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Bibliometric analysis of scientific literature available on e-wallets

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Abstract

An e-wallet is a mobile application that enables users to execute financial transactions. Customers are increasingly using e-wallet apps instead of traditional payment methods. The objective of this research is to conduct a comprehensive bibliometric analysis of the literature related to e-wallets that have been published and are included in the Scopus database. The documents were retrieved from the Scopus database as of November 26, 2023. A total of 398 documents were analyzed using the Biblioshiny R Studio-based application. The outcome of the research reveals that “electronic money”, followed by “e-wallets” are the top repeated keywords, and Alamsyah D.P. is the most productive author. Further, the outcome reveals that Malaysia and Indonesia are the top collaborative countries in the research area of “e-wallets”.

Keywords: E-wallets, ICT, application, bibliometric, RStudio

1. Introduction

The exponential expansion of information and communication technologies (ICT) over the past few years has resulted in the emergence of numerous novel systems, apps, and web-based platforms. One example is the electronic wallet, sometimes referred to as an e-wallet. The payment system has drastically changed, moving from barter to electronic wallets. An e-wallet refers to a software program that utilizes electronic gadgets, like computers or smartphones, to facilitate electronic transactions (Uduji *et al.*, 2018) ^[17-19], and it allows users to store money, make transactions, and keep track of their transaction records. E-wallets are considered prepaid payment instruments since users are required to either link their wallets to their bank accounts or deposit money into their wallets before any financial transactions can be processed (Ilieva *et al.*, 2023) ^[8].

E-wallet, a mobile-based application, allows users to conduct monetary transactions (Qasim *et al.*, 2012) ^[13]. Customers are increasingly using e-wallet applications in place of conventional payment methods (Chelvarayan *et al.*, 2022) ^[3]. This technology facilitates individuals in obtaining goods that align with their own needs and preferences in a more efficient and user-friendly manner. Technology advancements have led to the development of numerous e-wallet platforms like Paytm, Google Pay, PhonePe, Amazon Pay, etc. The ease with which payments may be performed with a smartphone and the lack of restrictions due to the features provided by e-wallet systems have made them a suitable alternative for fast transactions (Teoh *et al.*, 2020) ^[16].

Before the pandemic, a large portion of online purchases were made using electronic payment methods, such as e-wallets. Electronic wallets saw a surge in popularity as a consequence of the COVID-19 pandemic when governments took precautions to avoid direct contact with their citizens (Ilieva *et al.*, 2023) ^[8]. After the COVID-19 outbreak, using electronic money became popular worldwide (Puasa *et al.*, 2021; Revathy & Balaji, 2020) ^[12, 14]. The concept of an e-wallet is currently being investigated and studied. A lot of research has been conducted on the satisfaction, perception, and adoption factors of e-wallet services. There is hardly any study that examines the existing literature on this topic. Therefore, the main aim of the investigation is to explore the existing literature available on “e-wallets” through the bibliometric analysis technique.

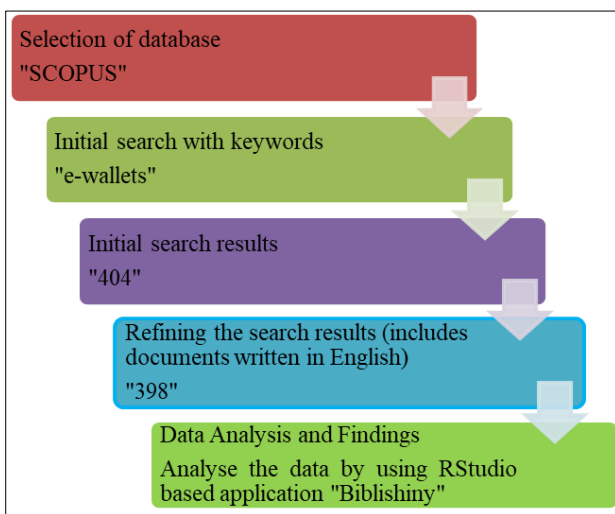
This study aims to achieve the following outcomes

1. Annual scientific production in the field of e-wallets research domain up to 2023
2. Most productive author in the field of e-wallet research domain.
3. Highly repeated keywords in the field of e-wallets research domain.
4. Worldwide collaboration in the field of the e-wallets research domain.
5. Highly-cited documents in the field of e-wallet research domain.

2. Research Methodology

The present study employed a bibliometric technique to examine the existing literature in the “e-wallets” research area. The objective of bibliographic analysis is to identify patterns and trends within existing scholarly publications. Bibliometric analysis can provide a comprehensive overview of the research and progress within a particular academic discipline. Additionally, it aids in ascertaining the most productive authors, institutions, and nations (Farrukh *et al.*, 2020b; Zupic and Cater, 2015) [6, 21]. The data was analyzed using RStudio and VOSviewer (Visualisation of Similarity). Using VOSviewer, we may see a crystal-clear graphic of the area, which simplifies things (Krugger *et al.*, 2020) [9]. The bibliographic data was analyzed using the "bibliometric" packages in "R" (Aria and Cuccurullo, 2017) [2]. The data used in this analysis derives from the Scopus repository as of November 26, 2023. When it comes to indexing databases and single abstracts, Scopus is legendary. The complete process of conducting the study is displayed in Figure 1.

The Scopus database is selected to extract relevant sources. The keyword “e-wallets” is used to retrieve the relevant documents. Initially, 404 documents were retrieved from the Scopus database, and out of them, 398 documents were used, which were written in English for analysis purposes. Analysis has been performed using the Bibliohiny application based on RStudio. The acquired data underwent analysis to identify various variables, including leading sources, top-cited documents, leading subject areas, leading countries, top repeated keywords, and authors. The data were analyzed quantitatively and reported in terms of frequency and percentage.

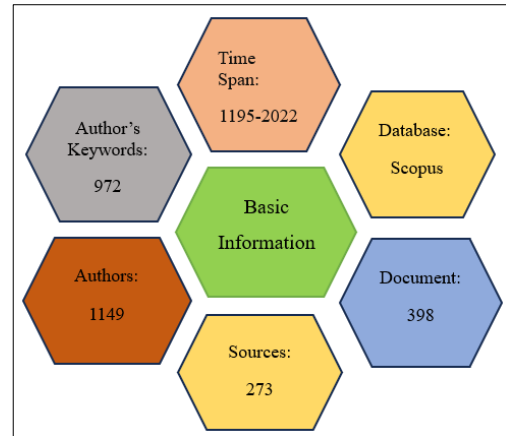


Source: Author’s compilation

Fig 1: Proceeding of the study

3. Data analysis

3.1 Key information

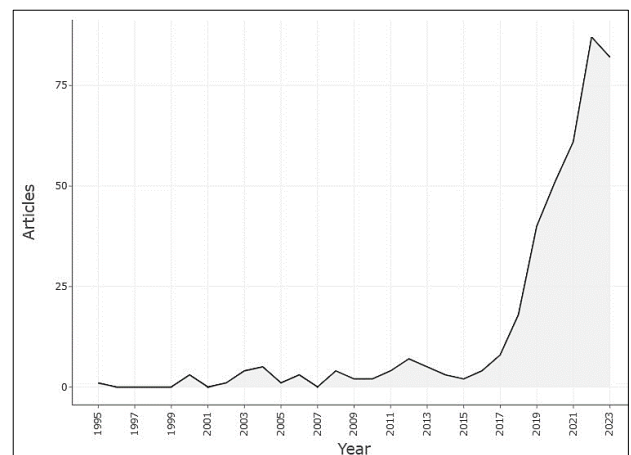


Source: Author’s compilation by using RStudio

Fig 2: Key information about the

Important details about the bibliometric study are provided in Figure 1, which demonstrates that data from the 28 years (1995-2023) was used to conclude. A total of 398 papers written in English were obtained from the Scopus database. The study encompasses the contributions of 1149 authors. The dataset has an extensive mix of keywords throughout its data. A total of 972 keywords are employed to categorize and characterize the assessed scholarly articles.

3.2 Annual scientific production



Source: Authors compilation by using RStudio

Fig 3: Annual scientific production

Figure 3 demonstrates the annual scientific production from 1995 to 2022. The first publication occurred in 1995, followed by a further document released five years later, in 2000. The growth of research in the field of e-wallets was slow until 2016. Since 2017, there has been an increase in research in this field. The graph's ending has a downward slope as we only consider documents that were published until November 26, 2023. The highest number of documents (87) were published in 2022.

3.3 Keyword analysis

The 33 keywords that are used most often are listed below.

Table 1: Highly repeated keywords

Keywords	Frequency	Keywords	Frequency
Electronic money	69	Payment systems	12
E-wallet	50	Sales	12
Electronic commerce	23	Smart cards	12
Indonesia	23	Behavioral intention	10
Surveys	19	Technology acceptance model	10
Intention to use	17	Consumer behavior	9
Mobile payment	17	Malaysia	9
Perceived usefulness	17	Service provider	9
Blockchain	14	Covid-19	8
Global system for mobile communications	14	Least squares approximations	8
Digital wallets	13	Mobile computing	8
Cryptography	12	Perceived ease-of-use	8

Sources: Authors compilation by using RStudio



Sources: Authors compilation by using RStudio

Fig 4: Highly repeated keywords

A brief yet thorough summary of the main ideas and concepts is given by the word cloud in Figure 4 and Table 1. Keywords listed in the table and figure present the highly repeated keywords. The size of the keywords indicates the repetition of the keywords. This analysis reveals the most relevant research keywords in the research domain of e-wallets. The size of the keywords indicates more repetitions of the keywords. ‘Electronic money’ is the most repeated keyword with 69 frequency, followed by ‘e-wallet’ with 50 repetitions. Electronic commerce, Indonesia, surveys, intention to use, mobile payment, perceived usefulness, etc. are also included in the 25 highly repeated keywords.

3.4 Top-cited documents

Table 2: Top 10 cited documents

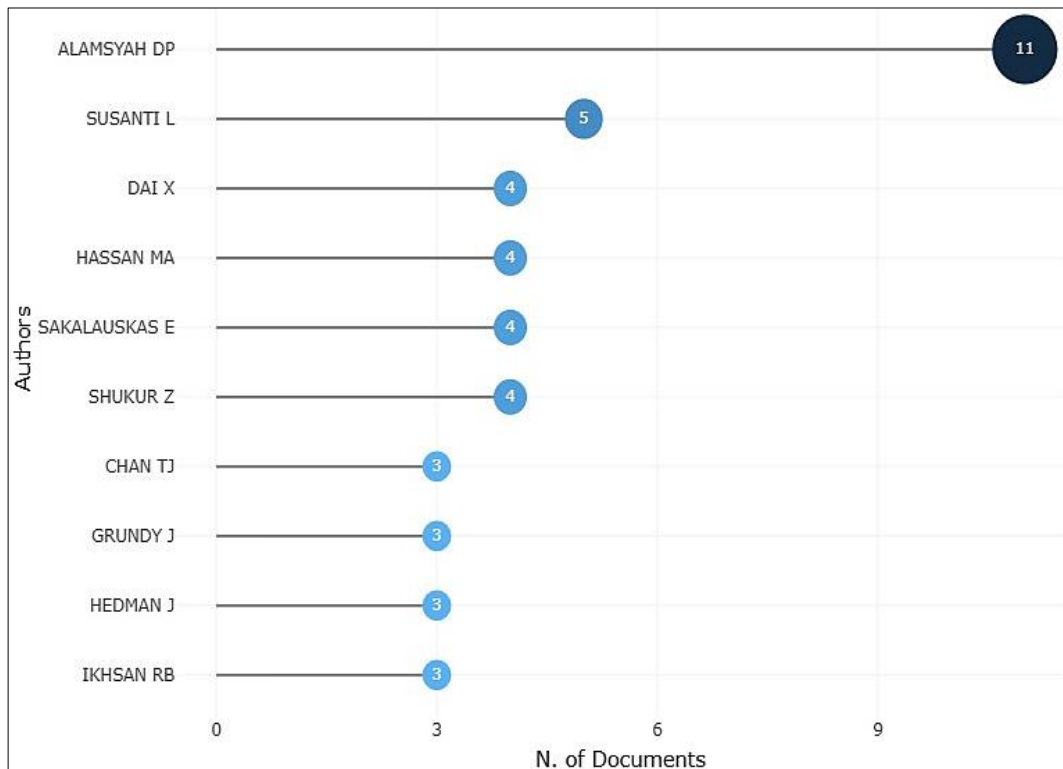
S. No.	Title	Authors	Publication	Total citations
1.	Contextual marketing--the real business of the Internet.	Davi D & Marshall, 2000 [5]	Harvard Business Review	135
2.	Semantic web technologies to reconcile privacy and context awareness	Gandon & Sadeh, 2004 [7]	Journal of Web Semantics	134
3.	COVID-19 and e-wallet usage intention: A multigroup analysis between Indonesia and Malaysia.	Aji <i>et al.</i> , 2020 [1]	Cogent Business & Management	103
4.	A Smart Parking System based on IoT protocols and emerging enabling technologies	Mainetti <i>et al.</i> , 2015 [11]	World Forum on Internet of Things (WF-IoT)	84
5.	Continuous Intention to Use E-Wallet in the Context of the COVID-19 Pandemic: Integrating the Health Belief Model (HBM) and Technology Continuous Theory (TCT)	Daragmeh <i>et al.</i> , 2021 [4]	Journal of Open Innovation: Technology, Market, and Complexity	81
6.	Software abstractions for trusted sensors	Liu <i>et al.</i> , 2012 [10]	International conference on Mobile systems, applications, and services	78
7.	Young rural women’s participation in the e-wallet programme and usage intensity of modern agricultural inputs in Nigeria	Uduji, & Okolo-Obasi, 2018 [17-19]	Gender, Technology and Development	77
8.	Adoption of improved crop varieties by involving farmers in the e-wallet program in Nigeria	Uduji, & Okolo-Obasi, 2018 [17-19]	Journal of Crop Improvement	71
9.	Virtual monotonic counters and count-limited objects using a TPM without a trusted OS	Sarmenta, <i>et al.</i> , 2006 [15]	In Proceedings of the first ACM workshop on Scalable trusted computing	71
10.	Cashless transactions: A study on intention and adoption of e-wallets	Young, <i>et al.</i> , 2021	Sustainability	65

Source: Author’s compilation using RStudio

Table 2 presents the seven top-cited documents in the research domain of e-wallets. “Contextual marketing-the real business of the Internet” (Davi & Marshall, 2000) [5], with 135 citations, is the top-cited document among all 398 documents. The second top-cited document is Semantic web technologies to reconcile privacy and context awareness

(Gandon & Sadeh, 2004) [7] with 134 citations, followed by “COVID-19 and e-wallet usage intention: A multigroup analysis between Indonesia and Malaysia (Aji *et al.*, 2020) [1] with 103 citations. Further, the table reveals that "Uduji and Okolo-Obasi” are the 2 authors whose documents come under the top 10 most cited documents.

3.5 Top productive authors



Source: Author’s compilation using by RStudio

Fig 5: Top productive authors

Figure 5 shows the top 10 productive authors in the research field of e-wallets. The top productive author is Alamsyah D.P. with 11 publications, followed by Susanti L., Dai X., Hassan M.A., Sakalauskas E., and Shukur Z., each of whom has 4 publications. Chan T.J., Grundy J., Hedman J., and Ikhsan R.B., with 3 publications each, also come under the 10 top-productive authors.

3.6 Top Productive Country Analysis

Table 3: Top productive countries with total citations

Rank	Country	Total publications	Total citations
1.	Indonesia	110	499
2.	Malaysia	81	631
3.	India	74	415
4.	United States	16	467
5.	Vietnam	14	85
6.	Nigeria	10	207
7.	China	9	33
8.	Saudi Arabia	7	10
9.	Canada	7	105
10.	Bahrain	7	10

Source: Author’s compilation by using VOSviewer

Table 3 presents the 10 top productive countries based on total publications along with total citations in the field of e-wallets. The analysis of the table reveals that Indonesia with 110 publications, Malaysia with 81 publications, and India

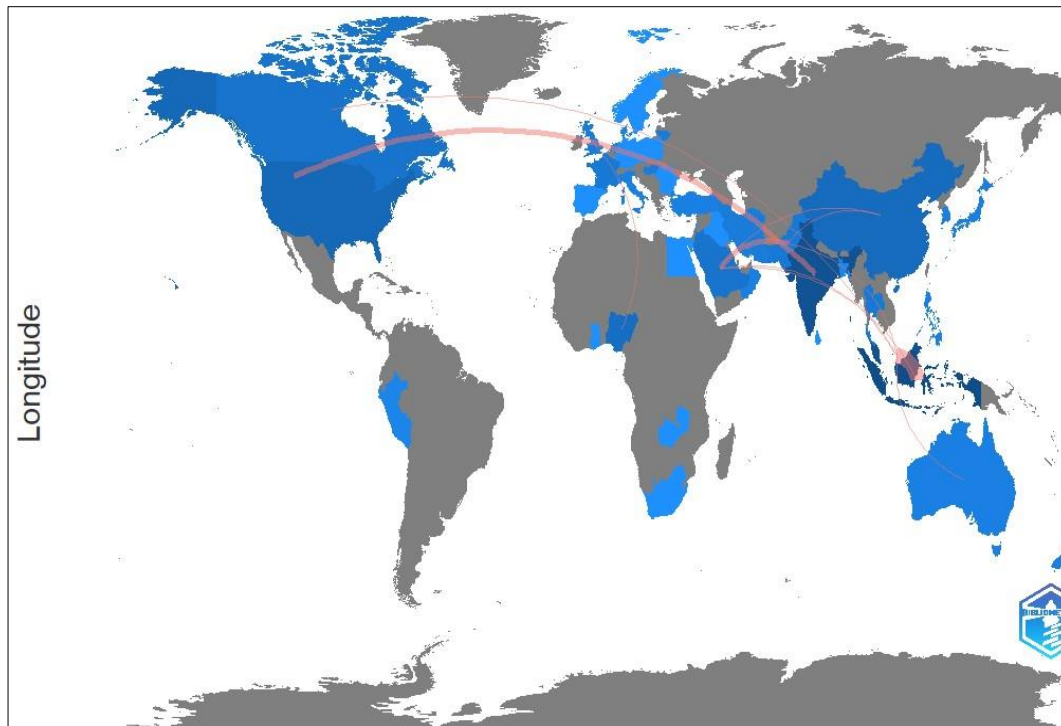
with 74 publications are the 3 top productive countries among all 206 countries. The United States, Vietnam, Nigeria, China, Saudi Arabia, Canada, and Bahrain also come under the 10 top productive countries. Further, it reveals that Malaysia, with 631, is the most cited country, followed by Indonesia with 499 citations. The comparison between total citations and total publications of the countries indicates that there is no relationship between publications and citations of the countries. A country with fewer publications gets more citations (Malaysia), and a country with more publications gets fewer citations (Indonesia).

3.7 World collaboration

Table 4: Top collaborative countries

S. No.	Name of top collaborative countries	Total publications
1.	Indonesia and Malaysia	13
2.	India and USA	3
3.	Pakistan and Saudi Arabia	3
4.	China and Pakistan	2
5.	China and Saudi Arabia	2
6.	Indonesia and Saudi Arabia	2
7.	Malaysia and Australia	2
8.	Malaysia and Canada	2
9.	Malaysia and Pakistan	2
10.	Malaysia and Saudi Arabia	2
	Nigeria and the United Kingdom	2

Source: Author’s compilation by using RStudio



Source: Author's compilation by using RStudio

Fig 6: Top collaborative countries

Table 3 and Figure 6 demonstrate the country-collaboration world map. The country collaboration world map reveals that the authors of the collaborative countries research together in any particular research domain. Table 5 demonstrates the top 11 collaborative countries that were researching in collaboration in the research domain of “e-wallets.” This analysis reveals that Indonesia and Malaysia, with 13 publications, are at the top of the list of collaborative countries, followed by India and the USA, and China and Pakistan, with 3 publications each.

4. Discussions and Implications

This study offers a comprehensive analysis of the existing literature on ‘e-wallets’. The findings indicate that the maximum number of articles (87) will be released in this field in 2022. The article titled "Contextual Marketing: The Real Business of the Internet" (David & Marshall, 2000) ^[5] has received the highest number of citations, with a total of 135, out of all 398 documents, and Alamsyah D.P., with 11 publications, is the most productive author among all 1149 authors. ‘Electronic money’ with 69 occurrences, followed by ‘e-wallet’ with 50 occurrences, are the top two occurring words. Further, the analysis revealed that Indonesia and Malaysia are the top collaborative countries with 13 publications.

The research is specifically focused on the area of ‘e-wallets’. The data includes valuable insights for potential academics, including annual research publications, significant authors, highly referenced documents, collaborative countries, and frequently used keywords. This knowledge will be helpful for researchers to facilitate their future research endeavours.

5. Limitations and Future recommendations

There are a few limitations to our investigation. The use of the Scopus database is one of our study's shortcomings. The aforementioned database is widely recognized as the most

comprehensive, but it only encompasses a proportion of all articles. The utilization of a single dataset may have resulted in the omission of potentially relevant studies.

To facilitate more accurate comparisons of findings, we recommend that future academics do similar investigations by utilizing metadata sourced from diverse and pertinent databases, including Web of Science and Google Scholar. The researcher does not examine certain aspects of bibliometric analysis like co-authors’ analysis, leading and influential sources analysis, funding institution analysis, etc. Therefore, researchers need to investigate these aspects in future research.

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