BIBLIOMETRIC ANALYSIS OF RISK TOLERANCE: GLOBAL COLLABORATION AND THEMATIC EVOLUTION

Nyoman Triaryati*, Ayu Desi Indrawati
Universitas Udayana Bali
Correspondence: triaryati@unud.ac.id

Abstract
This study aims to analyze the development of research on risk tolerance over the past two decades, focusing on collaborative networks among authors and countries, thematic evolution, and new research opportunities. The method used is bibliometric analysis based on R software and VOS Viewer. The research population includes 833 articles related to risk tolerance identified from the Scopus database. The study was conducted through network visualization, thematic clustering, and thematic evolution mapping. The results show that publications on risk tolerance have increased by 15% annually, with the United States as the primary contributor. The main recurring themes include risk assessment, decision-making, and financial risk tolerance. However, there is a gap in integrating the risk tolerance theme with broader concepts such as financial literacy. The analysis also indicates increased international collaboration, particularly in North America, Europe, and Asia, but with limited cooperation in Latin America and Africa. This study recommends further exploration of the relationship between risk tolerance, financial literacy, and technology-based decision-making. Additionally, it suggests enhancing cross-regional collaborations to broaden the scope and impact of research in this field.
Keyword: *Risk Tolerance; Bibliometric Analyses; Decision making; R-based; VOS viewer*

A. INTRODUCTION

Individuals strive to optimize the benefits associated with each decision they make. This approach to decision-making, based on the assessment of perceived benefits, the theoretical framework has been extensively developed over time. Individuals consistently seek to maximize the benefits derived from their decision-making processes. It's a theoretical framework emphasizing the importance of evaluating potential outcomes and their perceived advantages. Over the years, decision-making theories have been extensively developed to explore the cognitive and behavioural factors influencing how people assess benefits. These theories suggest that individuals weigh the advantages and disadvantages of various options, often employing heuristics or mental shortcuts to simplify complex choices. This systematic approach to decision-making reflects an innate desire for optimization. It plays a critical role in various fields, including economics, psychology, and behavioural sciences, where understanding the motivations behind choices can lead to more effective strategies for influencing behaviour and improving outcomes.

Bernoulli's concept of expected utility underscores the significance of benefits derived from a decision, extending beyond its inherent value. This theory posits that individuals should maximize their benefits based on their preferences, constraints, and information. (Bachman; Georgi; Henz,2008). Noumand and Morgenstern develop it and suggest that risks frequently accompany potential benefits, with individuals willing to embrace these risks when they perceive a possible advantage from a given decision. This highlights the interplay between risk tolerance and anticipated outcomes in decision-making processes. On the other hand, individuals also have a level of risk tolerance that describes the level of uncertainty or potential loss they are willing to bear to obtain the

desired benefits. Risk tolerance can explain differences in decision-making between individuals under uncertain conditions. Risk tolerance theory explores how individuals or entities understand, evaluate, and respond to risk, especially in finance, psychology, health, or organizational decision-making. Risk tolerance is fundamental to analyzing decision-making processes and outcomes across diverse fields. This concept is a critical variable that influences how individuals and organizations assess uncertainties and make informed choices in complex environments.

Over the past two decades, there has been a notable rise in the literature surrounding risk tolerance, as evidenced by the substantial number of publications and the annual growth of related documents. This trend reflects an increasing interest in the subject, particularly concerning risk's behavioural and psychological dimensions. However, despite numerous studies conducted, a comprehensive mapping of the development of risk tolerance as a research theme remains lacking. (Joo & Grable, 2004). Thematic maps illustrating these themes' relevance and development levels reveal that while risk tolerance encompasses well-established themes in specific subfields like finance and project management, these themes tend to be less integrated with overarching concepts such as decision-making and risk perception. This highlights the necessity for a more systematic investigation to identify developments, connections, and future research opportunities within this topic.

This study offers a comprehensive bibliometric approach to analyze the development and pattern of research on risk tolerance over the past two decades. It maps the collaboration network between authors and countries using R-based analysis tools and VOS Viewer. It also identifies deep thematic clusters, theme evolutions, and potential themes that emerge in this field. One of the distinguishing features of this study is its emphasis on integrating the theme of risk tolerance with broader concepts such as decision-making and financial literacy. This focus has been notably absent in many previous studies.

This research makes significant contributions in several ways. First, it uses thematic mapping to visualize how risk tolerance is discussed in scientific literature, helping to identify well-developed areas and those needing more exploration. Second, it finds new research opportunities by analyzing how themes and clusters have evolved, especially linking risk tolerance to decision-making and financial literacy. Third, it offers strategic guidance for researchers to explore under-researched areas, like combining psychological and economic aspects of risk tolerance. Lastly, it improves bibliometric methods by using a unique combination of tools (R and VOS Viewer) for better data visualization and interpretation.

This study aims to map risk tolerance research's collaboration network and geographical landscape, highlighting key themes, emerging areas, and new research opportunities. It will provide insights into the evolution of risk tolerance studies over the past two decades, offering valuable contributions for researchers, academics, and practitioners.

B. LITERATURE REVIEW

Bernoulli's concept of expected utility marks a ground-breaking development in decision-making theory, emphasizing the tangible value of outcomes and the subjective benefits individuals perceive from their choices (Bachman, Georgi, & Henz, 2008). The theory posits that rational decision-making involves more than calculating the direct monetary or material gains; it also requires an assessment of the utility—or personal satisfaction—derived from those outcomes. According to Bernoulli, individuals are

guided by maximizing their overall benefit, considering their unique preferences, the constraints they face (such as time, resources, or external limitations), and the information available to them at the moment of decision-making.

This perspective aligns with subsequent advancements in decision-making theories, such as Simon's theory of bounded rationality, which suggests that individuals often make decisions within the limits of their cognitive capacities and available information (Simon, 1955). Unlike Bernoulli's notion of optimal utility maximization, Simon emphasizes that individual's aim for "satisficing" rather than perfect optimization, often settling for choices that are "good enough" under the circumstances. Similarly, Kahneman and Tversky's Prospect Theory further refine these ideas by demonstrating how people's decisions are influenced by cognitive biases and the framing of outcomes (Kahneman & Tversky, 1979). Prospect Theory challenges the expected utility model by revealing that individuals do not always behave rationally; instead, they tend to overvalue potential losses compared to equivalent gains, a concept known as loss aversion.

These theories collectively expand the understanding of decision-making, illustrating the complex interplay of rational calculation, cognitive limitations, emotional factors, and contextual influences in shaping human choices. Together, they provide a comprehensive foundation for studying how individuals and organizations navigate the uncertainties and trade-offs inherent in decision-making processes.

In their foundational work on game theory and decision-making, Von Neumann and Morgenstern postulate that inherent risks often accompany prospective benefits, emphasizing the dynamic interplay between uncertainty and potential gains (Bachman, Georgi, & Henz, 2008). Their findings suggest that individuals are willing to accept risks when they perceive that the possible advantages of a decision outweigh its uncertainties. This willingness is highly dependent on the individual's level of risk tolerance, which reflects the degree of uncertainty or potential loss they are prepared to endure in pursuit of a desired outcome.

Risk tolerance plays a pivotal role in explaining the diversity in decision-making behaviours under conditions of uncertainty. For instance, individuals with high-risk tolerance are more inclined to make decisions with substantial uncertainties, such as speculative investments or innovative ventures. In contrast, those with low-risk tolerance may prefer safer, more predictable options. This concept is central to Risk Tolerance Theory, which investigates how people evaluate, interpret, and respond to risks across various domains, including finance, psychology, health, and organizational decision-making (Weber et al., 2002).

In finance, Markowitz's Portfolio Theory illustrates how individuals and institutions balance risk and reward, optimizing portfolios to maximize expected returns for a given level of risk (Jones, 2013). Kahneman and Tversky's Prospect Theory further explores the cognitive and emotional aspects of risk tolerance, highlighting how individuals' attitudes toward risk shift depending on whether outcomes are framed as potential gains or losses. Loss aversion, a core principle of this theory, explains why people avoid risks when facing potential losses, even if the probabilities or payoffs suggest a rational advantage (Copur, 2015).

By integrating these diverse perspectives, the study of risk tolerance enriches our understanding of decision-making processes, shedding light on why different individuals or entities may adopt varied strategies under uncertainty. This insight is critical for behavioural research and practical applications, including financial advising, public policy design, and organizational strategy development. Risk tolerance represents a fundamental construct across multiple disciplines, including finance, psychology, health,

and managerial decision-making. This concept pertains to how an individual or organization accepts uncertainty and potential adverse outcomes in decision-making. It encompasses evaluating risk in investment contexts and everyday life scenarios, influencing choices and behaviour in the face of uncertainty. Risk tolerance is fundamental to analyzing decision-making processes and outcomes across diverse fields. This concept is a critical variable that influences how individuals and organizations assess uncertainties and make informed choices in complex environments.

C. RESEARCH METHOD

Bibliometric analysis, a quantitative technique designed to identify, describe, and evaluate published research according to the desired theme, will be used to achieve the objectives of this study. (Bretas & Alon, 2021) This analysis requires managing *bibliographic database* software and *bibliographic references* to carry out a thorough and organized search of literature with related scientific fields. (Aguilar Roman et al., 2023) In this context, the study will employ a combination of two bibliometric tools: R-based analysis and VOSviewer. Both tools provide detailed data descriptions and visualize co-networking (Aria & Cuccurullo, 2017). The analytical process will commence with a defined study design within a specific scientific area, followed by data collection, data analysis enhanced by visualization, and concluding with interpretation.

The initial stage of the analysis technique employed in this study involves designing a research framework to address specific research questions. A critical decision in this design phase is determining the time frame, which may be segmented into various intervals to effectively capture the evolution of the scientific field being observed over time.

The second stage consists of data collection. This process begins with a comprehensive search of bibliometric databases, which are then filtered to include a selection of core documents based on specific classifications. The filtered data is subsequently extracted from the original data source, serving as the foundation for the bibliometric analysis used in this study.

The third stage entails data processing, utilizing two bibliometric analysis tools: one based on R and the other on VOS Viewer. These tools are instrumental in generating detailed visualizations that present the desired information comprehensively. The resulting data can be thoroughly described and interpreted based on these visualizations. Finally, the visualization and interpretation stage represents the concluding phase of the research analysis technique.

The data collection process for this study utilizes the Scopus database, focusing on the theme of risk tolerance. The Scopus database is advantageous as it encompasses over 20,000 peer-reviewed journals, including those published by reputable publishers such as Elsevier, Emerald, Taylor and Francis, Springer, Informs, and Inder Science. In general, two central databases are used in conducting systematic literature reviews with bibliometric analysis, Scopus and WoS, but WoS has a narrower scope than Scopus. (Bretas & Alon, 2021) WoS only includes ISI-indexed journals and is limited to 12,000 only. (Fahimnia et al., 2015) In this context, Scopus is selected as the data source for this study.

The database controls filtering data through several steps of request in the form of commands on the Scopus database, which can be summarized in Table 1 (one) as follows.

Table 1. Query description

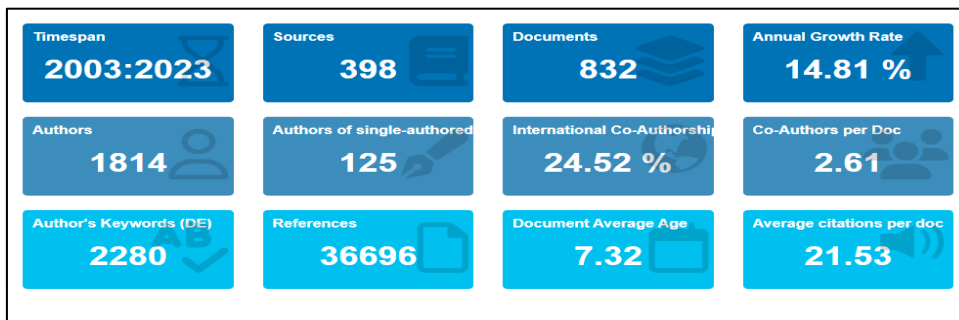| Query description		
Category	Criteria	# refined documents
Search documents	Risk Tolerance	2053
Document Type	Article	1003
Publication stage	Finale	983
Source type	Journal	923
Language	English	833

Source R-basic,2024

The table 1 (one) above illustrates that 2,053 documents were identified based on the keyword "risk tolerance." When focusing specifically on articles, the count is narrowed down to 1,003. After applying article specifications in the final stage, the number of records is 983. Further filtering for article sources in the form of journals yields 923 articles, of which only 833 are in English. Consequently, the final metadata collection comprises 833 articles, which will be processed, visualized, and interpreted per the research objectives.

D. RESULT AND DICUSSION
1. *Performance analysis*

Performance analysis in bibliometric studies provides an overview of data or profiles from previous research. It serves an analytical purpose by examining the contributions of specific entities to a particular field of knowledge. (Cobo et al., 2011),(Donthu, Reinartz, et al., 2021). The performance analysis starts by breaking down the core information related to the processed metadata, which generates inputs, as illustrated in Figure 1 (one)


Timespan	Sources	Documents	Annual Growth Rate
2003:2023	398	832	14.81 %
Authors	**Authors of single-authored**	**International Co-Authorship**	**Co-Authors per Doc**
1814	125	24.52 %	2.61
Author's Keywords (DE)	**References**	**Document Average Age**	**Average citations per doc**
2280	36696	7.32	21.53

Source: R-basic,2024
Figure 1. *Main information*

Figure 1 (one) summarizes key information from data processing results from the Scopus database. Eight hundred thirty-two published documents related to risk tolerance from 2003 to 2023 were identified, along with 398 distinct sources. The annual growth rate of documents of risk tolerance during this period is approximately 15%, indicating a commendable yet moderate increase. Notably, there are 1,814 total authors contributing to these documents, suggesting that a significant majority of the works are co-authored rather than written by a single individual. This is illustrated by the figure reflecting an average of 2.61 co-authors per document, highlighting the collaborative nature of authorship among local and international scholars. This trend is understandable, given that risk tolerance spans various fields of study, including finance, psychology, health,

and organizational decision-making. The subsequent data processing outcomes will provide a more detailed examination of these key figures.
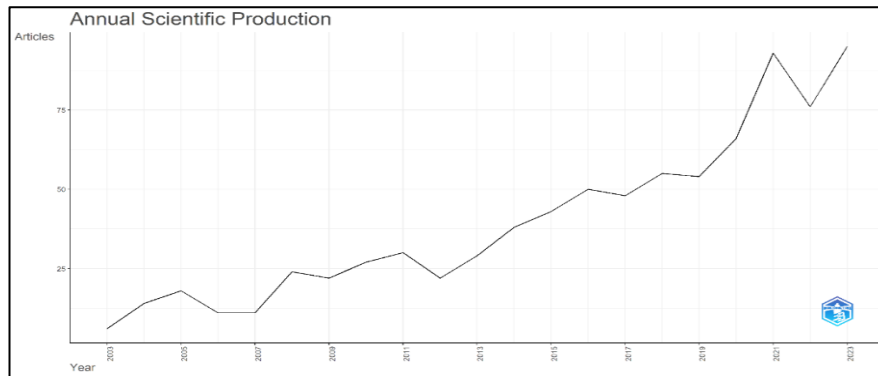
Source: R-basic,2024
Figure 2. *Annual Scientific Production*

Figure 2 (two) illustrates the production of scientific documents related to risk tolerance over the past two decades. The data shows a notable increase in publications, from fewer than 10 articles in early 2003 to 30 articles in the following decade. In the last decade, there has been a sharp increase to nearly 100 articles per year. This trend indicates a significant surge in interest in writing about risk tolerance, particularly in the previous five years, from 2019 to 2023. This increasing trend raises questions about the titles of articles related to risk tolerance, the frequently used keywords, and the geographical origins of the authors contributing to these documents. The results of the subsequent performance analysis will provide an overview of these aspects, including a selection of titles, keywords, and author origins.
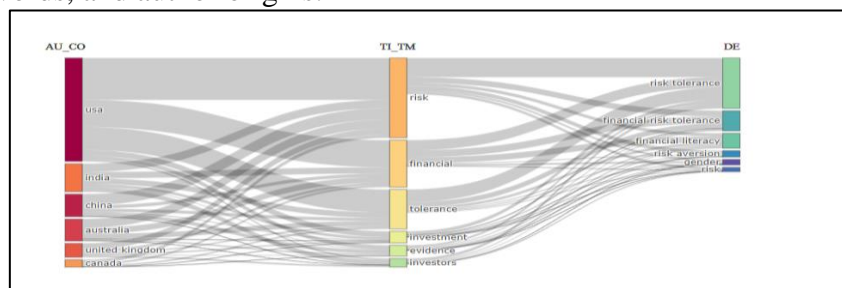

Source: R-basic,2024
Figure 3. *Three Field-Plot*

Figure 3 (three) shows three key relationships based on the research findings. The first column lists the authors' countries of origin, with the United States contributing the most literature and Canada the least regarding risk. The second column highlights common themes observed during the study, primarily focusing on risk and finance, reflecting a strong interest in risk management and financial tolerance. The third column presents keywords from the articles, including "financial risk tolerance," "financial literacy," and "gender," indicating that discussions on risk tolerance extend beyond the most frequently mentioned terms.

The line in Figure 3 (three) shows that the author's U.S. study primarily focuses on risk and risk tolerance. In contrast, countries like India, China, Australia, the UK, and Canada address risk and explore various topics, such as financial literacy and gender.
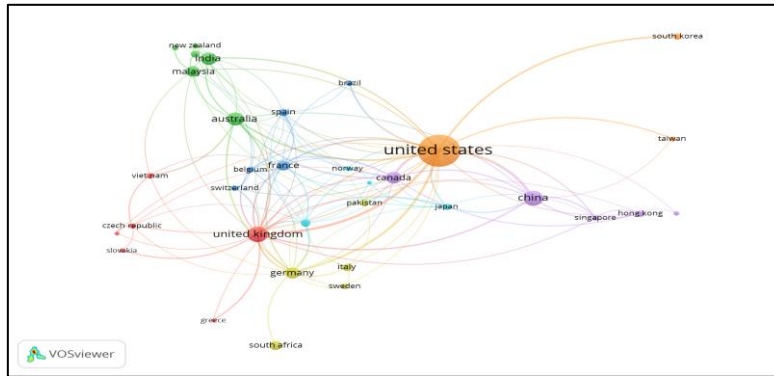
Source: VOS viewer,2024
Figure 4. Co-authorship network map

The figure above provides empirical support for the prior analysis regarding the leading countries in risk tolerance research. The largest orange node signifies the United States, indicating its dominance in the field with more publications, co-authors, and collaborations than any other nation. Following the United States is the United Kingdom, which ranks second in publications and collaborative efforts among European nations, including France, Belgium, and Italy. Nodes sharing the same color represent clusters that are characterized by frequent collaborations. The Green Cluster includes countries such as India, Malaysia, New Zealand, and Australia, highlighting a significant thematic partnership within the region. Additionally, the proximity of the United States and Canada nodes underscores their strong collaborative relationship, especially when compared to more distantly situated nodes. Researchers can use this map to discover potential partners in various regions by analyzing collaboration patterns.

An alternative method for assessing the current landscape of publications on risk tolerance is through citation analysis. This approach reveals the influence of key authors and identifies those with notable productivity. Citation analysis forms a part of bibliometric analysis, offering insights into authors, their output, and the most pertinent references. (Cobo et al., 2011)(Donthu, Kumar, et al., 2021). The following is a list of prominent authors contributing significantly to risk disclosure.

Table 2. *Most Relevant Author*

Authors	Articles	Articles Fractionalized
GRABLE JE	21	7,82
CHATTERJEE S	11	6,17
HANNA SD	11	4,20
RABBANI AG	11	4,32
HEO W	8	2,53
DICKASON-KOEKEMOER Z	7	3,00
FAFF R	7	2,33
YAO R	7	2,92
BROOKS C	6	2,03
FERREIRA S	5	2,25

Source: R-basic,2024

Table 2 (two) presents the ranking of the most significant authors based on the number of articles published. J.E. Grable is the leading author, having published the most

articles related to risk tolerance throughout the observation period and making the most substantial contributions to each publication compared to others listed. Following him are three authors—S. Chatterjee, S.D. Hanna and A.G. Rabbani produced the same number of articles, yet their contributions to those publications varied. This variation highlights that while the quantity of work may be similar, the quality of contributions can differ significantly among authors. Those authors who are deemed most relevant are those who not only have the most publications but also make the most meaningful contributions to their work.

The data processing results below constitute a performance analysis highlighting the most cited articles. Unlike the discussion of the most relevant authors, which focuses on the volume of publications produced, the number of citations reflects the impact of an author's work on a specific theme—in this case, risk tolerance. While authors may contribute to numerous journals, the impact factors of their publications can vary significantly.
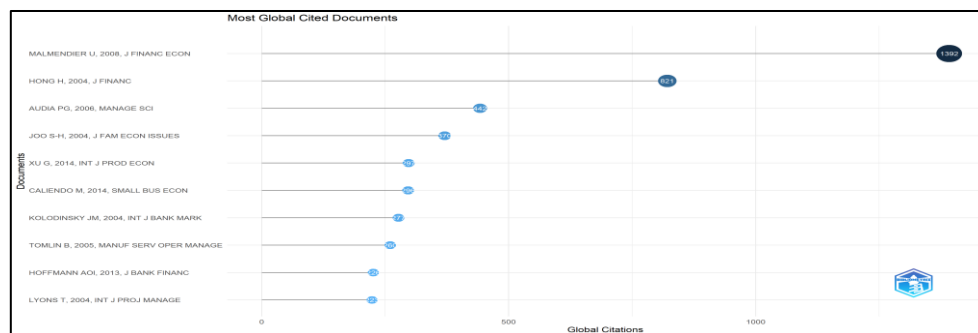
Source: R-basic,2024
Figure 5. *Most Global Cited Document*

In Figure 5 (five) we can see that the publication by Malmendier. has had the most substantial impact on the literature regarding risk tolerance. Although their work primarily addresses risk aversion and general risk rather than focusing exclusively on risk tolerance (Malmendier & Tate, 2005), it has been cited over 1,300 times by other authors. In comparison, the research conducted by Hong et al., which explores risk tolerance as one of the personality traits influencing participation in the capital market through social interaction (Judwhixo et al., n.d.), has received 821 citations. Despite having a lower citation count, Hong's work also plays a significant role in risk tolerance discussions.

Several other publications, such as those authored by Audia, Joo, and Xu, have citation counts averaging below 500 and concentrate more specifically on risk tolerance as a variable. (Audia & Greve, 2006). This suggests that highly cited works tend to engage in broader discussions about risk, resulting in a more significant overall impact, while less frequently cited publications focus on more specific elements of risk tolerance.

The final table and figure present a consistent analysis regarding the influence and relevance of authors in risk tolerance. Notably, the findings reveal that the most prolific writer does not necessarily have the most significant impact on risk tolerance. Conversely, those authors who significantly influence the discourse may not be the most productive regarding publications.

2. Structural Analysis

The following structural analysis will provide an overview of the characteristics of previous studies, the evolution of existing themes, and potential future themes related to risk tolerance. This analysis will include keyword mapping, collaboration clusters, theme evolution, and theme mapping.

The first analysis in this structural examination will focus on the authors' keywords, highlighting the characteristics of prior research on risk tolerance.
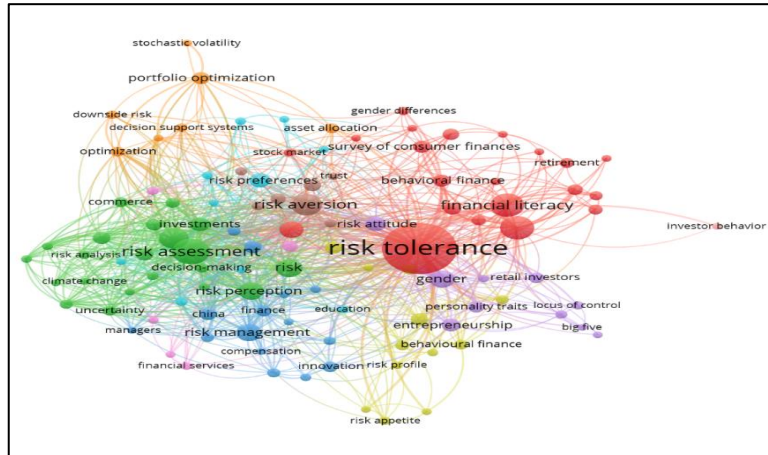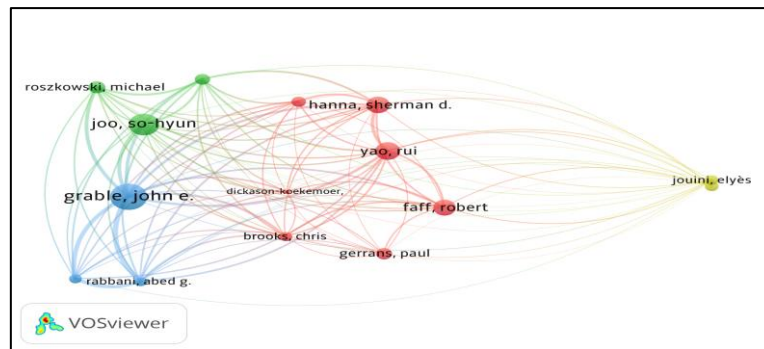

Source: VOS viewer,2024
Figure 6. *Keyword co-occurrence network*

Five distinct clusters are identified in Figure 6 (six), which illustrates a grouping based on occurrence patterns or the keyword co-occurrence network. The red cluster, which features the keyword "risk tolerance," stands out as the most central and significant term within the data set of this study, underscoring its importance. This red cluster is closely linked to themes of financial literacy, risk aversion, gender, and financial behaviour. Additionally, there are four other clusters, each focusing on their respective themes. The green cluster delves into general risk analysis, examining how individuals and organizations perceive and manage risk in broader contexts, including financial and environmental issues. Key terms in this cluster include risk assessment, decision-making, risk perception, risk management, uncertainty, and climate change. The orange cluster pertains to exploring technical or quantitative financial strategies for managing risk within an investment portfolio, incorporating keywords such as portfolio optimization, downside risk, asset allocation, and optimization. The purple cluster centres on personality psychology and risk-taking behaviour, particularly in entrepreneurship. It features keywords like entrepreneurship, personality traits, the Big Five, and locus of control. Finally, the blue cluster highlights organizational decision-making concerning innovation and strategic risk-taking, featuring keywords such as risk appetite, financial services, innovation, and compensation.

The second structural analysis focuses on the bibliographic coupling network of authors, illustrating active collaborations and interconnected research themes that reflect similar interests and fields of study. Figure 7 reveals that Grable J.E. is the most prominent author, represented by the large blue knot, demonstrating strong connections with blue and green authors. This underscores their significant role in establishing foundational literature on the theme of risk tolerance, as noted by the most relevant author in the previous discussion.

   This cluster encompasses fundamental and well-established topics, including risk tolerance, behavioural finance, and financial decision-making. Another key figure in this area is Hanna, S.D., who will likely collaborate with or influence authors such as Yao, Rui, Faff, Robert, Gerrans, and Paul. (Cao et al., 2023). These clusters tend to concentrate on behavioural finance and related themes, focusing on financial decision-making and literacy. Conversely, the yellow clusters appear more specialized and less interconnected with other groups. There is potential for developing niche fields that delve into specific aspects of finance, such as theoretical or mathematical approaches, which may emerge in the future.

Source: VOS viewer,2024
Figure 7. *Bibliographic coupling network of authors*

The third structural analysis explores the evolution of the theme of risk tolerance over the past three decades. As illustrated in Figure 8, this analysis delineates the development of the theme within each decade, highlighting the shifting perceptions and attitudes towards risk during this period.
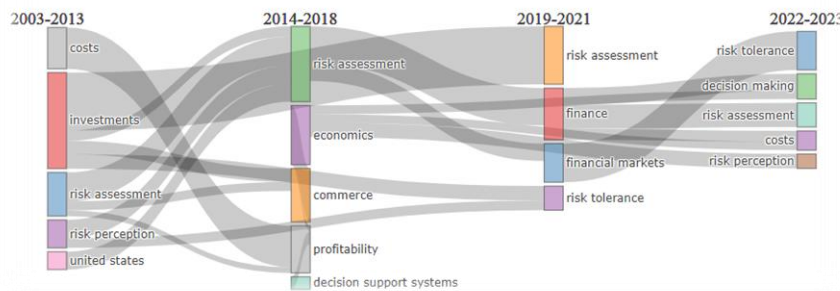
Source: R-basic,2024
Figure 8 *Theme Evolution*

   In the initial period (2003–2013), the primary themes revolved around cost, investment, risk assessment, risk perception, and the United States. This era emphasized fundamental topics, such as economic costs and investment strategies, alongside a general understanding of risk. Moving into the middle period (2014–2018), the focus evolved to encompass risk assessment, economics, commerce, profitability, and decision support systems. This transition shifted towards quantitative and technical methodologies, highlighting profitability and utilizing decision-making tools in trading and evaluation.
   The last decade, specifically from 2019 to 2021, saw the emergence of themes such as risk assessment, finance, financial markets, and risk tolerance gaining prominence. During this time, there was a more explicit emphasis on the economic applications of risk

management and the behavioural aspects of risk tolerance, distinguishing this period from earlier years when these elements were merely part of broader themes.

In the most recent period, 2022–2023, key themes that surfaced included risk tolerance, decision-making, cost, risk perception, and risk assessment. This latest phase strongly emphasizes individual decision-making, risk-related behaviour, and enhanced financial risk assessment. Risk assessment has remained a consistent core theme throughout all periods, underscoring its fundamental importance in this field. Other recurring topics, such as cost, finance, and risk perception, highlight the enduring relevance of risk's economic and psychological dimensions.

Emerging themes like risk tolerance and decision-making have also gained traction in recent years, reflecting an increasing interest in risk's behavioural and psychological aspects. Over time, the evolution of these themes has shifted from general economic and risk-related discussions to more specialized areas, focusing on financial markets and the intricacies of individual decision-making processes.

The thematic map presented in Figure 9 serves as the research's final structural analysis. This map categorizes the central research theme by assessing its relevance (centrality) and level of development (density). It organizes the findings into four distinct quadrants, facilitating a clearer understanding of the thematic relationships and their significance within the study.
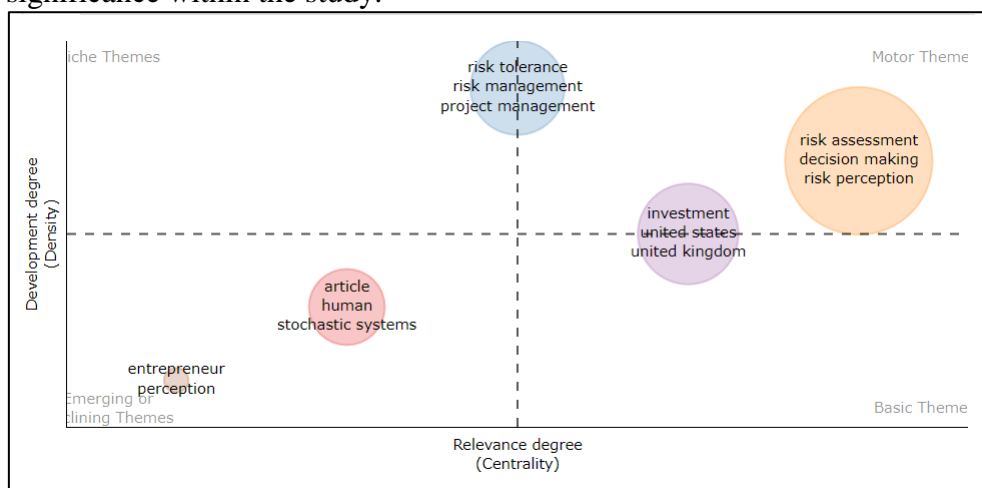
Source: R-basic,2024
Figure 9. *Theme Evolution*

Starting from the first quadrant with a high level of relevance and development with strong momentum and a mature system, the theme of the motorcycle (Wei & Jiang, 2023). The motorcycle theme is a pivotal element in structuring a study on risk tolerance and has evolved significantly within this field. The themes in this quadrant exhibit high centrality and density values, indicating their relevance and maturity. Notable examples include "risk assessment," "decision making," and "risk perception." These themes are key drivers in the associated literature.

The theme characteristics in the second quadrant are those with a high level of development and a low level of relevance, suggesting that the growth momentum is better but not closely related to mainstream research in the current field. (Wei & Jiang, 2023) This quadrant is often called a niche theme, characterized by high density and low centrality. Such themes are considered mature, indicating that extensive research has been conducted, and both the concepts and methodologies are well established, with ample supporting literature. These themes represent significant concerns within a specific

subcommunity or a more defined subfield. However, they are less interconnected with other themes in the broader domain, which may render them less relevant to researchers operating in more generalized areas. Examples of these niche themes include "risk tolerance," "risk management," and "project management."

The third quadrant has growth potential but can also experience decline. This is primarily due to the characteristics associated with this position, which often indicate low development and relevance. As a result, themes within this quadrant may be considered immature, lacking a well-defined core critical for sustained development. (Wei & Jiang, 2023). This theme is crucial in the field of study as it connects to numerous other themes. It often serves as a conceptual foundation or basis for research within the main domain. These themes are typically relevant across various disciplines or subfields. The themes in this quadrant have the potential to be further developed into more mature concepts, advancing to the Upper Right quadrant, known as Motor Themes. Examples of themes in this quadrant include "investment," "United States," and "United Kingdom."

The fourth quadrant indicates significant potential for future development and is highly relevant. The themes discussed within this quadrant often serve as foundational concepts essential for a deeper understanding of a specific field. (Wei & Jiang, 2023).. The phenomenon under consideration can be characterized by low centrality and density themes. This suggests that these themes may be emergent or on the verge of obsolescence. For instance, terms such as "entrepreneur," "perception," and "stochastic systems" exemplify this trend. Specifically, the themes associated with both "entrepreneur" and "stochastic systems" may be in a developmental stage or experiencing a decline in their relevance within the broader academic discourse.

Themes in the second quadrant present valuable opportunities for researchers interested in an in-depth exploration of a specific subfield. Given its well-established nature (high density), this theme provides a solid foundation for further investigation. Researchers can examine how these themes can be integrated or associated with broader topics to enhance their relevance. However, it is essential to note that the findings in this area may primarily appeal to niche audiences and may not exert a significant impact beyond that specific community. While risk tolerance is pertinent in particular finance, investment, or project management literature, it is less associated with overarching themes such as "decision-making" or "risk perception."

E. CONCLUSION

This study employs a bibliometric approach to examine the evolution of risk tolerance and research trends over the past two decades. Research on risk tolerance has surged significantly in the last decade, with the United States emerging as the leading contributor to international publications and collaborations. The annual growth rate of publications in this field is 15%, reflecting a growing interest across various disciplines, including finance, psychology, and risk management.

The key thematic finding of this study indicates that risk assessment, decision-making, and financial risk tolerance are predominant themes that remain highly relevant. Despite the extensive research conducted, a gap exists in integrating the concept of risk tolerance with broader themes such as decision-making and financial literacy. Collaboration among international researchers is on the rise, particularly in North America, Europe, and Asia, yet regions like Latin America and Africa still possess significant untapped potential.

Initially, risk tolerance studies focused primarily on economic issues and general risks; however, in the past decade, the research has increasingly shifted towards behavioral aspects and digital applications in finance.

This study inspires a call for further exploration of the connection between risk tolerance, financial literacy, and technology-driven decision-making. It emphasizes the importance of cross-regional collaboration, particularly with researchers from Africa and Latin America, to enrich perspectives and cultivate inclusive research networks involving developing countries. By intertwining the concept of risk tolerance with critical themes such as climate change, digital literacy, and technological innovation, we can significantly enhance the relevance of our research and embrace multidisciplinary approaches to understand the psychological and social dimensions of risk. Focused research on impactful themes is essential, paving the way for significant citations and practical relevance and encouraging a surge of publications in leading journals to amplify academic influence.

This study presents a comprehensive strategic framework for researchers. It encourages an in-depth exploration of unexamined themes while fostering a proactive approach to risk tolerance within the global research ecosystem. By embracing these opportunities, researchers can enhance their contributions to the field and navigate the complexities inherent in contemporary research initiatives.

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