSHE	09
5	UNIVERSIDADE DE SAO PAULO	12
6	UNIVERSITY OF BELGRADE	09
7	UNIVERSITY OF CALIFORNIA SYSTEM	15
8	UNIVERSITY OF LONDON	12
9	UNIVERSITY OF TEXAS SYSTEM	12
10	UNIVERSITY SYSTEM OF GEORGIA	12

TP* = Total Publications **Source WEB OF SCIENCE**

In the past decade, many esteemed educational institutions have made significant progress in studying technological disclosure. Nanyang Technological University is the most prolific institution, with 30 articles focusing on innovation, digital transformation, and new technologies. Other notable contributors include the University of California System, with 15 articles, followed by Universidade de São Paulo, the University of London, the University of Texas System, and the University System of Georgia, each with 12 publications. Harvard University, Nanjing University, the Pennsylvania Commonwealth System of Higher Education (PCSHE), and the University of Belgrade have published nine articles illustrating their participation in technology disclosure research. These institutions have significantly shaped academic discourse in this field, highlighting the importance of technological innovation and intellectual property studies in higher education and research. Their contributions highlight the global nature of technical disclosure research, with leading institutions from North America, Europe, Asia, and South America advancing progress in this essential domain.

Table 02: Top 10 authors in the field

#	Author	TP*	TC*	H-INDEX	Most cited article*	Times Cited	Country
1	**Ricardo P C Leal**	25	735	9	Volatility in emerging stock markets	312	Universidade Federal do Rio de Janeiro (UFRJ)
2	**Khaled Hussainey**	201	5410	42	ESG disclosure and firm performance before and	217	

					after IR: The moderating role of governance mechanisms		
3	**Kang, Hyunjin**	20	526	14	SOURCE CUES IN ONLINE NEWS: IS THE PROXIMATE SOURCE MORE POWERFUL THAN DISTAL SOURCES?	76	Nanyang Technological University
4	**Yimin Chen**	167	6087	35	A future land use simulation model (FLUS) for simulating multiple land use scenarios by coupling human and natural effects	1161	Northwestern Polytechnical University
5	**Ziane, Idriss**	9	133	5	The impact of climate change management on banks' profitability	51	Univ Paris 1 Panthéon-Sorbonne
6	**Guler Aras**	46	999	11	Governance and sustainability - An investigation into the relationship between corporate governance and corporate sustainability	247	Yildiz Technical University
7	**Hong-Shuang Li**	148	1688	20	Secure Cloud-Based EHR System Using Attribute-Based Cryptosystem and Blockchain	204	Zhengzhou University of Light Industry
8	**Bo-Xiang Hsu**	6	90	4	Corporate social responsibility and value-added in the supply chain: Model and mechanism	38	National University of Kaohsiung
9	**Fadi Alkaraan**	20	493	11	Corporate transformation toward Industry 4.0 and financial performance: The influence of environmental, social, and governance (ESG)	180	Gulf Univ Sci & Technol
10	**Bortolon, Patricia Maria**	13	63	6	Dual-class unifications and corporate governance in Brazil	10	Universidade Federal do Espírito Santo

TP*=TOTAL PUBICATIONS, TC*=TOTAL CITATIONS

Source WEB OF SCIENCE

Research on technology disclosure has attracted substantial attention over the past decade, with many leading scholars making noteworthy contributions to the field. Their research has impacted discussions on innovation, corporate governance, and digital transformation, as demonstrated by their publication output, citation impact, and H-index. Yimin Chen is a distinguished author with 167 publications, 6,087 citations, and an H-index of 35; his most-cited piece on land-use simulation models has received 1,161 citations. Khaled Hussainey possesses 201 papers, 5,410 citations, and an H-index of 42, with his research on ESG disclosure and company performance cited 217 times. Hong-Shuang Li has significantly contributed to the security of cloud-based systems employing blockchain, authoring 148 articles and garnering 1,688 citations.

Notable contributors include Ricardo P. C. Leal, whose research on stock market volatility in emerging economies has garnered 735 citations, and Guler Aras, whose scholarship on corporate governance and sustainability has garnered 999 citations. Scholars such as Hyunjin Kang, Fadi Alkaraan, and Ziane Ydriss have made substantial contributions to the influence of online media, corporate transformation in Industry 4.0, and climate change management in the banking industry.

These researchers have significantly advanced the field of technological disclosure research, influencing both academic scholarship and industry practices. Their contributions underscore the importance of continued study in this field and impact future innovation, governance, and breakthroughs in digital transformation.

Table 03: Top 10 Journals in the field

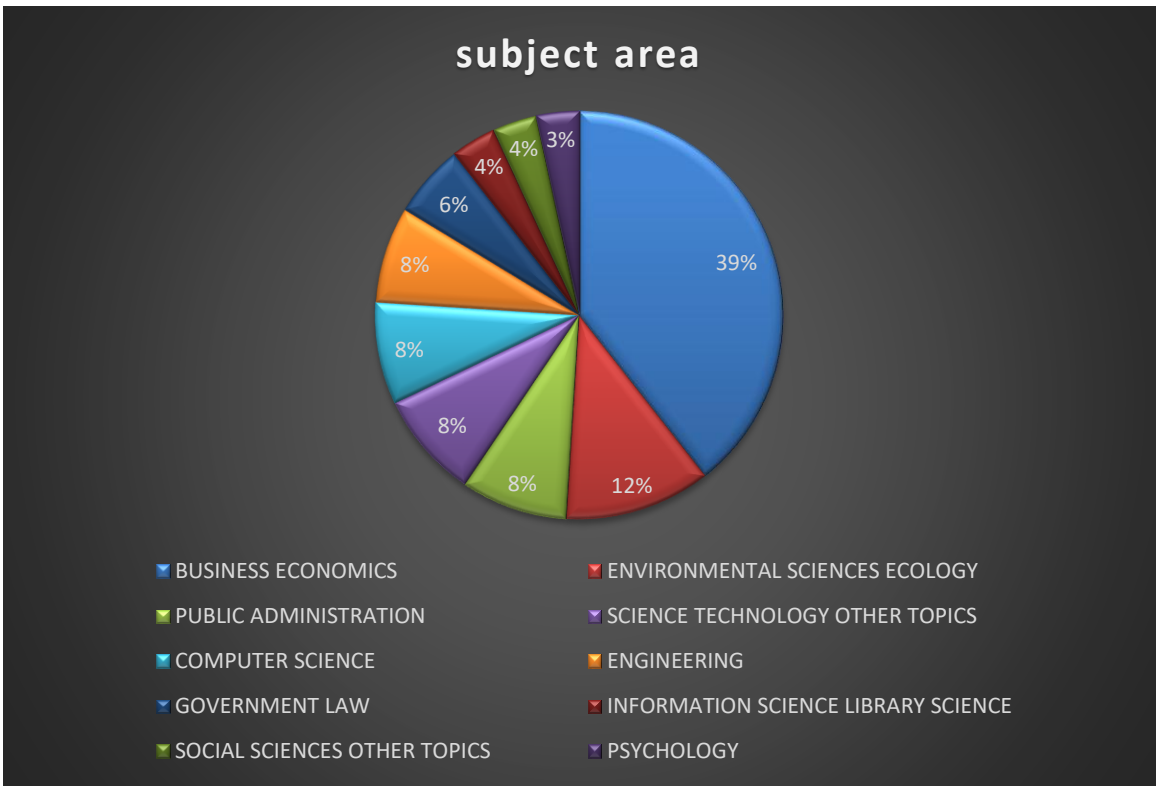
of journals	tp
TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	70
SUSTAINABILITY	27
COMPUTERS IN HUMAN BEHAVIOR	9
JOURNAL OF CLEANER PRODUCTION	9
PLOS ONE	9
ACCOUNTING REVIEW	8
INTERNATIONAL JOURNAL OF DISCLOSURE AND GOVERNANCE	8
TECHNOLOGICAL AND ECONOMIC DEVELOPMENT OF THE ECONOMY	8
CORPORATE SOCIAL RESPONSIBILITY AND ENVIRONMENTAL MANAGEMENT	7
CUREUS JOURNAL OF MEDICAL SCIENCE	7

TP*=TOTAL PUBLICATIONS Source WEB OF SCIENCE

Over the previous decade (2015–2024), the foremost journal in Technological Disclosure research, by total publications, is Technological Forecasting and Social Change, with 70 articles, underscoring its crucial importance in the field. Sustainability ranks second among the most influential journals, with 27 articles. Other notable journals include Computers in Human Behavior, Journal of Cleaner Production, and PLOS ONE, each with nine publications, highlighting their significance in specific aspects of technology disclosure. Moreover, Accounting Review, International Journal of Disclosure and Governance, and Technological and Economic Development of Economy have each published eight papers, indicating a moderate impact within the field. In conclusion, Corporate Social Responsibility and Environmental Management, along with the Cureus Journal of Medical Science, each with seven publications, finalize the list of notable contributing journals. The results demonstrate that the research on technical disclosure is multidisciplinary, including technological forecasting, sustainability, governance, and corporate accountability.

Technological disclosure is crucial to innovation and knowledge dissemination, affecting several academic and professional fields. A bibliometric analysis of research in the Web of Science (2015–2024) reveals that the primary topic area in technical disclosure is Business Economics, with 350 publications. This indicates a strong emphasis on economic and managerial aspects, encompassing innovation management, intellectual property, and market strategy. Other significant fields are Environmental Sciences and Ecology (103), which highlight the necessity of technological disclosure for sustainability and green innovation, and Public Administration (75), which emphasizes policy and regulatory dimensions. Moreover, Science & Technology Other Topics (75), Computer Science (72), and Engineering (68) highlight the subject's technological and multidisciplinary significance. Supplementary contributions from Government and Law (52), Information Science and Library Science (32), Social Sciences (31), and Psychology (30) reflect a broader societal and behavioral interest in transparency in technology.

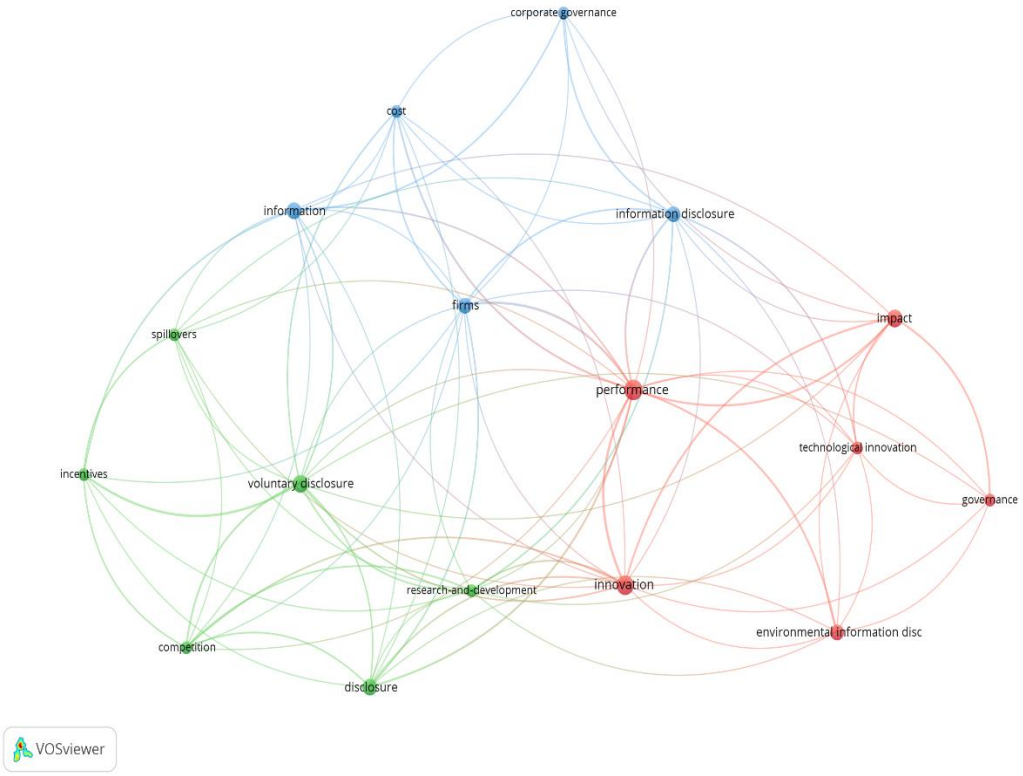
These findings underscore the intricate nature of technical disclosure, encompassing economic, technological, environmental, and regulatory dimensions, thereby establishing it as a dynamic and evolving area of research.



Source WEB OF SCIENCE **Figure 3: Distribution by subject area**

This VOSviewer network map, based on Web of Science data for "Technological Disclosure Research" from 2015 to 2024, depicts three principal term clusters and their interconnected topics. The green cluster examines the strategic and economic determinants of disclosure, highlighting the impact of "voluntary disclosure," "spillovers," "incentives," and "competition" on the decision to disclose technological information and the ensuing dissemination of that knowledge. The blue cluster emphasizes firm-level governance, demonstrating how "corporate governance," "cost," and "information disclosure" affect disclosure strategies in the context of regulatory and economic problems. The red cluster emphasizes the outcomes and broader implications of disclosure, illustrating its influence on "performance" and "impact," while underscoring "technological innovation," "environmental information disclosure," and "governance." The interconnections across clusters demonstrate that business practices, governance frameworks, and innovation outcomes converge within a multifaceted area of study, increasingly highlighting sustainability and societal impacts in relation to technology disclosure.

Figure 5: a map based on the relationship of co-occurrence with all keywords



Source vosviewer

This bibliometric analysis reveals several important patterns and findings with major significance for technological disclosure research. The increasing number of articles from 2015 to 2024 underscores a growing academic and professional interest in technology disclosure. The significant rise in recent years—culminating in 184 papers in 2024—demonstrates that researchers are increasingly recognizing the importance of understanding how the diffusion of technical innovations shapes competitive strategies, innovation ecosystems, and intellectual property management. This inclination is probably motivated by rapid digital transformation, changing regulatory structures, and global advocacy for open innovation.

Moreover, the geographical distribution of research output indicates that, while China and the United States lead in terms of numbers, there is a vast array of global contributions to the field. This distribution illustrates the economic and technological capacities of various nations and highlights the interdisciplinary essence of the research, encompassing commercial economics, environmental sciences, and public administration. The significance of institutions like Nanyang Technological University and Harvard University underscores the essential role of established research centers in shaping scholarly discourse and advancing the theoretical and practical dimensions

of technical disclosure.

The co-occurrence analysis conducted with VOSviewer clarifies the discipline's conceptual structure. Recognizing three distinct clusters—strategic and economic factors, corporate governance, and innovation outcomes—demonstrates the intricate nature of technical disclosure. The green cluster, emphasizing voluntary disclosure, incentives, and knowledge spillovers, clarifies the essential motivations and economic rationales for companies to disclose technology-related information. The blue cluster underscores the impact of corporate governance and cost considerations, accentuating the strategic significance of disclosure in balancing transparency with competitive advantage. The red cluster underscores the consequences of disclosure, including its effects on performance, innovation, and sustainability, within a broader societal and environmental framework.

These discoveries have significant implications for future research. Researchers could build on this study by investigating the dynamic interactions among these clusters to develop integrated models that better capture the complex dynamics of technological disclosure. The interdisciplinary nature of the subject prompts scholars to explore how advancements in digital technology and changes in global legal frameworks continuously reshape disclosure practices. The study delineates shortcomings, such as potential biases in database coverage and the omission of non-English publications, which future research should address to improve comprehension of the subject.

This bibliometric analysis traces the evolution of technical disclosure research and lays the foundation for further exploration of its measurement, determinants, and implications. The study clarifies the various interwoven topics within the issue, hence improving comprehension of the reciprocal relationship between technical disclosure and overarching patterns in innovation, governance, and economic development.

3. Experimental

This study utilized a bibliometric approach to extensively examine the research landscape of technical disclosure from 2015 to 2024. Data were obtained from two key scientific databases — the Web of Science Core Collection and Scopus — to guarantee extensive coverage of peer-reviewed papers in the discipline.

The search method used the exact keyword "Technological Disclosure" across document titles, abstracts, and keywords. Only English-language journal articles were considered to ensure academic rigor and comparability. The data collection method produced 1,377 records, which were then processed to eliminate duplicates and extraneous entries. After applying the inclusion and exclusion criteria, 880 publications were selected for comprehensive analysis.

All bibliometric indicators were analyzed utilizing VOSviewer and Microsoft Excel to discern patterns, prominent contributors, and intellectual frameworks within

the discipline. The analysis concentrated on multiple critical facets:

Yearly publishing trends to evaluate research expansion over time.

Assessing national and institutional productivity to identify the primary contributors.

Author influence is determined by publication quantity, citation rate, and h-index.

Analysis of journals to identify primary publication venues.

Mapping keyword co-occurrence to illustrate thematic groupings and emergent subjects.

This experimental design guarantees methodological transparency, reproducibility, and objectivity in investigating the evolution and conceptual underpinnings of technological disclosure research.

4. Conclusion

The bibliometric analysis of technical disclosure research from 2015 to 2024 reveals a dynamic, continually growing field crucial to understanding innovation management, intellectual property processes, and competitive market strategies. The continual rise in publications signifies an enduring academic interest, driven by rapid advances in digital technology and changes in regulations. The diverse contributions from leading nations and institutions highlight the region's global and multidisciplinary nature. The observed clusters—comprising strategic and economic considerations, corporate governance, and innovation outcomes—demonstrate that technical disclosure is a multifaceted phenomenon with significant implications for business success, sustainability, and overall economic development. Despite limitations such as potential database biases and language constraints, this work provides a robust foundation for future research aimed at developing integrated models and exploring the complex interactions between disclosure practices and emerging technological developments.

Table 04: Summary of Key Findings and Emerging Trends

Aspect	Findings	Implication	Trends	Future agenda
Publication	Steady growth from 35 publications in 2015 to 184 in 2024.	Increasing academic and practical interest in technological disclosure.	Accelerated growth in recent years, reflecting digital transformation and evolving regulatory frameworks.	Investigate emerging technological and policy impacts driving publication trends.
Journals	Technological Forecasting and Social Change are the most influential, followed by Sustainability, Computers in Human Behavior, and others with lower counts.	Core venues for disseminating technological disclosure research indicate disciplinary focus and quality.	Multidisciplinary outlets are gaining traction, with a mix of technology, management, and sustainability-focused journals.	Monitor evolving journal impact and consider the role of new publication outlets in shaping the field.
Countries	China leads with 258 publications, followed by the USA with 212; significant contributions also from Brazil, England, Australia, and others.	Global research activity is concentrated in significant economies, highlighting economic and innovation capacity.	Geographic concentration in leading economies, with emerging contributions from diverse regions.	Explore international collaboration patterns and strategies to diversify research contributions across more regions.
Educational Institutions	Nanyang Technological University, the University of California System, and others are among the top contributors, along with prominent institutions from various regions.	Leading research hubs are instrumental in advancing the field, indicating strong institutional research capacity.	Concentration of research output among a few leading institutions, indicating established expertise and collaborative networks.	Encourage cross-institutional partnerships and broaden the research base to include emerging universities and regions.
Authors	Yimin Chen, Khaled Hussainey, Hong-Shuang Li, and others are among the top authors. High publication counts, citation impact, and H-index values characterize their work.	Influential scholars are shaping research trends and defining the intellectual direction of technological disclosure studies.	A growing pool of influential researchers with increasing citation impacts, reflecting deepening academic engagement and leadership in the field.	Foster interdisciplinary research and support emerging scholars to diversify further and enrich the field's intellectual contributions.
Keywords	The analysis identified clusters: strategic/economic	These clusters reveal the field's multifaceted focus	There has been a shift toward sustainability and	Develop integrated models combining these thematic

	drivers (e.g., voluntary disclosure, incentives), corporate governance, and innovation outcomes (e.g., performance, sustainability).	and its interconnections among strategy, governance, and innovation.	digital transformation themes, with keywords evolving to capture broader, interdisciplinary aspects of technological disclosure.	clusters to address complex phenomena in technological disclosure comprehensively.

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