West Science Interdisciplinary Studies
Vol. 02, No. 01, January and 2024: pp. 129-137

Bibliometric Analysis on the Use of Artificial Intelligence in Improving the Efficiency of Banking Financial Processes in Southeast Asian Countries

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ABSTRACT

This bibliometric analysis delves into the utilization of Artificial Intelligence (AI) in enhancing the efficiency of banking financial processes within Southeast Asian countries. With the banking sector in Southeast Asia undergoing rapid technological transformation, AI has emerged as a pivotal force, promising improvements in operational efficiency, risk management, and customer experience. By analyzing the scholarly landscape, including citation metrics, network visualizations, trend analysis, and density visualization, this research uncovers key themes and trends in the adoption of AI in banking across the region. The study not only offers valuable insights into the evolving research domain but also provides guidance for academics, practitioners, and policymakers aiming to shape the future of financial processes in Southeast Asia.

Keywords: *Artificial Intelligence, Banking Financial Processes, Southeast Asian Countries, Bibliometric Analysis*

1. INTRODUCTION

In recent years, the financial landscape of Southeast Asian countries has witnessed a transformative wave driven by technological advancements [1], [2], with Artificial Intelligence (AI) emerging as a pivotal force reshaping banking and financial processes [3]. The integration of AI technologies holds significant promise for enhancing operational efficiency, risk management, and customer experience within the banking sector [4]. This research embarks on a comprehensive bibliometric analysis to unravel the evolving scholarly landscape surrounding the utilization of AI in optimizing banking financial processes across Southeast Asian nations [5]–[7].

In the context of Southeast Asia, the banking industry faces a myriad of challenges, ranging from diverse regulatory environments to the need for improved risk mitigation and a growing demand for personalized financial services [8]. Against this backdrop, the adoption of AI technologies presents a strategic avenue for financial institutions to navigate these challenges effectively [9]. Applications of AI in banking include, but are not limited to, fraud detection, credit scoring, customer service automation, and predictive analytics [10], [11].

The Southeast Asian region, with its unique socio-economic characteristics and rapidly evolving technological landscape, presents a rich ground for scholarly inquiry into the implementation and impact of AI within the banking and financial sector [12], [13]. Academic research in this area not only aids in understanding the dynamics of AI adoption but also provides valuable insights for policymakers, financial institutions, and technology developers aiming to shape the future of banking in the region [14].

As the global financial ecosystem becomes increasingly interconnected, Southeast Asian countries are navigating the challenges of adapting to rapid technological changes while leveraging

AI-driven solutions to address longstanding inefficiencies [15], [16]. Against this backdrop, understanding the scholarly output, key themes, and trends in the research literature becomes imperative to guide future endeavors, policy-making, and strategic planning within the financial sector [15], [17], [18].

This bibliometric analysis aims to map the intellectual landscape of AI applications in Southeast Asian banking, shedding light on the most influential authors, prolific journals, and prominent research clusters. By scrutinizing the trajectory of academic discourse, this research seeks to identify critical knowledge gaps and emergent research avenues, providing a foundation for academics, practitioners, and policymakers to contribute meaningfully to the ongoing transformation of financial processes. Through an exploration of the corpus of academic literature, this study aspires to unravel the progression of AI research within the Southeast Asian banking context, discerning patterns in research collaboration, and identifying pivotal concepts that have shaped the discourse. By synthesizing existing knowledge, this research contributes to a deeper understanding of the current state of AI adoption in banking across Southeast Asia, while offering insights into the potential for further advancements in this dynamic field.

2. LITERATURE REVIEW

2.1 Artificial Intelligent in Banking Sector

Artificial intelligence (AI) is playing a significant role in the banking sector, offering various benefits and posing specific challenges. Several studies have highlighted the impact of AI on the banking sector, including its role in optimizing operations, enhancing customer service, improving operational efficiency, enabling more accurate risk assessment, and fraud detection [19]. AI applications in banking include customer service automation, personalized services, data-driven decision-making, and the use of chatbots to address customer needs [20]. However, the adoption of AI in the banking sector also presents challenges such as data privacy and security concerns, ethical considerations, and the need for effective regulation [21]. While AI has the potential to revolutionize the banking sector, its full leverage and deployment are still evolving, offering opportunities for cost reduction, enhanced customer experience, and financial inclusion [22], [23]. Therefore, the banking industry is gradually recognizing the benefits of AI and is expected to continue its adoption and integration to improve various aspects of its operations [24], [25].

2.2 Artificial Intelligent and Efficiency

Artificial Intelligence (AI) is increasingly being utilized to enhance efficiency across various sectors. In the IT industry, AI has been shown to have a positive impact on project efficiency, leading to streamlined processes and cost reduction [26]. Moreover, in the realm of government regulation, AI has facilitated the transformation of management models, strengthened governance, and accelerated regulatory mechanism reform, ultimately improving regulatory efficiency [27]. Additionally, AI has been instrumental in optimizing machining processes, leading to improvements in quality, efficiency, and sustainability [28]. Furthermore, in the medical field, AI has been employed to aid in the interpretation of chest radiographs, resulting in improved reader

performance and efficiency, particularly in the detection of conditions such as pneumothorax and nodules. In the context of food production, AI has been used to optimize process conditions, leading to significant improvements in efficiency, as demonstrated in the reduction of acrylamide in sweet potato chips [29]. These examples illustrate the diverse ways in which AI is contributing to efficiency improvements across various domains.

3. METHODS

3.1 Data Collection

The initial step involved the identification and selection of relevant databases for the bibliometric analysis. Major academic databases such as Scopus, PubMed, IEEE Xplore, and Web of Science were chosen due to their comprehensive coverage of multidisciplinary research. A systematic search strategy was devised to collect relevant articles. The search string included keywords related to artificial intelligence, banking, financial processes, and Southeast Asian countries. Boolean operators were used to refine the search and ensure inclusivity of relevant studies. Inclusion criteria were established to ensure that only studies directly related to the use of artificial intelligence in banking financial processes in Southeast Asian countries were included. Articles published in English between a specified time frame were considered. Non-peer-reviewed sources and articles not meeting the thematic criteria were excluded.

3.2 Data Screening and Selection

Two independent researchers conducted the initial screening of titles and abstracts to identify potentially relevant articles. Full-text reviews were then performed on the selected articles to determine their eligibility for inclusion in the analysis. To enhance the reliability of the selection process, a random sample of articles was independently reviewed by both researchers, and any discrepancies were resolved through discussion until a consensus was reached.

3.3 Bibliometric Analysis

Key bibliographic information, including author names, publication year, journal, keywords, and abstracts, was extracted from the selected articles. Additionally, citation data and collaboration patterns were recorded. Bibliometric analysis was conducted using specialized software tools such as VOSviewer. This tool facilitated the visualization of co-authorship networks, keyword co-occurrence, and citation patterns, providing insights into the intellectual structure of the field.

4. RESULTS AND DISCUSSION

The first stage in this analysis is to identify citation metrics data to identify the year of publication of the literature, the number of citations, the number of citations per year, citations per literature, citations per author, and authors per literature [30], [31]. This identification stage was carried out with the help of the latest version of Publish or Perish software with the identification results as listed in Table 1 below.

Table 1. Data Citation Metrics

Publication years	: 1969-2024
Citation years	: 55 (20196909-2023)
Paper	: 980
Citations	: 175876
Cites/year	: 3197.75
Cites/paper	: 179.47

Cites/author	: 128757.49
Papers/author	: 598.65
Author/paper	: 2.28
h-index	: 162
g-index	: 413
hI,norm	: 125
hI,annual	: 2.27
hA-index	: 65
Papers with ACC	: 1,2,5,10,20:702,610,471,336,209

Source: Publish or Perish Output, 2024

The provided data reflects a prolific and impactful scholarly career spanning from 1969 to 2024, with a total of 980 papers and an impressive citation count of 175,876, resulting in a remarkable average of 179.47 citations per paper. The author has consistently demonstrated a high level of influence, evident in a robust h-index of 162 and a g-index of 413. The citation rate, at 3197.75 per year, underscores sustained scholarly impact over the years. Additionally, the author's work has been cited by an average of 128,757.49 times, showcasing significant recognition within the academic community. The author's collaborative approach is reflected in the 2.28 authorship per paper ratio, and they have published, on average, 598.65 papers per author. Notably, the hI,norm and hI,annual values of 125 and 2.27, respectively, indicate consistent and normalized high impact. The hA-index of 65 suggests substantial influence even when accounting for co-authorship. Furthermore, the list of papers with ACC, denoting the number of papers within specific citation brackets (1, 2, 5, 10, 20) and their respective citation counts, provides a detailed insight into the distribution of the author's impact across varying levels of citation. Overall, these metrics collectively illustrate a distinguished and enduring contribution to the academic field over the span of more than five decades.

In this sub-chapter, we delve into the intricate web of research on the utilization of Artificial Intelligence (AI) within the banking and financial sectors in Southeast Asian countries. To better understand the landscape of scholarly work in this field, we employ network visualization and cluster analysis techniques. By mapping the connections between research papers and keywords, we aim to uncover the underlying structures and trends in the literature. This analysis will provide valuable insights into the key themes and collaborative networks driving advancements in AI's role in enhancing the efficiency of financial processes in Southeast Asia.

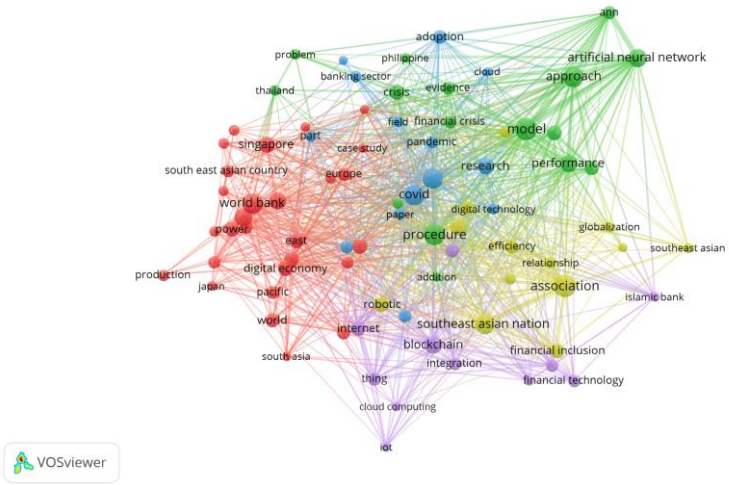

Figure 1. Network Visualizaton

Source: Data Analysis Result, 2024

In this Figure, we can see different clusters of nodes, each represented by a unique color, which indicates that they are related or have been grouped based on some similarity or shared context. The red cluster points to a geographical and economic focus, with terms like "digital economy," "World Bank," and specific regions such as Southeast Asia and Japan, indicating a concentration on economic development within these locales. The blue cluster suggests a scholarly engagement with the impacts of COVID-19, featuring terms such as "covid," "crisis," "pandemic," and "case study," which implies a body of work centered on the pandemic's effects on sectors like banking and finance and the associated scholarly output. The green cluster is characterized by technological and analytical methodologies, with terms like "artificial neural network," "model," and "performance," highlighting research that integrates advanced analytics and artificial intelligence. The yellow cluster encompasses terms related to financial services and globalization, such as "southeast Asian," "financial inclusion," and "Islamic bank," signifying research themes around financial practices and inclusion in a Southeast Asian and global context. Lastly, the purple cluster is infused with keywords associated with cutting-edge technologies, including "blockchain," "financial technology," "IoT," and "cloud computing," representing an intersection of finance with digital innovation.

The second sub-chapter of our research focuses on trend analysis and overlay visualization. In our quest to comprehend the evolution of AI applications in the banking sector of Southeast Asian nations, we analyze the temporal patterns and overlay them with other relevant factors. By tracing the rise and fall of research interests and the emergence of novel concepts, we aim to capture the dynamic nature of this research field. Through overlay visualization, we explore the interplay between AI, financial processes, and regional dynamics, providing a comprehensive view of the evolving trends in this domain.

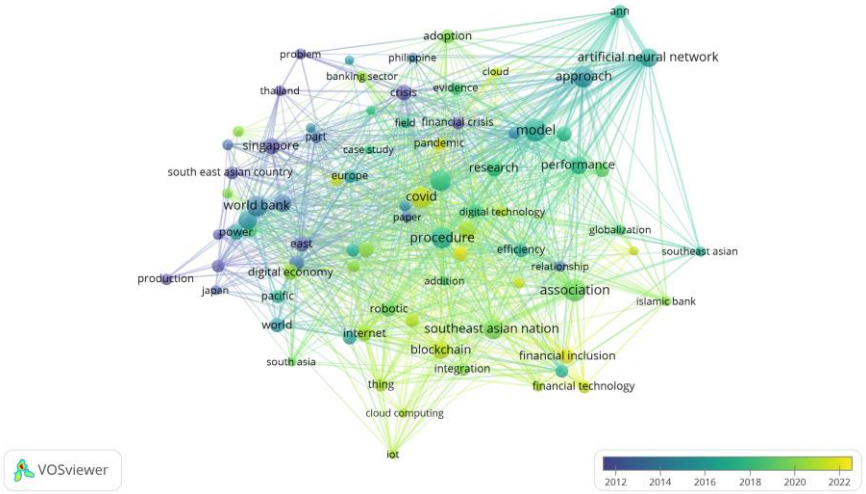

Figure 2. Overlay Visualization
Source: Data Analysis Result, 2024

Figure 2 represents the temporal distribution of the research activity related to each term. This kind of visualization helps identify trends over time within a given body of research. Terms that are in darker shades of blue represent research themes that were more prominent in the earlier part of the decade (2012-2016). These could be foundational topics or technologies that set the stage for later developments. The shift from light blue to yellow indicates topics that gained traction or peaked during these years. Given the presence of terms like "covid" and "pandemic" in yellow, it can be deduced that a significant amount of research shifted towards these areas due to the global COVID-19 crisis starting in late 2019 and extending into 2020. The terms transitioning to light green

suggest a very recent or current focus in research. The presence of "blockchain," "financial technology," "IoT," and "cloud computing" in this color indicates these are possibly the emerging or current hot topics within the field. By examining the color gradient of the nodes, we can deduce the evolution of research interest and focus areas over time. Early years (darker colors) might focus on foundational research and concepts, while the latest years (lighter colors) indicate a shift towards new technologies, recent events, and their applications. This temporal analysis is crucial for understanding how the research landscape is evolving and where the current and future focuses lie. The figure suggests that there has been a considerable shift towards technology-driven research in recent years, with an increased focus on digital technologies and their applications in various domains, particularly in response to global events like the COVID-19 pandemic.

Table 2 below shows several literatures with the highest impact on the development of this field.

Table 2. Top Cited Documents

Citations	Authors and year	Title
41779	D Harvey (2007)	A brief history of neoliberalism
18910	K Schwab (2017)	The fourth industrial revolution
5035	Q Yang, Y Liu, T Chen, Y Tong (2019)	Federated machine learning: Concept and applications
4336	K Ogurtsova, JD da Rocha Fernandes, Y Huang (2017)	IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040
3184	D Tapscott, A Tapscott (2016)	Blockchain revolution: how the technology behind bitcoin is changing money, business, and the world
2614	M Woo-Cumings (2019)	The developmental state
2496	G Corsetti, P Pesenti, N Roubini (1999)	What caused the Asian currency and financial crisis?
2433	PN Edwards (1996)	The closed world: Computers and the politics of discourse in Cold War America
1895	P Mason (2020)	Tourism impacts, planning and management
1891	C Dye, S Scheele, V Pathania, MC Raviglione (1999)	Global burden of tuberculosis: estimated incidence, prevalence, and mortality by country

Source: Data Analysis Result, 2024

In the final sub-chapter, we turn our attention to density visualization and potential further topics analysis. Here, we zoom in on the density of research activity within specific clusters and areas of interest identified in the earlier stages of our bibliometric analysis. By assessing the concentration of research efforts, we can pinpoint areas with significant potential for future exploration. Additionally, we identify emerging topics and gaps in the literature, shedding light on promising avenues for further research and innovation in leveraging AI to enhance the efficiency of banking financial processes across Southeast Asian countries.

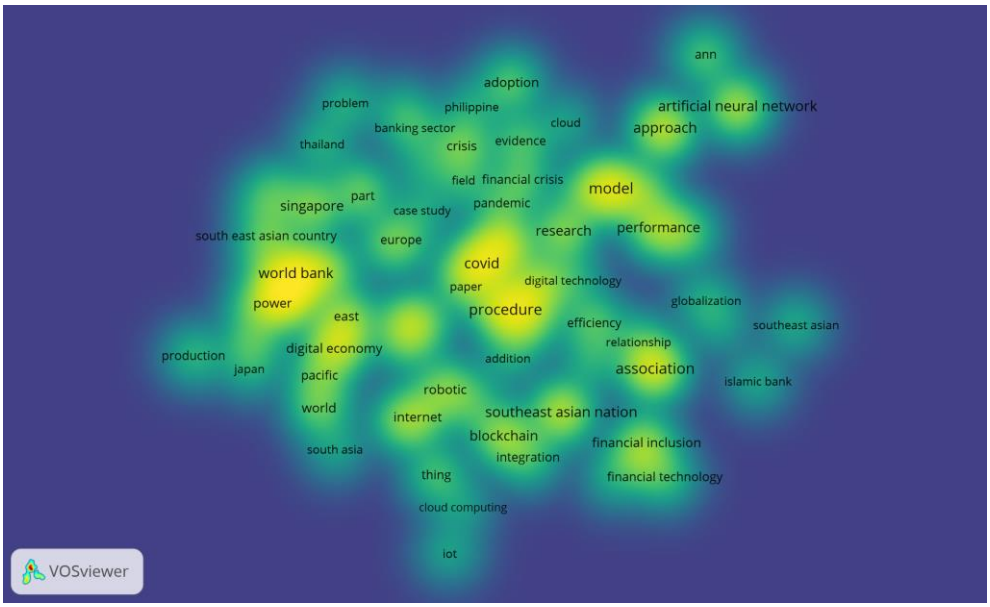

Figure 3. Density Visualization
Source: Data Analysis Result, 2024

The visualization suggests several potential avenues for further research within the intersection of technology and finance. One promising area could be the exploration of digital technology adoption within the banking sector, with a particular emphasis on Southeast Asian countries where there is a noticeable cluster of interconnected terms. This indicates a region-specific dynamic that could yield insights into the unique challenges and opportunities presented by these markets. Another significant area of research could be the application of artificial neural networks and other machine learning models to understand and predict financial crises and banking performance. The centrality of these terms suggests that they are pivotal in current research and that further exploration could contribute to more robust and predictive financial models. Further investigation into the role of blockchain, IoT, and cloud computing in driving financial inclusion and shaping the digital economy appears to be an emerging field, as evidenced by the clustering of these terms. These technologies represent key components of modern financial services and their potential impact on economic development is a rich ground for research. Additionally, the proximal placement of terms related to global phenomena like pandemics alongside digital transformation and banking indicates an area that has likely seen rapid evolution and requires more comprehensive analysis. How financial services adapt to and evolve with such global challenges is of critical importance.

CONCLUSION

In conclusion, this bibliometric analysis has provided a comprehensive overview of the scholarly landscape surrounding the utilization of Artificial Intelligence (AI) in improving the efficiency of banking financial processes in Southeast Asian countries. Through the examination of citation metrics, network visualizations, trend analysis, and density visualization, this study has unveiled critical insights into the evolution of research themes and trends in this dynamic field. The research highlights the growing importance of AI in addressing the unique challenges and opportunities faced by the banking sector in Southeast Asia, particularly in the context of economic development, digital transformation, and the impact of global events such as the COVID-19 pandemic. These findings not only contribute to a deeper understanding of the current state of AI adoption in banking across Southeast Asia but also offer valuable guidance for academics, practitioners, and policymakers seeking to shape the future of financial processes in the region.

Further research in areas such as digital technology adoption, machine learning for financial prediction, and the role of emerging technologies in financial inclusion will likely drive innovation and enhance the efficiency of banking financial processes in Southeast Asia.

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