

# Uncertain Supply Chain Management

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## A bibliometric review of risk disclosure studies

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### ABSTRACT

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Risk disclosure condenses information asymmetry and delivers company risk information to external parties—nonetheless, inadequate studies highlight risk disclosure’s role in investor perception. Consequently, the risk disclosure studies are predominantly about determinant and tone impact, demanding further endeavor on the role of risk disclosure by enacting a bibliometric approach to review the status quo, pattern and focus, and the trend of the risk disclosure studies to determine the future research direction. This study pinpoints that risk disclosure has been progressively discussed in international publications over the last decade. Nevertheless, some relevant research community themes must be carefully planned, i.e., risk assessment and market risk disclosure. Further, the noteworthy aspect of writers’ productivity is that the most productive writers are excluded as the most cited authors, demonstrating that the hotspot of study on risk disclosure is the role in annual financial stability, determinants, and how crucial transparency is in the capital market. This study also reveals that extensive cooperation is conducted primarily in the USA, UK, and Australia. However, the development has shifted to China, India, and Asia. Future research on risk disclosure will be explored more in Russia, South America, and Africa, considering the countries’ regulations and risk policies.

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## 1. Introduction

Nowadays, the world encounters an unpredictable global environment. In a borderless landscape, economic activity in one country influences other countries. As an integral part of the business community, investors, corporates, and industries encounter uncertainty in regular business dealings. Uncertainty brings risks that must be handled to earn profits and dodge unforeseen consequences. Initially, the risk was perceived as perilous, while the present risk is viewed positively or negatively as a response to the outcome (Linsley & Shrides, 2006). Given the duality perspective of risk, stakeholders demand further evidence about risk disclosure to enable them to generate corporation and investing evaluations and better comprehend the company’s social responsibility position (Probohudono et al., 2013). Information asymmetry exists between management as an internal party and stakeholders as an external party. Information asymmetry is an information gap or information difference between the two parties. When information symmetry is lacking, it results in an inequitable distribution, enabling certain stakeholders to gain informational advantages that are inaccessible to others (Elrefae et al., 2024). It obliges the corporation to communicate to external parties how risk management is enacted in its business processes. The signaling process is interrelated to the corporation’s risk-averse external parties (Jorgensen & Kirschenheiter, 2003; Linsley & Shrides, 2006; Dobler, 2008). Risk disclosure is imperative for regulated corporations to communicate transparently about risk management procedures and how to mitigate them. It helps (potential) investors to estimate cash flows accurately and regulators to anticipate systemic risks (Düsterhöft et al., 2023).

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Risk disclosure incorporates comprehensive material regarding the foundations of risk and methods of risk management in location, scope, and nature (Dobler, 2008). The central objectives of risk disclosure are transparency, risk communication, and risk management (Düsterhöft et al., 2023). Different countries have distinct risk disclosure standards, which concern the corporation as it dictates how to ensure investors correctly comprehend the risk disclosure information. It will eventually shape investors' expectations of the corporation and evaluate its value, reflecting its share price. The literature verifies the practicality of risk disclosure for investment marketplace practitioners (Campbell et al., 2012; Elshandidy & Shrivess, 2016). According to Heinle and Smith (2017) "By heightening investors' knowledge of banks' risk acquaintances and management practices, prime risk disclosure can alleviate premiums improbability and promote pronounced economic stability". Risk disclosure is valuable in overall marketplace circumstances and is more exceptional in bearish and recuperating stock markets against bullish during economic downturns because investors are cautious and increase their inquiries for risk information (Miihkinen, 2013).

The advancement of studies on risk management has been initiated since the early 80's. Nonetheless, the prominence of corporation risk management disclosures has yet to experience an encouraging development. Although the empirical literature reflects elaborated academic work regarding risk management, further studies on corporation risk disclosure still demand recognition (Giacosa et al., 2016). The studies conducted at this point are predominantly on what determines risk disclosure and its influences on corporation performance. Nevertheless, studies on how risk disclosure can shape the expectations of investors and other stakeholders are not sufficient.

Risk disclosure is critical in socio-economic sciences, such as finance and other scientific fields. The utilization of this concept is extensive and unrestricted. Moreover, different countries possess distinct standards and regulations on risk disclosure. Accordingly, it is crucial to map to what extent the risk disclosure concept has been pursued.

This study evaluates how the risk disclosure concept has been elaborated globally. The initial objective is to determine the status quo of international studies on risk disclosure considering published scientific publications. Then, the subsequent objective is to investigate the pattern and focus of the existing research groups on risk disclosure and how they work collaboratively. The final objective is to explore the evolving movements and potential research focuses of the global study of risk disclosure.

This study is segmented into three sections corresponding to its objectives. The first section is a performance analysis considering yearly systematic construction, most applicable bases, source development, and author production to comprehend the status quo of international research on risk disclosure. The second section examines the social construction to grasp the major clusters in the field, their corresponding instructions, and the linkages between different clusters by collaboration networks between authors and country collaboration networks. The third section applies author keywords, thematic evolution, and maps to discern the advancement of key topics within the risk disclosure studies and predict future research trends.

## 2. Material and Method

This study utilized bibliometric analysis to review the literature to attain this objective. Bibliometric analysis is a quantitative technique devised to recognize, illustrate, and appraise circulated research corresponding to a desired theme (Bretas & Alon, 2021). A systematic review article, bibliographic databases and bibliographic reference management software are needed to carry out a rigorous and organized search of the scientific literature in the corresponding field of study (Aguilar Roman et al., 2023). Multiple software tools were offered as bibliometric analysis tools. However, to optimize the results, this study employed two tools, i.e., an R-based bibliometric tool commonly known as bibliometric and a VOS viewer. R-based bibliometrics could describe the data in more detail, allowing researchers to gain a more in-depth view, while VOS viewer could visualize the co-networking in the desired field more precisely (Aria & Cuccurullo, 2017). This method applied the same work as the current proposal (Zupic & Čater, 2015). This study workflow began with research design, followed by data collection, continued with data analysis, accompanied by data visualization, and concluded with interpretation.

The study design defined the research question before opting for an adequate bibliometric method. In the study design, one of the most crucial decisions for researchers is the time span or the deliberation to divide the time span into timelines to apprehend the development of the field over time (Aria & Cuccurullo, 2017). In data collection, databases were identified as containing bibliometric data, filtering the core set of documents, and exporting data from the preferred databases. This step may entail the construction of the database (van Eck & Waltman, 2010). One or more bibliometric or statistical software was deployed for data analysis. In data visualization, it must be determined what visualization method to apply to the results from the third step and then utilize suitable mapping software. Further, the final stage was interpretation, where the findings were interpreted and illustrated.

The data collection process utilized the Scopus database for the observed theme, i.e., risk disclosure. There were two primary sources of databases, Scopus and WoS; however, WoS possessed a narrower scope than Scopus (Bretas & Alon, 2021). Scopus covered over 20,000 scientific journals from Elsevier, Emerald, Taylor & Francis, Springer, Informs, and Inder Science. Conversely, WoS provided ISI-indexed journals and was restricted to 12,000 journals (Fahimnia et al., 2015). Subsequently, after loading the data in the format required by this tool, the metadata we retrieved from these database sources can be deployed as appropriate to our needs. The subsequent descriptions of the queries corresponding to the study.

**Table 1**  
Query description

Category	Criteria	# refined documents
Search documents	Risk Disclosure	853
Document Type	Article	681
Publication stage	Finale	650
Source type	Journal	647
Language	English	624

Source: R-based data analyses

The description of the research query commenced with 853 documents with the first criterion, i.e., risk disclosure. The document type of the second criterion was articles, which specified the filtered documents to be 681 articles. The publication stage category was the last category, filtering the documents to 650 articles. The source type category was the journal, resulting in 647 articles. The last category was language, refining documents being 624 articles. The existing sections in this study performed data analysis and visualization steps. The first section analyzed performance by yearly systematic construction, most applicable bases, source development, and author production to examine international research on risk disclosure status quo. The second section examined the social construction to underpin the primary research clusters, respective research focuses, and the interlinkages between distinct clusters by collaboration networks, authors, and country association networks. The third section employed author keywords, thematic advancement, and maps to seize the evolution of key topics within the risk disclosure studies and predict future research trends.

**3. Result and Discussion**

*3.1. Performance analysis*

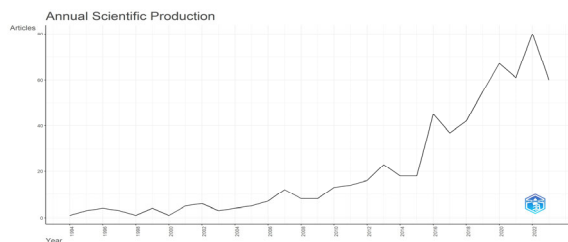
Performance analysis in bibliometrics is a descriptive part corresponding to the background of the study with a methodical function to examine contributions to specific research fields (Cobo et al., 2011; Donthu et al., 2021). Table 2 illustrates the primary information of the processed results. There were 624 publication documents between 1994 and 2023 from the Scopus database out of 367 sources. The “Author’s keyword” section describes the basic concept of risk disclosure identified by the authors, where there are 1493 articles. The number 1667 is “Keyword plus,” which is the number of keywords frequently found in the article’s title. With 1563 authors, the picture of author collaboration in one article from 1994 to 2023 shows most articles were written by three authors [3.22] and only 80 by single authors, meaning that most risk disclosure articles are affiliated. It is logical, considering risk disclosure involves science in economics and business and distinct fields of science, such as medicine. The research could be done across fields of science.

**Table 2**  
Data information

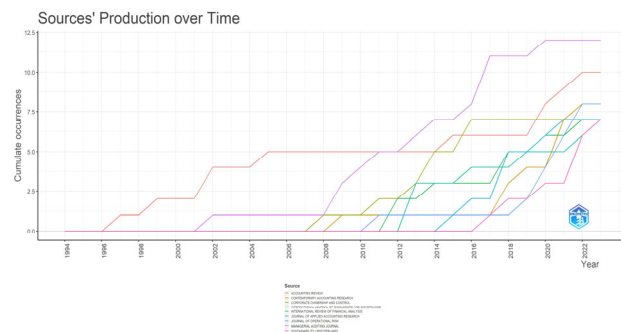
Description	Results		
DATA INFORMATION	DOCUMENT CONTENTS		
Timespan	1994:2023	Keywords Plus [ID]	1667
Sources [Journals, Books, etc.]	367	Author’s Keywords [DE]	1493
Documents	624	AUTHORS	
Annual Growth Rate %	15.16	Authors	1563
Document Average Age	6.2	Authors of single-authored docs	70
Average citations per doc	22.33	DOCUMENT TYPES	
References	28815	article	624
AUTHORS COLLABORATION			
Single-authored docs	80		
Co-Authors per Doc	3.22		
International co-authorships %	24.2		

Source: R-based data analyses

The subsequent figure demonstrates the distribution of articles, revealing an increasing trend, with a typical 22.3 citations per document and a 15.16% yearly growth rate over the past 20 years.

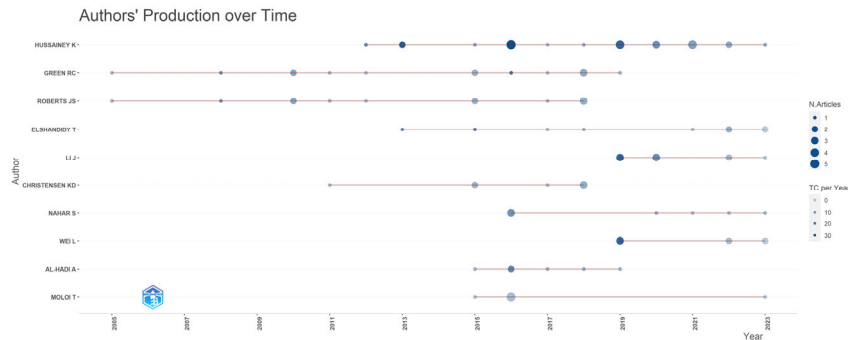


**Fig.1.** Annual scientific production



**Fig. 2.** Source production over time

Fig. 1 depicts the drift in journal article numbers relating to risk disclosure studies from 1994 to 2023. Publications from 1994 to 2004 are under ten articles, although there is an uptrend. Proceeding to the next ten years, i.e., from 2005–2015, there was a doubled growth of twenty articles, and the significant growth started in 2016. The expansion commenced at the end of 2015 when there was a surge in articles, which doubled from the previous year to 45 articles. Subsequently, it peaks in 2022 with 80 articles. It portrays a gradual uptrend in journal risk disclosure articles from 1994 to 2014. The following seven years significantly increases, exhibiting a high interest in publishing risk disclosure articles. The subsequent figure depicts the growth of the source, demonstrating the number of journal publications corresponding to risk disclosure from 1994 to 2023.



**Fig. 3.** Author's production over time

Fig. 3 reveals a significant increase between 2014 and 2015. The Journal of Accounting Review has the uppermost publications until 2012, consistently trending upwards until 2022. After 2012, the journal Managerial Auditing surpassed the Journal of Accounting Review in publication numbers and became the journal with the uppermost publication number from 2012 to 2023. Henceforth, The Managerial Auditing Journal has continued to be the most relevant source of risk disclosure studies, exceeding the previous leading journal, i.e., Accounting Review. Other journal publications also demonstrate a consistent uptrend since 2010. These journals include Contemporary Accounting Research, Corporate Ownership and Control, International Journal of Disclosure and Governance, International Review of Financial Analysis, Journal of Applied Accounting Research, and Journal of Operational Risk and Sustainability (Switzerland). Considering the total growth in publication productivity over the past three decades, the dominance of journals publishing on risk disclosure has shifted. Dominated by journals in accounting, there was a demand for more of these topics in finance and risk journals. Regardless, risk disclosure has begun to be more extensively discussed in international publications in the past decade.

### 3.2. Citation Analyses

Citation analysis is attributed to bibliometric analysis, an advanced technique in mapping techniques that indicates the most prominent influence of documents, sources, and authors academically. The overview was achieved through the most relevant authors, author productivity, and references (Cobo et al., 2011; Donthu et al., 2021). Another section of performance evaluation that describes the status quo of publications in risk disclosure was citation analysis, displaying the most notable influence of authors by the most relevant authors and author productivity.

**Table 3**  
Author Citation

No.	Paper	Year		Total Citations	TC per Year	Normalized TC
1	Linsley Pm	2006	British Accounting Review	374	20.78	5.31
2	Campbell JI	2014	Review of Accounting Studies	339	33.90	5.69
3	Beretta S	2004	International Journal of Accounting	329	16.45	3.00
4	Abraham S	2007	British Accounting Review	306	18.00	5.93
5	Kravet T	2013	Review of Accounting Studies	261	23.73	4.25
6	Ntim Cg	2013	International Review of Financial Analyses	223	20.27	3.63
7	Bao Y	2014	Management Science	211	21.10	3.54
8	Steiger R	2019	Current Issue in Tourism	203	40.60	10.50
9	Elzahar H	2012	Journal of Risk Finance	193	16.08	6.74
10	Pérignon C	2010	Journal of Banking and Finance	192	13.71	5.63

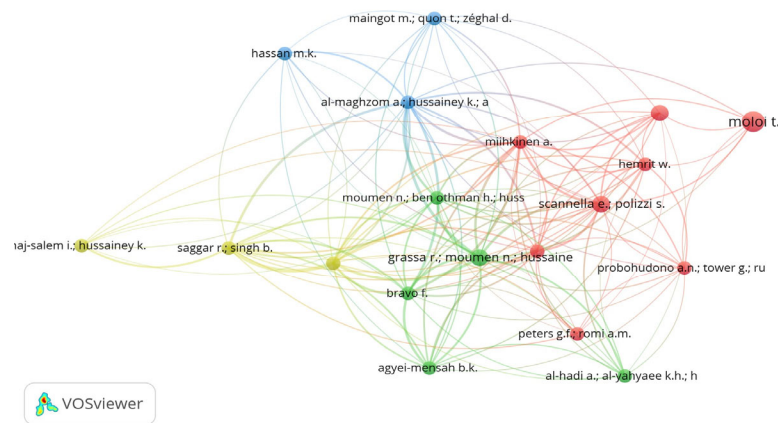
Source: R-based data analyses

Table 2 highlights that Linsley (Linsley & Shrives, 2006) is the most cited author and the earliest publication on risk disclosure compared to others. When viewed from citations per year, he is not the highest because Steiger (Steiger et al., 2019), who published his article in 2019, has the highest total citations. Subsequently, the author with the most citations is Campbell (Campbell et al., 2012) due to his total citation value and total citations. This analysis reveals that these three authors were the most cited. The fascinating point of author productivity is that the most prolific authors are not presented among the most cited authors, as shown in Fig. 3. There is a distinct difference in the focus of the discussion, orienting toward the drivers of risk disclosure and orienting toward the role of risk disclosure on shareholders and corporation value.

Fig. 3 demonstrates researchers' ranking, adhering to the number of articles on risk disclosure and the range of publication years. Accordingly, the researcher with the highest number of articles is Hussaeny (Mcchlery & Hussainey, 2021), with 25 articles from 2012 to 2023, as opposed to Green (Vernarelli et al., 2010), with 14 articles, and Robert (Vernarelli et al., 2010), with 12 articles, is the prolific author who published 25 articles from 2012 to 2023. Meanwhile, Elshandidy and Shrivs (2016) with nine articles, has the productivity of authoring articles from 2012 to 2023, despite being more than Hussaeny (Mcchlery & Hussainey, 2021). Subsequently, some academics have been active since 2012 and remain productive until 2023, i.e., Li (Wei et al., 2019) has nine articles. Nahar et al. (2016) and Wei et al. (2019) have seven articles, and Moloï (Moloï, 2016) has six articles. Two researchers were formerly prolific but have yet to publish significantly more papers from 2019 to 2023, i.e., Baumann-Pauly et al. (2013) with seven articles and A-Hadi et al. (2018) with six articles. These authors contributed the most writing on risk disclosure from 2012 to 2023. Accordingly, although Hussainey (Mcchlery & Hussainey, 2021) produced the most publications, i.e., Linsley (Linsley & Shrivs, 2006), Steiger (Steiger et al., 2019), and Campbell (Campbell et al., 2012) are the most relevant authors in the study of risk disclosure owing to the amount of citations over the last two decades.

### 3.3. Social structure analyses

Estimating the collaboration in risk disclosure studies from 1994 to 2020, the Co-Authors per Document in Table 1 indicates that most articles are authored by about three or more people (3.22), and the international co-authorship of academics globally is 24.2%. It implies an intense collaboration between academics in writing risk disclosure studies. Fig. 4 pinpoints some of the significant author groups discussing risk disclosure.



**Fig. 4.** Bibliographic coupling author

The first cluster in red comprises researchers influential in risk disclosure and its role in a corporation's yearly financial description on market value and investor perceptions. These academics are Antti Miihkinen (Miihkinen, 2013) from Aalto University School of Business, Finland, then Philip M. Linsley (Linsley & Shrivs, 2006), and Philip J. Shrivs, University of Hull, University of Northumbria, UK, followed by Oliveira (Oliveira et al., 2021), de Michele Gendelsky, Graça Azevedo, and Jonas Oliveira, University of Aveiro, Portugal.

The second cluster in blue illustrates the drivers of corporation risk disclosure, ranging from corporation authority and characteristics of the top management team to financial crisis demographically and regulations on risk disclosure. The researchers performed studies in developed and developing states. The researchers are Abdullah Al-Maghzom (Giacosa et al., 2016) from the University of Gloucestershire, UK, Khaled Hussainey (Moumen et al., 2015), from Plymouth University, UK and Doaa Aly (Giacosa et al., 2016), Helwan University, Egypt, subsequently Michael Maingo (Maingot et al., 2018), Tony Quon, and Daniel Zéghal from the University of Ottawa, Canada, then Mostafa et al. (Hassan, 2014) University of Essex, UK.

The third cluster in green highlights the role and impact of risk disclosure on corporation merit, investor perceptions, and the significance of risk disclosure transparency in the capital market. Researchers featured in this cluster are Moumen et al. (2015) from the University of Tunis, Tunisia, Tunisia, Hakim Ben Othman (Moumen et al., 2015) from the University of Manouba, Tunisia, Tunisia, Khaled Hussainey Portsmouth from University of the United Kingdom, M. Kabir Hassan from University of New Orleans, New Orleans, Francisco Bravo University of Sevilla, Sevilla, Spain.

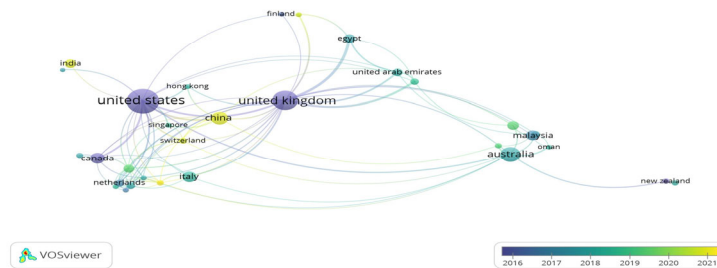
The fourth yellow cluster delineates recent risk disclosure issues, specifically on the role of voluntary risk disclosure in corporation cash holdings, gaps in risk disclosure, and gender diversity in firms. The authors are Issal Haj-Salem (Haj-Salem & Hussainey, 2021a) from the Universities of Portsmouth and UK and Khaled Hussainey from the University of Portsmouth, UK and Sagar and Singh (Sagar & Singh, 2017) from Nanak Dev University, Amritsar, India. The authors are covering issues concerning risk disclosure in the four clusters, as classified in Table 4.

**Table 4**  
Author Cluster

Research cluster in risk disclosure literature	Topic related to	Reference
Red cluster	risk disclosure role in yearly financial reports on market value and investor perception.	Miihkinen, 2013; Linsley & Shrives, 2006; Oliveira et al., 2021; Moloi, 2016; Hemrit, 2018; Scannella & Polizzi, 2018; Mcchlerly & Hussainey, 2021; Probohudono et al., 2013; Peters & Romi, 2013.
Blue cluster	the drivers of corporation risk disclosure	Maingot et al., 2018; Giacosa et al., 2016; Hassan, 2014.
Green cluster	risk disclosure role and impact on company value, investor perception, and risk disclosure precision in the capital market	Moumen et al., 2015; Grassa et al., 2022; Agyci-Mensah & Buertey, 2019; Al-hadi et al., 2018; Bravo, 2017.
Yellow cluster	the latest issue related to voluntary risk disclosure, the disparity in the risk disclosure domain, and gender diversity.	Salem et al., 2019; Hussainey, 2021a; Saggat & Singh, 2017.

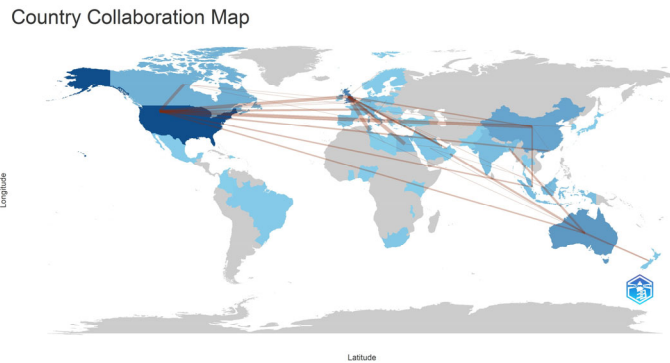
Source: Scopus

Every cluster indicates issues concerning risk disclosure. Starting from the linkage of the role of risk disclosure in yearly statements, it extends to its linkage with capital markets and to domain and gender diversity. The subsequent discussion of the social structure of risk disclosure utilizes a network collaboration map to illuminate collaboration between countries globally. The map depicts the collaborations established to date and a country’s contribution to the study of this topic. Figure 5 represents nodes corresponding to states, and linkages refer to collaborations involving the countries. The size of the nodes represents a country’s prominence and contribution to collaboration. Thicker lines between countries denote the frequency of collaboration between countries (de Moor et al., 2022).



**Fig. 5.** Bibliographic coupling country

The US has become the most active country and has dominated risk disclosure studies since 2016, subsequently, the UK and Canada. They also share research collaborations throughout the year. A transition in dominance commenced, albeit not as active as the US and UK, with Australia emerging as the dominant country in late 2017 to early 2019, followed by Malaysia, Italy, Egypt, United Arab Emirates, Netherlands, Hong Kong, New Zealand, and Finland. Subsequently, from late 2020 to 2021, China, India, and Switzerland overtake the dominance and collaboration of risk disclosure studies. There has been a transition of dominance in risk disclosure studies in the last five years, and collaborations are demonstrated in light of developments in the respective timeframes. Accordingly, a more explicit global mapping is presented in Fig. 6.



**Fig. 6.** Country Collaboration Map

Fig. 6 highlights two aspects of risk disclosure studies: collaboration and dominance. A few countries in the American West, the UK, Australia, China, and some countries in the Middle East predominantly collaborate across continents. The map delineates with a darker blue color which countries dominate risk disclosure studies. The subdued blue color denotes that this

country is emerging as dominant. Further, the soft blue color suggests that this country has recently become the future dominant country for risk disclosure studies. The gray areas are future countries in risk disclosure studies, such as Russia, some countries in Eastern Europe, some countries in South America, and most parts of Africa.

3.4. Conceptual Structure Analyses

This analysis centralizes on the features of the prior studies, the evolution of themes, and the development of themes from risk disclosure studies. The first analysis outlines the keywords employed by the authors, centralizing on specific words that exhibit the characteristics of the risk disclosure studies that have been explored.

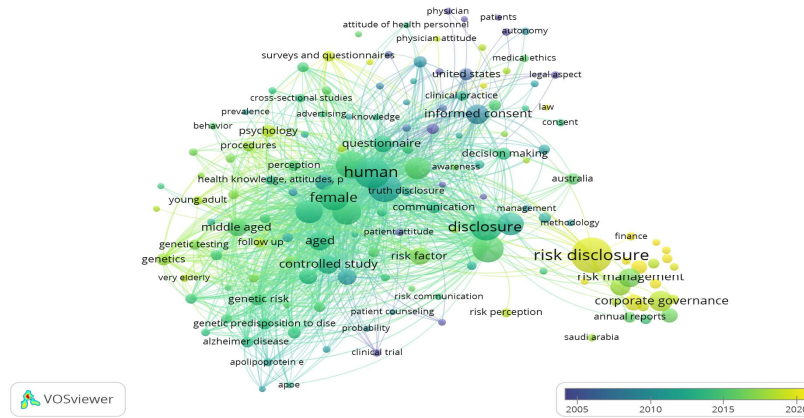


Fig.7. Co-occurrence all keyword

Fig. 7 depicts keyword filtering from 2005 to 2020. Nearly two decades ago, studies on risk disclosure were dominated by studies in the health field, making it closely related to truth-telling, clinical trials, personnel, physicians, patients, physician attitudes, clinical trials, and other health-related matters. Further expansion about a decade earlier demonstrates the dominance of behavioral fields, albeit still associated with health, i.e., man, woman, informed consent, health knowledge and attitude, perception, genetic risk, Alzheimer’s disease, patient counseling, and truth-telling, among others. In the last five years, the extension of risk disclosure studies began to approach the topic of risk management despite remaining followed by psychology and health themes, i.e., risk factors, risk communication, risk management, annual reports, genetics, elderly, young adults, and psychology. In the most recent expansion since 2020, dominance is represented by risk disclosure studies relating to finance and corporation governance. The subsequent section of the conceptual structure analysis is the evolution of themes over the past almost three decades. Drawing on the evolution of risk disclosure themes in Fig. 8, it is apparent that theme evaluation occurred in three stages.

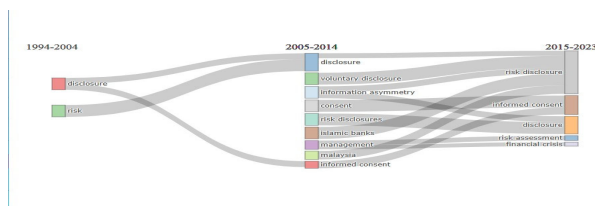


Fig. 8. Thematic evolution

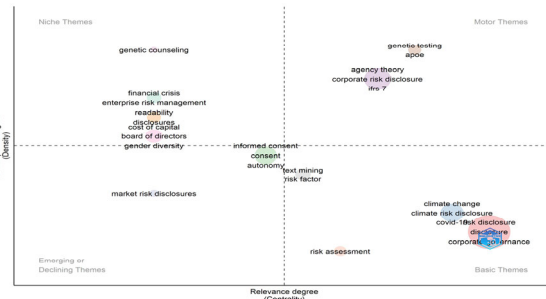


Fig. 9. Thematic map

The first stage is dated from 1994 to 2004, with only two themes, i.e., disclosure and risk. In the second stage, between 2005 and 2014, risk disclosure ranked fifth after disclosure, voluntary disclosure, information asymmetry, and consent. In this second stage, there are nine topics besides those mentioned earlier: Islamic banks, management, Malaysia, and consent. Risk disclosure is the most popular theme in the third stage between 2015 and 2023. At this stage, among the topics covered, risk disclosure is the most popular, followed by informed consent, disclosure, risk assessment, and financial crisis. Subsequently, there has been an evolution of topics regarding corporation risk management disclosure. In the early stages of evolution, risk disclosure is not a favored theme in research, but over time, it has become relevant and the most prevalent. The final conceptual structure analysis is a figure that showcases four quadrants with specifications of the level of relevance and development of a theme. Fig. 9 displays the view of the four quadrants. The first quadrant begins with a high significance and advancement with solid momentum and a mature system, i.e., the motor theme (Wei & Jiang, 2023). The motor theme is the driving force

in conducting studies on risk disclosure and has been progressing significantly in this field of study. The developed and relevant themes are segmented into two areas of study. The first is health, where genetic testing is the most mature and developed theme. Conversely, the second is economics and business, where the extension of agency theory and corporation risk disclosure is almost developed and established. The themes in this quadrant are expandable. However, there is a limited opportunity as most of the themes are mature and well-established.

The themes featured in the second quadrant are a high of advancement and a low degree of significance, suggesting favorable advancement momentum yet not strictly linked to the conventional research (Wei & Jiang, 2023). The quadrant is referred to as niche themes. The existing niche themes, i.e., health and genetic counseling, are highly evolving yet need to be more relevant to the mainstream research in the current field. In economics and business, they aligned in the same quadrant, i.e., the financial crisis, corporation risk management, capital expenditure, boards of directors, and gender diversity have advanced. However, they are required to be more relevant to mainstream research in the field nowadays. There are promising opportunities to develop these themes given their location in the low second quadrant; nonetheless, relevant mainstream theme research must be incorporated to redevelop them. Combining these themes with well-developed themes and high relevance is also viable to establish them accordingly.

The third quadrant could evolve; nevertheless, it is possible to decline since, at this position, the theme characteristic is at a low level of advancement and significance, indicating immature advancement that has yet to establish a solid central theme (Wei & Jiang, 2023). The theme related to market risk disclosure features a low level of advancement and is not yet a solid core theme. The themes can be advanced to the extent that they are relevant to promising future research. Other health-related themes, i.e., informed consent, consent, and autonomy, associated with behavioral studies, could be optimized. These themes are expandable while relevant to some promising future research. Consequently, determining the relevance of the field of study to these existing themes dictates whether they will evolve or decline.

The fourth quadrant is a quadrant that promises future development with a high degree of relevance. This quadrant's themes are vital, typically the cornerstone for comprehending a particular field (Wei & Jiang, 2023). Risk assessment themes share the lowest level of development but are relevant. Conversely, text mining and risk factors with the same level of relevance have experienced substantial development. The primary underpinning themes that have a high significance level and could be developed in the future are climate change, climate risk disclosure, and COVID-19, and the most relevant are risk disclosure, disclosure, and corporation governance. Some consensus has been attained in this quadrant, but developing research in this area remains promising.

#### 4. Conclusion

A visual analysis of 624 publications on risk disclosure in Scopus was performed using bibliometrics in R-Studio and VOS viewer. Subsequently, the conclusions are presented in three parts to confirm the study's objectives. As the status quo is the objective of this study, the results demonstrate that risk disclosure started to be covered extensively in international publications in the last decade. According to published scientific publications, international studies on risk disclosure evolved significantly in the previous decade, ranging from health, law, and psychology to business and accounting. Risk disclosure is not a favored theme in research in the early stages of evolution, yet it has become relevant and most prevalent. Nonetheless, some relevant research community themes must be considered, i.e., risk assessment and market risk disclosure. The pattern and focus of studies can be viewed in risk disclosure hotspots, i.e., its role in annual financial stability, its determinants, and the significance of transparency in the capital market. As visible in the clusters, the pattern and focus of existing risk disclosure clusters have opportunities to evolve toward themes pertinent to sustainability and relevant to risk management specialty publications. Interestingly, the most prolific authors are not included in the most cited authors. Extensive collaborations, which can point to research patterns, are performed predominantly by US, UK, and Australian authors. Nevertheless, the development has recently centered toward China and India, Asia, where Russia, South America, and Africa are the future. The development of future research trends and directions in international studies on risk disclosure is optimistic in light of the recommendations of previous studies.

With the prevalence of risk disclosure-related publications in the past decade, some research gaps can still be expanded. The subsequent is the development of future research trends and directions.

Predominated by journals in accounting, there is demand for more of this topic in finance and risk journals. Future research can extend climate change disclosure, COVID-19 disclosure, risk disclosure, and corporation authority themes in risk disclosure research in these journals. The overlooked risk assessment and market risk disclosure themes should also be addressed.

There has been a noticeable shifting of contributors to risk disclosure studies in the last five years, with China and India leading the way, followed by simultaneous author collaboration. The publication of risk disclosure in Asian and African countries with distinct standards, regulations, and country policies is an area of further research.

There is a divergence in the focus of the discussion, which is oriented toward the drivers of risk disclosure and oriented toward its role of risk disclosure on shareholders and corporation value, allowing future research to incorporate the two focuses; risk disclosure can be an intervening variable to link the two focuses.



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