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A Visualization of Digital Finance Research: A Bibliometric Analysis on E- wallet



Abstract: - The e-wallet has seen significant development and has become widely adopted and used. The objective of this study is to assess the effectiveness and analyze the existing body of knowledge in order to identify the pathways for further advancement in mobile payment research during the new normal. In order to accomplish its objectives, this study utilizes and executes a bibliometric technique on a collection of 53 papers obtained from the Scopus database to offer a comprehensive analysis of past and future e-wallet research. This study use performance analysis to examine the productivity and influence of contributors to research on e-wallets. This study using scientific mapping to uncover the fundamental themes and topical paths in the existing literature focused on e-wallet research. The results obtained from the study of performance and the mapping of scientific knowledge are then utilized to guide the direction of future research on e-wallet technology.

Keywords: E-wallet, E=payment Risk, Bibliometric

I. INTRODUCTION

Indonesia is third in terms of the proportion of internet users in Asia. This indicates a significant annual surge in internet usage in Indonesia, with a growing number of individuals incorporating it into their everyday routines [1]. With the rapid growth of the internet, mobile payment systems have been widely accessible [2]. E-wallets and other mobile payment methods contribute to the growth of the digital economy in both developed and developing countries.

The E-Wallet Industry Outlook 2023 survey, done by Insight Asia, reveals that 74% of the 1,300 respondents from metropolitan regions have utilized e-wallets [3]. E-wallets streamline financial transactions by leveraging smartphones, offering individuals the benefits of technology advancement [4]. Utilizing digital wallets can also help financial records, even for personal use. Each transaction will be meticulously documented in the transaction history [5]. This data can be utilized as valuable information in the creation of financial reports. As to the study conducted by [6], despite the significant advantages of e-wallets such as quick, secure, and convenient payments, a considerable number of consumers discontinue using this service after a specific duration. The usage of internet platforms for financial transactions can generate significant apprehension, leading customers to exhibit reluctance in utilizing these services on a recurring basis [7]. E-wallet payment transactions entail inherent dangers and potentialities due to their association with criminal activities such as theft, account takeover, fraudulent transactions, and data breaches [8]. However, a more thorough assessment of the future development trend of e-wallet and risk technologies in developing trends in mobile payments requires in-depth insights and bibliometric research.

Hence, the objective of bibliometric analysis is to chart the advancements in mobile payment research and focus on the subsequent areas of research that need more investigation. The research conducted in this field has primarily focused on risk, as indicated by [7], [9]. Meanwhile, as a result of novel and developing technology, the field has broadened and become more intricate. Hence, a more comprehensive perspective necessitates a deeper comprehension beyond mere acceptance. The report also discusses the lack of theoretical frameworks used to analyse mobile payments. The predominant focus in the subject consists primarily on empirical studies and is generally approached from the perspective of information systems [10].

This research utilises a bibliometric approach to examine the existing literature on e-wallet. The bibliometric method stands out from other review methods, such as framework or narrative/thematic approaches, due to its strong objectivity. This method relies on quantitative techniques to evaluate the performance and map the scientific landscape in the field [11]. Significantly, a bibliometric study can offer crucial insights for determining the trajectory and magnitude of research in the field by charting the progression of research and evaluating the trends and advancement of the field [12]. This paper examines three research questions commonly addressed and resolved through bibliometric investigations, drawing inspiration from previous research [10].

RQ1. What is the current pattern of publication and citation for research on e-wallets?

RQ2. Who are the primary authors who have made significant contributions to e-wallet research?

RQ 3. What areas should future e-wallet research explore?

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The subsequent sections of the paper are organized in the following manner. Section 2 outlines the methodology that informs the current review. Section 3 provides the findings of the analysis, while Section 4 ends the study and highlights potential areas for future investigation.

II. METHODOLOGY

A. Method

The bibliometric approach for review emerged from the field of library and information sciences. It involves retrieving and reviewing the bibliographic data of existing literature in a quantitative manner, using statistical methods [13]. By employing bibliometric methodologies, researchers can investigate various aspects of the discipline [14], enabling them to cultivate a comprehensive comprehension of the field [10].

B. Data Collection

This research aims to contribute to the existing bibliometric evaluations of risk of e-wallet by examining the intellectual structure of this knowledge domain using the Scopus database. Furthermore, in accordance with the methodology employed in comparable studies, the analysis of bibliometric indicators focuses exclusively on articles that have been published in scholarly journals. This selection is made due to the fact that these articles serve as a reliable and representative sample of the global scientific endeavors, [15]. A search method was implemented to gather data for this investigation (Table 1).

TABLE 1. Search Strategy in Scopus Database

Search Word	“Risk” AND “e-wallet”
Category	Article title, Abstract, Keywords
Search Date	December 2023

C. Analytical Tools

The present study utilizes Scopus databases for data collection, Microsoft Excel for statistical analysis, and VOSviewer as a bibliometric analysis tool for generating network maps. In order to visualize the data, this study employs the VOSviewer software to examine the literature [10]. This software is capable of generating various knowledge graphs for analyzing keyword co-occurrence, cooperative network, cluster, and co-citation patterns.

III. ANALYTICAL TOOLS

A. Publication Productivity of E-wallet Research (RQ1)

Bibliometric analysis employs performance analysis as a means to delineate the contributions within the research domain being examined, namely e-wallet [16]. The following study involves analyzing the performance of publication trends, most cited articles, and top authors in a collection of 53 identified publications.

TABLE 2. Years of Publications

Year	Number of Paper
2012	1
2018	2
2019	5
2020	3
2021	8
2022	14
2023	20
Total	53

Table 2 displays the yearly output of papers, indicating that there were four articles in the field of e-wallet published in Scopus indexed journals. The inaugural publication in the domain was the article by [17], titled “The electronic payments: Architectures and trends” which was published in 2012. The domain has experienced substantial growth during a brief timeframe of 11 years (until 2023), with the number of publications increasing to 14 articles in 2022 and 20 articles in 2023. The domain experienced a significant increase starting from 2021, with a particularly high surge observed between 2021 and 2023.

Citations serve as a well-established metric for gauging the influence of research published within a certain field [14]. Table 3 displays the top ten papers in the risk of e-wallet field.

TABLE 3. Most Cited Publications

Citation	First Author	Title	Year	Journal
109	Aji H.M.	COVID-19 and e-wallet usage intention: A multigroup analysis between Indonesia and Malaysia	2020	Cogent Business and Management
31	Widodo M.	Extending UTAUT2 to explore digital wallet adoption in Indonesia	2019	2019 International Conference on Information and Communications Technology, ICOIACT 2019
27	Singh K.	An interoperable and secure e-wallet architecture based on digital ledger technology using blockchain	2019	2018 International Conference on Computing, Power and Communication Technologies.
27	Chauhan V.	Adoption of electronic banking services in India: an extension of UTAUT2 model	2022	Journal of Financial Services Marketing
26	Malik A.N.A.	The Effect of Perceived Usefulness, Perceived Ease of Use, Reward, and Perceived Risk toward E-Wallet Usage Intention	2021	Eurasian Studies in Business and Economics
15	Senali M.G.	Determinants of Intention to Use e-Wallet: Personal Innovativeness and Propensity to Trust as Moderators	2023	International Journal of Human-Computer Interaction
14	Sable N.P.	The Secure E-Wallet Powered by Blockchain and Distributed Ledger Technology	2022	2022 IEEE Pune Section International Conference, PuneCon 2022
14	Sanghi N.	BlockCloud: Blockchain with Cloud Computing	2018	Proceedings - IEEE 2018
10	Lee Y.Y.	Do E-wallets trigger impulse purchases? An analysis of Malaysian Gen-Y and Gen-Z consumers	2023	Journal of Marketing Analytics
10	Phan T.N	Factors Affecting the Behavioral Intention and Behavior of Using E-Wallets of Youth in Vietnam	2020	Journal of Asian Finance, Economics and Business

The article with the highest number of citations was authored by [18], titled “COVID-19 and e-wallet usage intention: A multigroup analysis between Indonesia and Malaysia”, and had a total of 109 citations. The study enhances the existing body of knowledge by investigating the impact of perceived risk, government assistance, and perceived usefulness on customers' inclination to utilize e-wallets during the COVID-19 pandemic [18]. Next, in the second position, there is an article affiliated with [19] that has a total of 31 citations. The objective of this study is to ascertain the determinants that impact the acceptance of digital wallet usage in Indonesia. The article produced by [20] holds the third place and has a total of 27 citations. This article introduces an innovative framework for the smooth integration of e-wallets from various banks and collaborating institutions utilizing blockchains.

B. Key Authors Influencing E-wallet Research (RQ2)

There are five authors that have each submitted two articles in the field of e-wallet research. This suggests that the study of e-wallets is still in its early stages and has been mostly conducted by a small number of experts (Table 4).

TABLE 4. Most Authors

Author	Number of Paper
Anggriawan R.	2
Halim A.	2
Hamsin MK	2
Ikhsan RB	2

Author	Number of Paper
Meiyani	2

Table 4 displays the authors' contributions to the articles under "Risk of E-wallet" starting from 2012. The writers who made the most contributions were Anggriawan R. (2), Halim A. (2), Hamsin MK (2), Ikhsan RB (2), and Meiyani (2).

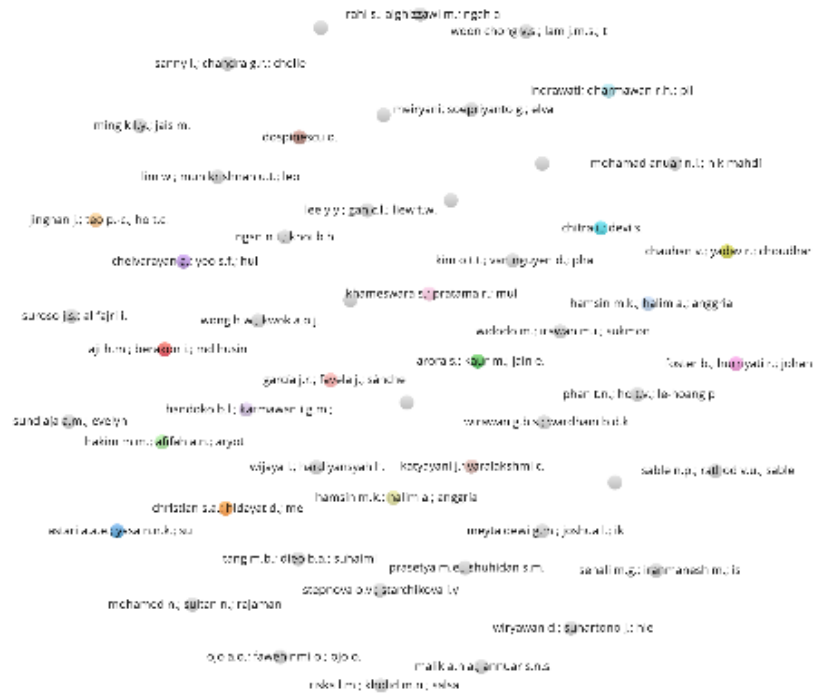


FIGURE 1. Co-authorship

Figure 1 depicts the interconnection between the authors and a network. It is anticipated that future collaborations among researchers will increase, leading to a greater number of high-quality study findings, as there are currently only a limited number of authors who are affiliated with each other.

C. Foundation Theme in E-wallet Research (RQ3)

VOSviewer was used to assess the co-occurrences of terms in all publications used for the bibliometric analysis. An analysis was conducted to assess the patterns of keyword co-occurrence over a specific time frame in order to discover trends and investigate the evolution of the field. Analyzing the correlations between keywords over time assists in comprehending the development of the area in terms of its content and structure [11]. Significantly, each phrase signifies a certain subject matter within the field. Keywords that appear in larger nodes indicate higher frequencies, while tighter distances or links between nodes suggest better connections between the subjects. Using a co-occurrence analysis technique, the author identified 21 keywords out of a total of 359 terms, with a minimum co-occurrence of 3. The picture 2 depicts the co-occurrence data for terms.

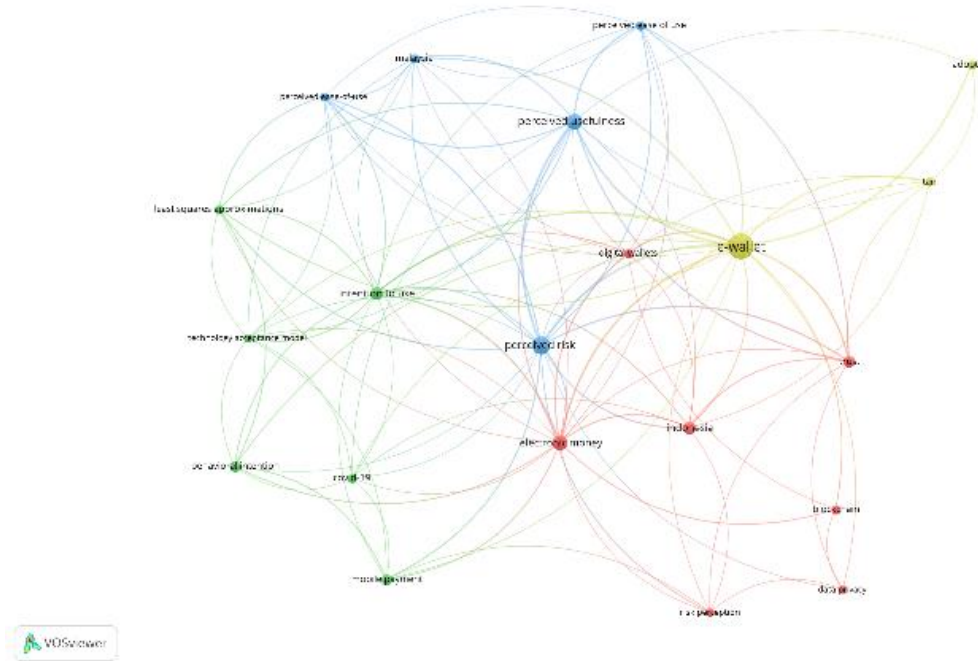


FIGURE 2. Network Visualization

TABLE 5. Co-occurrence network tabular form

Cluster	Top 3 Keywords
Cluster 1 (red)	Electronic money, digital wallets, risk perception
Cluster 2 (green)	Intention to use, mobile payment, behavioral intention
Cluster 3 (blue)	Perceived risk, perceived usefulness, perceived ease of use
Cluster 4 (yellow)	E-wallet, adoption, TAM

Figure 2 and table 5 displays the co-occurrence network, which is partitioned into 4 clusters. The initial cluster, specifically the red cluster. Electronic money is a product of advanced payment technology designed to facilitate the modern lifestyle of today's society [21]. Digital wallets are regarded as a novel and cutting-edge payment solution that has the potential to supplant cash-based payment methods [22]. Risk perception refers to the comprehension of potential dangers and unfavorable outcomes associated with the utilization of a particular service [23]. Engaging in activities such as mobile technology-based purchases and money transfers is commonly regarded as convenient yet fraught with risk. Wireless data transport increases the likelihood of data interception and redirection [24]. The second cluster, referred to as the green cluster. Mobile payments refer to a payment model that uses electronic means to conduct transactions for products, services, invoices, and receipts [25]. The elements that impact a user's intention to utilize mobile payment services are perceived trust, perceived utility, and risk. These factors play a significant role in determining the acceptability of mobile payment services [5]. The third cluster, referred to as the blue cluster. Perceived risk refers to the potential danger or lack of certainty associated with the adoption of a novel technology or service [24]. Consumers see danger as the primary obstacle to engaging in online and mobile payment [26]. Perceived usefulness of a product or service's utility is determined by the consumers' view of the anticipated advantages gained from its utilization [25]. Furthermore, perceived ease of use refers to an individual's perception of how simple, easy, and effortless it is to operate a specific technology system [27]. The fourth cluster, referred to as the yellow cluster. An e-wallet is a digitalized payment system where monies are stored on a server rather than a physical chip [28]. It was also referred to as an electronic card that facilitates digital transactions through a smartphone [29]. The Technology Acceptance Model (TAM) examines the behavioral traits of persons in connection to their usage of an application system or information technology, taking into account several aspects [30]. Empirical research findings indicate that user views are primarily influenced by two factors: perceived utility and perceived ease of use [31].

VOSviewer was utilized to examine the co-occurrences of terms in all publications used for the bibliometric analysis. An analysis was conducted to evaluate the patterns of keyword co-occurrence across a specific time frame. The aim was to detect trends and get insights into the evolution of the field. Analyzing the correlations between

keywords over time allows for a comprehensive comprehension of the development of the area in terms of its content and structure [11].

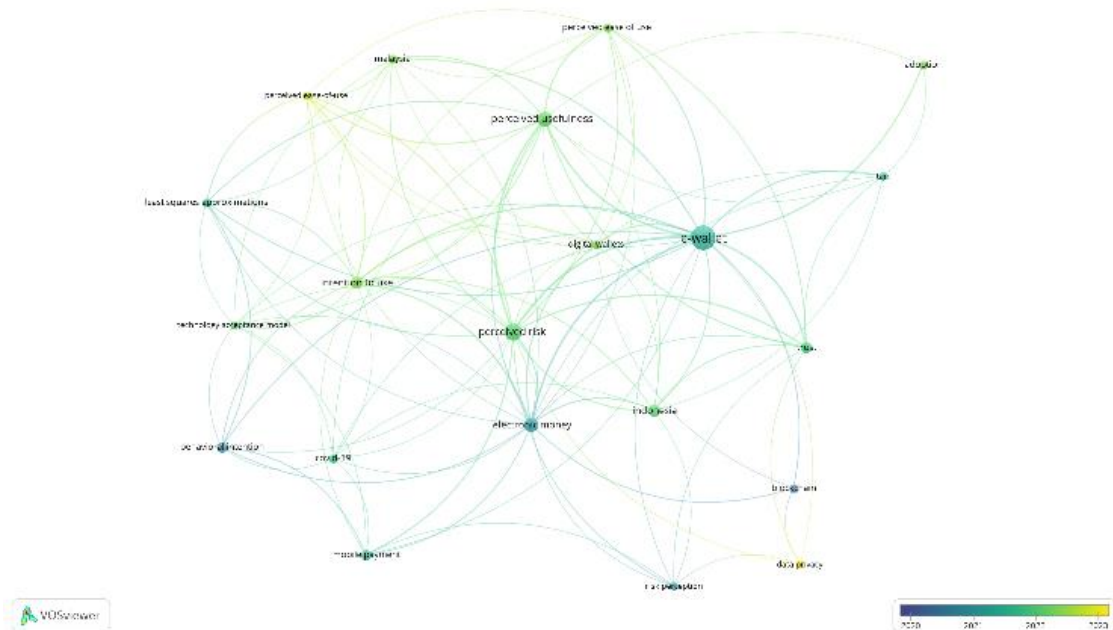


FIGURE 3. Overlay Visualization

The keyword co-occurrence analysis reveals that prior to 2020, research on e-wallet was mostly focused on the behavioral intention of e-wallets (Figure 3). There was a gradual shift in the trend, and in 2021 and 2022, the focus was mostly on concerns with the adoption of e-wallets and the factors influencing it. Scholars showed increasing interest in researching this topic during this time. Between 2023 and the present study, e-wallet research has primarily concentrated on data privacy. The analysis indicates that there has been a shift in recent research towards focusing on the risks, particularly data privacy, connected with the adoption of e-wallets.

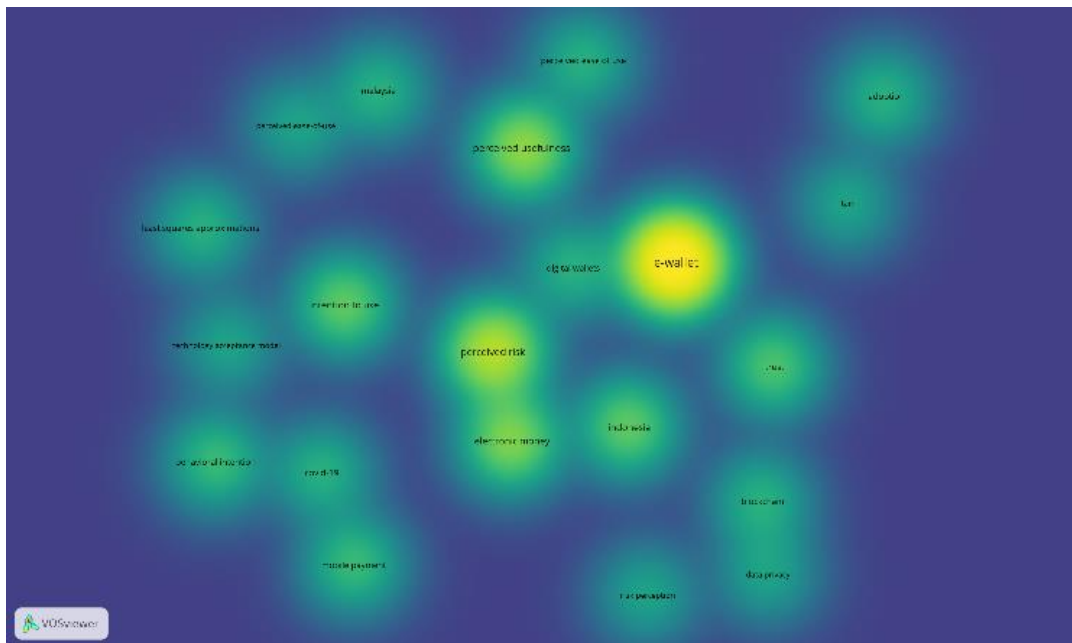


FIGURE 4. Density Visualization

Figure 4 illustrates the proximity of nodes and the density of co-occurring keywords, as shown by [32]. The frequency of phrases is represented by the yellow nodes, which reflect the level of saturation. The most often occurring keyword, "e-wallet," is shown by the yellow node, showing that this topic has gotten the highest amount

of investigation. The topics represented by the green nodes, such as "data privacy," "risk perception," "technology acceptance model," and "adoption," are distinct from one another. Nodes that are coloured green indicate that a certain issue has not been thoroughly investigated.

IV. CONCLUSION

An analysis was conducted on the available literature pertaining to e-wallets in order to gain insights into the prevailing research patterns. The current study focused on two main objectives. Firstly, it examined the patterns of publishing and citation in e-wallet research, as well as identified the key contributors in this field. Secondly, it analysed the fundamental themes that have emerged in the body of knowledge on e-wallet from its beginning until January 2024. An exhaustive bibliometric review of the literature on e-wallet indicates a consistent and continuous expansion in this area of research. The bibliometric analysis facilitated the study in addressing its research inquiries and deriving three significant main findings with associated consequences.

The number of publications in the field of e-wallet has been steadily increasing, particularly in the last two years. This suggests that there is still a lot of potential for research on mobile payments, and therefore, studying the usage and evolution of e-wallets would be a valuable area for new research projects. The article by [18] is the most frequently referenced publication in the field of mobile payment research (RQ1). Therefore, it is recommended that future research on e-wallets also make use of [18] as well as other highly cited publications on e-wallets identified in this study. This will help establish a solid basis and rationale for new endeavours aimed at advancing the existing knowledge. The research on e-wallets is still in its early stages, with just a few academics, such as Anggriawan R., Halim A., Hamsin MK, Ikhsan RB, and Meiyani (RQ2), contributing to the field. This presents an opportunity for new scholars to enter the field and establish themselves as specialists in e-wallets. Science mapping has identified four key themes in e-wallet research that future studies can use to build upon and position their own research. These themes are "data privacy," "risk perception," "technology acceptance model," and "adoption" (RQ4).

We acknowledge that no study is flawless, and our research also has its limitations. Although we took significant efforts to reduce issues, we still anticipate providing valuable recommendations for future studies on bibliometrics and the risk of e-wallets. We employed the widely utilized Scopus database, which is commonly employed in bibliometric research, to collect our bibliometric data [48]. While Scopus is comprehensive in terms of data sources, it does not encompass all research databases pertaining to the risk of e-wallets. Future researchers can utilize Web of Science and perform investigations with the data taken from the alternative database. Furthermore, the analysis only focused on the keywords "e-wallet" and "risk". In the rapidly developing sector of e-wallet, there is an ongoing evolution of new concepts and procedures that require careful study.

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