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A BIBLIOMETRIC ANALYSIS OF IMPLEMENTATION OF FINANCE TECHNOLOGY IN ENDOWMENT MANAGEMENT

Syarbaini Ahmad
Department of Computing,
Faculty of Multimedia Creative and Computing,
Selangor Islamic University
syarbaini@uis.edu.my

Mokmin Basri
Department of Multimedia Creative,
Faculty of Multimedia Creative and Computing,
Selangor Islamic University
mokmin@uis.edu.my

Ahmad Misbah Muhamad Hilmi
Faculty of Syariah and Law,
Selangor Islamic University
ahmadmisbah@uis.edu.my

Rafiza Kasbun
Department of Multimedia Creative,
Faculty of Multimedia Creative and Computing,
Selangor Islamic University
rafiza@uis.edu.my

ABSTRACT

This paper presents a bibliometric analysis of the evolving landscape of fintech applications within endowment fund management. By examining a comprehensive dataset of academic publications from various databases, the study identifies key trends, influential authors, and prominent research clusters in the field. The analysis reveals the growing importance of technological innovations, such as blockchain, artificial intelligence, and machine learning, in enhancing endowment fund performance, risk management, and governance. Furthermore, the study uncovers the geographical distribution of research, highlighting leading institutions and countries contributing to this domain. The findings provide valuable insights for academics and practitioners, emphasizing emerging research areas, potential collaborations, and the implications of fintech advancements on the strategic management of endowment funds. This study contributes to a deeper understanding of how fintech is reshaping endowment fund management and offers a foundation for future research directions.

Keyword: Fintech, Endowment, Zakat, Wakaf, Blockchain, Finance Technology, Bibliometric Analysis

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INTRODUCTION

Fintech has significantly revolutionized different areas of the financial sector, including the administration of endowment funds. Endowment funds, which are crucial for ensuring the long-term financial stability of educational institutions, non-profits, and other organizations, have progressively adopted fintech advancements to improve their investment strategies, risk management, and general governance (Ahmad & Mustafa, 2023). This work seeks to examine the overlap between fintech and endowment fund management by doing a thorough bibliometric analysis.

The goal is to gain a detailed awareness of the existing research landscape and identify upcoming trends in this field. M.A. Hambali et.al. (2021) defined Fintech comprises several technologies such as blockchain, artificial intelligence (AI), and machine learning. These technologies have the potential to greatly improve the efficiency of endowment fund operations. Blockchain technology has the potential to increase openness and security in transactions, while AI and machine learning algorithms can boost investment decision-making and predictive analytics. The implementation of these technologies is transforming conventional endowment management processes, resulting in enhanced efficiency and efficacy in fund administration.

Bibliometric analysis is a quantitative approach that provides significant insights into the development and diffusion of research in the academic literature. This study utilizes an analysis of publication output, citation networks, and research collaborations to identify the main authors, prominent publications, and dominating themes in the field of fintech applications in endowment management. This approach not only emphasizes the most influential studies but also reveals areas that need further exploration and potential avenues for future research.

The data used for this bibliometric analysis is sourced from reliable academic databases, guaranteeing a thorough and strong review of the current literature. This methodology enables the detection of nascent research clusters and the visualization of intellectual landscapes, illustrating the integration of various facets of fintech into endowment management procedures. Additionally, the analysis offers a geographical viewpoint, highlighting the worldwide distribution of research endeavours and identifying prominent institutions and the places that are pushing innovation in this field.

Gaining a comprehensive understanding of the present level of research on fintech and endowment management is of utmost importance for both scholars and professionals. For researchers, it provides a clear plan for future investigations and prospective cooperation across different disciplines. This resource offers valuable insights into the most recent technical breakthroughs and their practical applications, specifically for practitioners, particularly those involved in managing endowment funds. It assists in the creation of more efficient methods and instruments.

The results of this bibliometric analysis highlight the increasing importance of fintech in transforming endowment management. The study enhances our comprehension of how technology advancements are being utilized to tackle the obstacles and seize the chances encountered by endowment funds by clarifying the patterns and important individuals in this domain. This knowledge is crucial for promoting further progress and ensuring that the management of endowments continues to develop in accordance with the ever-changing landscape of financial technology.

Ultimately, this article offers a thorough examination of the study terrain where fintech and endowment fund management interact. By utilizing bibliometric analysis, this study emphasizes the significant and far-reaching effects of fintech developments and provides vital insights for future research and practical implementations. In order to ensure the enduring viability and expansion of endowment funds, it is vital to comprehend the ongoing developments in the financial sector.

LITERATURE REVIEW

The body of research on the use of fintech in endowment management is growing quickly, indicating the growing incorporation of sophisticated technologies in financial operations. Initial research mostly concentrated on the capacity of fintech to improve financial inclusivity and operational effectiveness, establishing a foundation for more targeted examinations of its utilisation in endowment management. Recent research emphasises the notable influence of fintech in various crucial domains, including investment strategies, risk management, and governance.

Blockchain technology has emerged as a crucial breakthrough, providing improved transparency and security for endowment transactions. The research conducted by Narayanan et al. (2016) and Tapscott & Tapscott (2017) provides evidence of how blockchain technology may optimise procedures, diminish fraudulent activities, and guarantee precise and unalterable record-keeping. Moreover, AI and machine learning are being increasingly employed to enhance investment decision-making. Studies conducted by Kroll et al. (2013) and Agrawal et al. (2019) demonstrate that these technologies have the capability to analyse extensive datasets in order to forecast market trends, optimise the allocation of assets, and find investment opportunities that may be disregarded by conventional approaches.

Fintech plays a crucial role in the field of risk management. Gai et al. (2018) state that fintech solutions have the capability to improve risk assessment and mitigation by utilising advanced analytics and real-time monitoring. Endowment managers can enhance their ability to promptly and efficiently address market volatility and other risks through this. Moreover, research conducted by Philippon (2016) investigates the potential of fintech to decrease operating expenses, therefore enhancing the overall effectiveness of managing endowment funds.

The literature also explores the issue of governance, which holds great importance. Studies conducted by Zyskind et al. (2015) and other researchers indicate that fintech has the potential to enhance governance structures by implementing more effective transparency and accountability procedures. It is especially crucial for endowments, as they are frequently examined for their financial operations and ethical considerations. Improved governance has the potential to foster greater trust and confidence among stakeholders, such as donors and beneficiaries.

The research's geographical distribution indicates that the United States and Europe are at the forefront of fintech advances, with notable contributions from nations such as China and Singapore. Research conducted by Allen et al. (2020) emphasise the variations in the adoption of fintech across different regions and the resulting impact on the methods of managing endowments. The focus of study in these areas highlights the significance of regional financial ecosystems in promoting the growth of fintech. Collaborative research endeavours are prevalent, as academics, industry, and government institutions frequently collaborate to

investigate the possibilities of fintech in endowment management. The works of Chen et al. (2019) and Lee & Shin (2018) demonstrate an interdisciplinary approach, highlighting the importance of collaborative frameworks in tackling the intricate difficulties and opportunities posed by fintech.

Although there is an increasing amount of research, there are significant gaps that require additional investigation. Specifically, the lasting effects of fintech on the performance and sustainability of endowment funds have not been thoroughly investigated. In addition, although a significant amount of study is dedicated to analysing the impact of fintech on large and established endowments, there is a scarcity of information regarding the consequences for smaller funds and those located in developing regions.

To summarise, the research on fintech applications in endowment management is varied and complex, encompassing a wide array of technologies and their effects on investment strategies, risk management, and governance. The findings emphasise the revolutionary capacity of fintech, while also indicating the need for additional research in some sectors. Continued research is essential for comprehending and using the complete capabilities of fintech in endowment administration as the area progresses.

METHODOLOGY

When investigating fintech in the managing endowment in the literature, we can notice a considerable amount of research conducted by the circle of researchers on the subject. By examining the literature closely, we notice that there are bibliometric analyses or literature reviews on two important keyword which is fintech or finance technology and endowment. All these studies show that research on “fintech” and “endowment” that has increased over the years. This means that endowment using fintech is an exciting, important and promising field, especially with the post COVID-19 where the era of digital technology is growing up.

Although there are a significant number of studies on fintech in “endowment” or “zakat” or wakaf” or “blockchain” are conducted on bibliometric analysis or meta-analysis in recent years. This paper aims to perform a meta-analysis of the research work from 2019 to 2024 using bibliometric metadata. The field analysis will be done according to variables such as keywords, authors, countries, citations, publications, universities, and journals. It will be a question of knowing:

i. What are the widely used keywords?
ii. What is the most popular country study on this topic?
iii. Who are the most influential authors?
iv. Which are the most influential journals?

This study is carried out according to an approach of analysis of bibliometric data of scientific publications dealing with “endowment” and “fintech”. The other words related with these two words are also used as additional word such as “zakat”, “wakaf”, “finance technology”, “blockchain” and “cashless”. The analysis focuses on two parts (1) bibliometric mapping to examine the trends in fintech and endowment, and (2) analysis of keywords indexed in the articles to identify research groups and to understand the research themes associated with endowment and fintech. The database of the research is referred to Scopus database. The steps of getting data are shown in Figure 1.

Data Collection

The bibliometric analysis of fintech applications in endowment fund management was conducted using a comprehensive dataset derived from 683 journal databases, in Scopus. Keywords such as "fintech", "blockchain, "machine learning", "artificial intelligence", "big data", "database system", "information management", "data mining", "info system", "iot" and "digital transformation" were used to identify relevant publications. The search was limited to journal articles published between 2019 and 2024 to ensure a focus on recent advancements and trends. The data was collected on 29th of July 2024.

Data Extraction

The initial search yielded a substantial number of publications. Each entry was meticulously reviewed to ensure relevance, with criteria including the explicit discussion of fintech applications within the context of endowment management. Metadata for each selected publication, including title, authors, publication year, journal name, keywords, abstract, and citations, were extracted for further analysis.

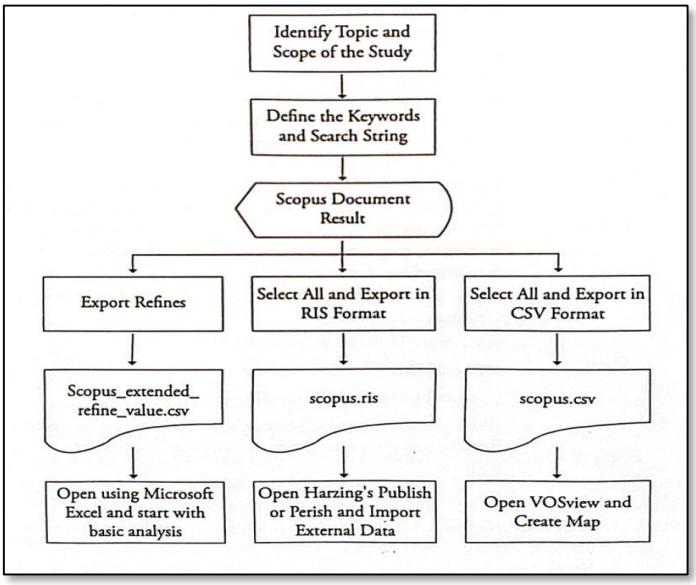

Figure 1: Steps on getting dataset from Scopus database.

Data Cleaning

To ensure accuracy and consistency, the dataset underwent a rigorous cleaning process. Duplicate entries were identified and removed. Discrepancies in author names, journal titles, and keywords were standardized. Publications with insufficient metadata or irrelevant content were excluded from the analysis.

i. Citation Analysis
   - Citation Counts: Assessment of the most cited papers to determine influential works in the field.

- H-Index: Calculation of the h-index for authors and journals to measure productivity and impact.
- Citation Networks: Visualization of citation relationships to identify key papers and their interconnections.

ii. Co-Occurrence Analysis
- Keyword Co-Occurrence: Analysis of frequently occurring keywords and their co-occurrence to identify main research themes and emerging topics.
- Thematic Mapping: Use of VOSviewer to create visual maps of research themes and their evolution over time.

iii. Geographical Analysis
- Regional Distribution: Mapping the geographical distribution of research outputs to highlight leading countries and institutions.
- Collaboration Networks: Examination of international collaboration patterns among researchers and institutions.

iv. Trend Analysis
- Emerging Trends: Identification of recent trends and shifts in research focus through temporal analysis of keywords and topics.
- Future Directions: Projection of potential future research directions based on current trends and gaps identified in the literature.

Tools and Software

This study was conducted using various software tools to ensure robust and accurate results:
- VOSviewer: For constructing and visualizing bibliometric networks, including co-authorship, co-citation, and keyword co-occurrence networks.
- Harzing Publish or Pearish: For statistical analysis and visualization of bibliometric data.
- Microsoft Excel: For data cleaning, management, and preliminary analysis.

FINDINGS

In this study, we gathered 683 papers from the Scopus database that focus on the utilization of fintech in endowment within the last 5 years (2019-2024). The papers have received approximately 12,260 citations, with an average of 2,452 citations per year. The paper's H-index is 54. The keyword used as a key study are based on the implementation of fintech and endowment. All the terms that related with also used as the keyword in order to get more accuracy of the output data. So, the script applied as in the following:

(“implementation" fintech" AND "endowment" OR "zakat" OR "wakaf" OR "blockchain" OR "finance technology" OR "sedekah")

Given the abundance of subjects associated with fintech and endowment, we will limit our discussion to the field of computer science and its area of investigation. The fields of study include computer science, engineering, decision sciences, artificial intelligence, IoT, machine learning, data analytics, big data, mathematics, business, management and accounting, social sciences, economics, econometrics & finance, material science, and multidisciplinary. Additional filtering parameters include the restriction of selecting just journals, while excluding proceedings, industrial reports, books, and theses. So, the filtering script applied as in the following:

PUBYEAR > 2019 AND PUBYEAR < 2024 AND (LIMIT-TO (SUBJAREA , "COMP") OR LIMIT-TO (SUBJAREA , "ENGI") OR LIMIT-TO (SUBJAREA , "DECI") OR LIMIT-TO (SUBJAREA , "MATH") OR LIMIT-TO (SUBJAREA , "BUSI") OR LIMIT-TO (SUBJAREA , "SOCI") OR LIMIT-TO (SUBJAREA , "ECON") OR LIMIT-TO (SUBJAREA , "MATE") OR LIMIT-TO (SUBJAREA , "MULT")) AND (EXCLUDE (DOCTYPE , "le") OR EXCLUDE (DOCTYPE , "sh") OR EXCLUDE (DOCTYPE , "er"))

Figure 2 displays the annual frequency of created journals. Only 53 publications were published in 2019. This may be attributed to the novelty and obscurity of fintech research during its initial introduction. Between 2020 and 2021, there was a significant spike and notable growth. In 2022, there was a slight decrease in the number of papers; but, in 2023, it experienced a subsequent increase. The potential for Covid-19 pandemic in early 2020 may have had a role in this, since it has expedited the acceptance of cashless transactions and the rapid progress of digital technology. The data collection scheduled for the middle of the year is expected to be a contributing factor to the anticipated decrease in the number of articles in 2024.

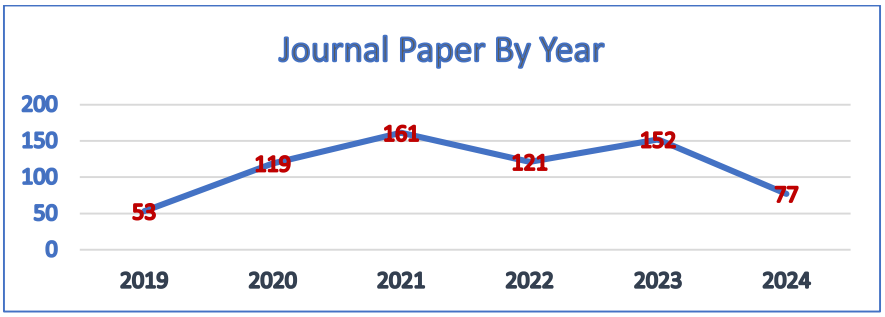

Figure 2: Frequency of journal publication by year

Analysis by Country

The study conducted on a global scale seeks to compare various countries in order to determine which of the current publications made a greater contribution. Comparisons among nations highlight numerous studies and arguments concerning the use of fintech in endowments within such nations. Figure indicates that China has conducted extensive research on the topic in comparison to other countries with about 218 papers or 31.9%. It then followed by United

States (11.9%), India (9.5%), UK (7.3%) and South Korea (7%). Malaysia is a predominantly Islamic nation that extensively researches endowment and fintech with 35 papers (5.1%).

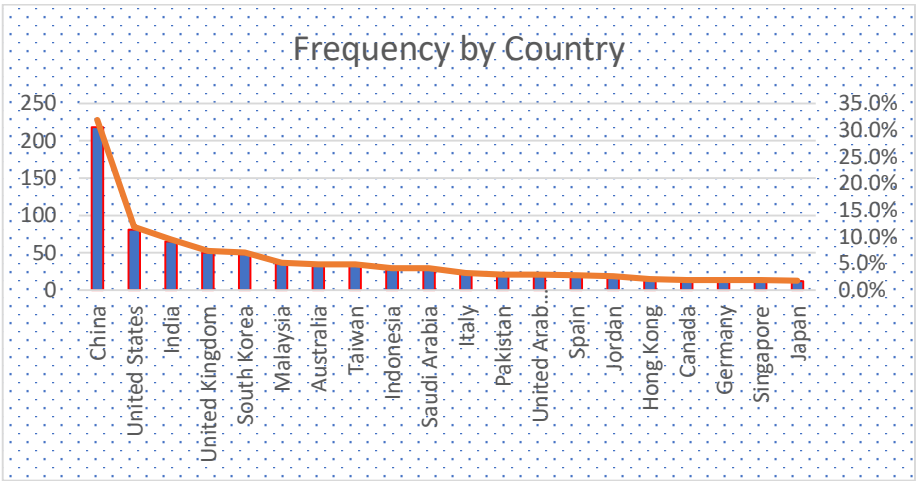

Figure 3: Frequency paper contribution by country.

Analysis by Keywords

Another intriguing element to consider is the utilisation of keywords. The purpose is to determine which keyword is most commonly used to represent the research study on using endowment in fintech. A total of 100 fintech-related keywords were used for the search in this research. The keywords are divided into 3 main clusters, namely fintech, which contains keywords related to fintech technology from a technical perspective, consisting of 36 items. Examples of keywords include big data, data analytics, risk assessment, information system, and so on.

The second cluster is related to finance and has 36 entries. The keywords contained in this cluster include ecommerce, commerce, economic, electronic trading, and so on. The third cluster is a blockchain related cluster that has 28 items. Some of the keywords contained in this cluster include crypto, IoT, microgrids, and so on. Figure 4 showing this search result. Observing the three indicated clusters, it is evident that cluster 1 exhibits greater dominance compared to the other two clusters. The keyword that is most often used and recognized is "fintech". The dominant term for cluster 2 is "commerce" and the third cluster is focused on "blockchain". Keyword popularity indicates that blockchain is surpassing commerce. Some often used keywords include machine learning, artificial intelligence, financial technology, and internet of things.

This finding seeks to employ a systematic bibliometric analysis method to effectively map the intellectual landscape of fintech applications in the management of endowment funds. This strategy enables us to gain a full understanding of the trends, research communities, and potential future research prospects for endowment and fintech. These findings are anticipated to serve as a beneficial foundation to gather information from reputable experts and high-quality sources to generate impactful studies for individuals interested in financial technology and endowment management.

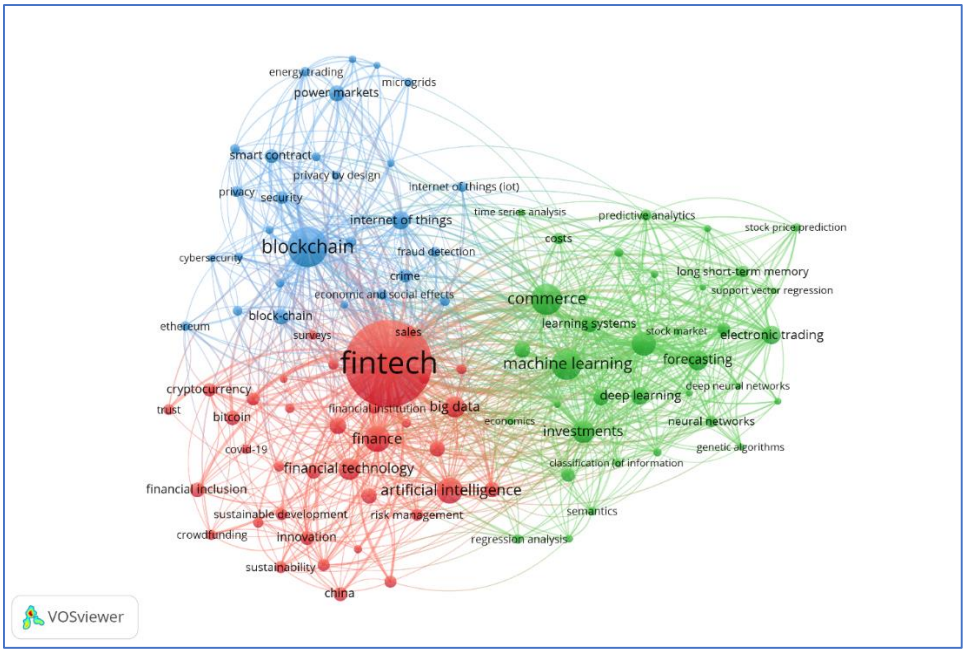

Figure 4: Keyword strength link

Analysis by Influential Author

In this sub chapter, we provide a comprehensive description of the author of the published journal. The objective is to observe the community of researchers who make significant contributions to research in the field of fintech and endowment. Table 1 presents a list of primary writers together with the corresponding count of their published academic papers and the number of times their work has been cited as a primary author. This table presents authors who have a minimum of three journals as the author. The database indicates a total of approximately 16 scholars. There is just Barney Tan, who has published 4 papers, while the remaining scholars have only published three papers each. However, Robert Kauffman has the highest citation count of 194, despite having only three works.

Table 1: List of top authors

Author	Documents	Citations	Total link strength
kauffman, robert j.	3	194	33
tan, barney	4	129	272
javaid, nadeem	3	116	137
stojanović, branka	3	115	0
gozman, daniel	3	112	378
shafiq, muhammad	3	110	137
ozili, peterson k.	3	89	24
karanasios, stan	3	76	257
zhao, yuanjun	3	76	0
corchado, juan m.	3	72	83
rodríguez-gonzález, sara	3	72	83
ferrer-gomila, josep-lluis	3	51	3
xia, huosong	3	19	271
zhang, justin zuopeng	3	19	271
sharabati, abdel-aziz ahmad	3	4	23
hu, xiao	3	4	4

It is noteworthy that despite having several citations, Kauffman only has a link strength of 33. Among all the authors, Gozman, D. has the highest link strength, with a total of 378 links. According to Figure 5 and Table 2, there are five authors who have more than 200 links. These authors are Gozman, D. with 378 links, Tan, B. with 272 links, Ferrer, J. with 271 links, Xia, H. with 271 links, and Karanasios, S. with 257 links. They are perceived as dominant and serve as a benchmark for other researchers.

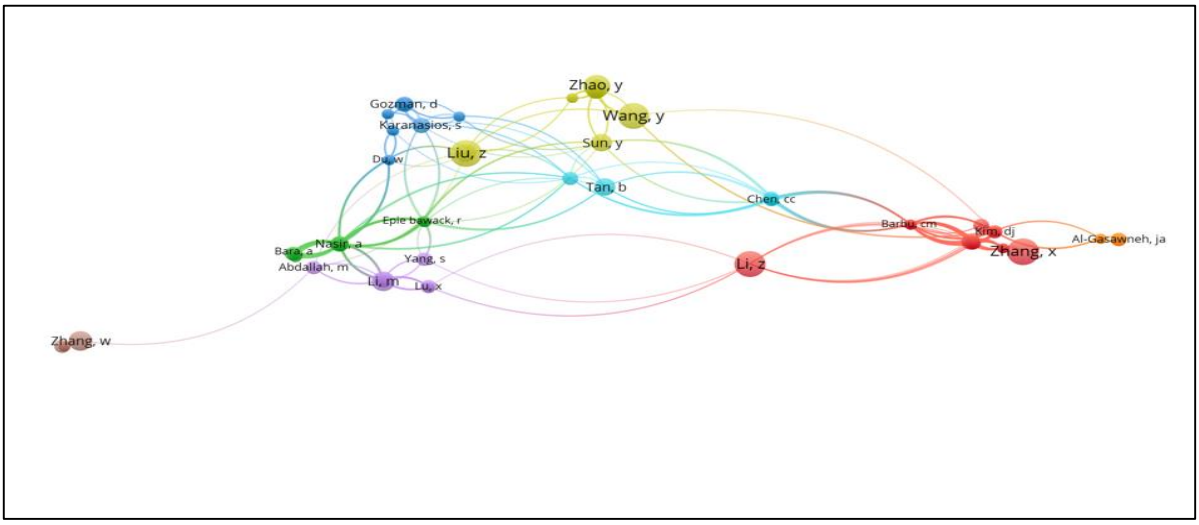

Figure 5: Link strength of top authors.

Analysis by Source of Journal

In addition to examining the author's data, we can also consult the journal's source to identify the primary sources of research on fintech and endowment. Consulting journal sources can assist us in assessing the frequency with which certain journals are cited in regard to the specific topic of this study. According to Table 2, the journal with the biggest number of published journals are ranked first, even though who has only published one journal. The majority of the leading journals are cited by over 100 sources. IEEE Access is the most highly referenced journal, with a total of 1447 citations across 46 periodicals. Sustainability in Switzerland is represented by 46 periodicals, which have received a total of 773 citations. Figure 6 illustrates the relationship between the data presented in Table 2 and the strength of the journal's connections.

Table 2: List of cited journals.

Source	Documents	Citations	Total link strength
industrial management and data syste...	9	769	28
ieee access	46	1447	22
information systems journal	5	170	16
sustainability (switzerland)	46	773	12
electronic commerce research	14	146	12
journal of theoretical and applied elect...	4	175	10
applied sciences (switzerland)	6	84	9
information systems research	4	138	8
international journal of human-comp...	1	165	7
international journal of technology ma...	2	49	6
production planning and control	1	243	5
journal of strategic information systems	1	214	5
digital policy, regulation and governan...	6	105	5
international journal of data and netw...	9	41	5
ieee transactions on industrial informa...	3	202	4
mathematics	8	144	4
electronic markets	7	40	4
information (switzerland)	8	266	3
ieee internet of things journal	13	255	3

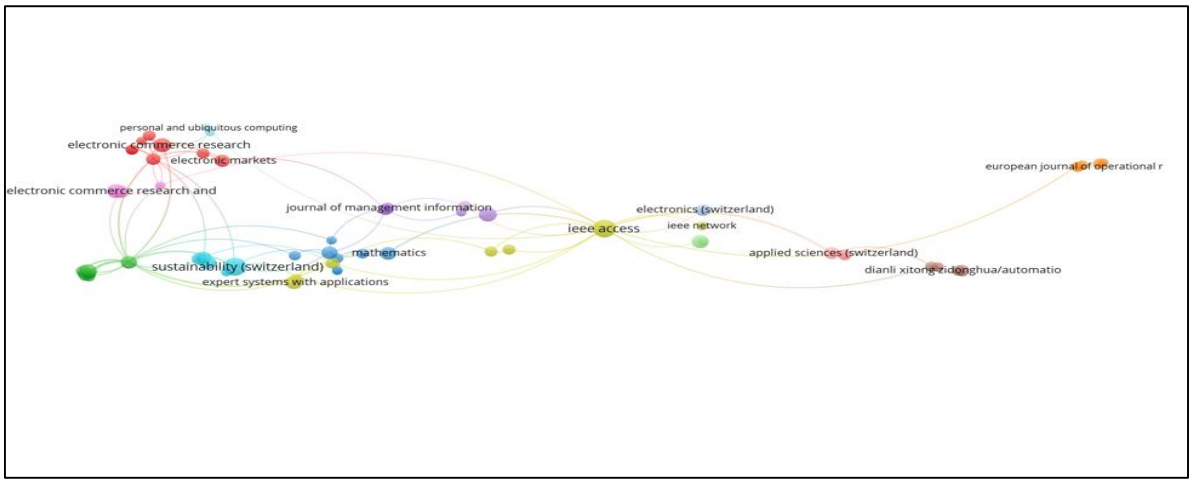

Figure 6: Link strength of top journals.

A high citation does not necessarily indicate a strong link. The Industrial Management & Data Systems Journal has a lower citation count than IEEE Access, but it has a link strength of 28. This guide encourages us to explore additional perspectives while considering studying in fintech, with a focus on ensuring that we fully comprehend the breadth of literature available.

CONCLUSION

The discussion in this chapter is divided into two critical aspects, (i) limitation in order to delineate the general limitations of this study. It functions as a manual for other researchers to enhance the research. (ii) conclusion to provide a summary of the discussion that has been elucidated in this writing.

Limitations

While this methodology provides a comprehensive overview of the research landscape, it is not without limitations. The reliance on specific academic databases may exclude relevant publications not indexed in these sources. Additionally, the analysis is constrained by the quality and completeness of the metadata available for each publication. Despite these limitations, the methodology offers valuable insights into the trends, key players, and emerging themes in the field of fintech applications in endowment fund management.

Conclusion

This study intends to utilise a systematic bibliometric analysis method to effectively map the intellectual landscape of fintech applications in endowment fund management. This strategy enables us to gain a full understanding of the major trends, research communities, and potential future research prospects. These findings are anticipated to serve as a beneficial foundation for us to gather information from reputable experts and reliable sources to generate impactful studies for those who are interested in financial technology and endowment management.

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