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Publication Analysis with Scientometric for Electronic Money

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Abstract
In recent years, online electronic transactions have become a new trend that is widely exposed. There has not been much research on e-money by providing the big picture that is visualized from year to year. This study aims to map research in the field of e-money with data from all international research publications. This study uses bibliometric methods and analyzes research data using the Analyze Search Results service from Scopus and the VOSviewer application. The data obtained in this study amounted to 269 academic documents published from 1990 to 2019 globally. The results show that the institutions and individual researchers at the global level who are the most productive in e-money publications are Xidian University and Okamoto, T. This study is to characterize the body of knowledge generated from the last 2 decades, about how the development of Electronic Money, Communication, Data, Systems, Computing, and Economics, abbreviated as ECDSCE.

Keywords: Electronic money, Communication, Data, System, Computing, Economy.

1. Introduction

The spread of information technology and the internet has an important function to build digital economic growth and national economic competitiveness in the world. Kar and B. Majhi, 2009 Innovation in business transactions is a new technology that greatly affects current business activities Stewart, (2013). The success of electronic commerce has created the need to develop electronic payment systems for payment for goods and services. Peláez et al, (2013). In recent years, online electronic transactions have become a very well-known new trend. Through this online electronic transaction, everyone can buy goods wherever and whenever they want [4]. Therefore, Electronic Money has emerged as an alternative to developing an electronic payment system that can improve transaction efficiency. Peláez et al, (2013).

Electronic Money or commonly called E-Money is a non-cash transaction tool that is used using the Surtikanti and RH Mustofa electronic system [2019]. E-money is the most important way in the e-payment business, which requires fast payments and preventive measures against cybercrimes such as information fraud, double spending, and money tampering Y. Liang, X. Zhang, and ZM Zheng [2016]. The birth of electronic money has become an important issue in e-commerce. This is a future currency revolution that will replace traditional cash and check approval instruments. Generally, electronic money is used with the concept of "carrying out the functions of money with electronic equipment". Electronic money that provides monetary value with electronic symbols reduces social costs and is portable and convenient. The creation of Electronic Money helps consumers to transact more easily. Electronic money also has advantages, including faster and more efficient payment transactions, more security, as well as encouraging better personalization of banking services. However, electronic money carries many risks such as not being able to directly check transactions like traditional transactions. Therefore, it is necessary to pay more attention to the development of safer security technology and the practicality of electronic money

In subsequent research related to Electronic Money, it is generally limited to one area by

Riskinanto, Kelana, and DR Hilmawan, "The Effect of Age Moderation on the Adoption of E-Payment Technology, so there are no publications on Electronic Money that show the big picture by visualizing it from year to year. with data from all countries. Also, there are no publications in the field of Electronic Money that specifically address the relationship between affiliates, authors, most citations, and the impact of their research. The growth in the number of academic documents related to the topic of Electronic Money that has been published and indexed by Scopus from 1990 to 2019 is 269 documents. Therefore, this study aims to measure the status of research maps in the field of Electronic Money which are published internationally.

2. Research methods

This study measures the publication status of the "E-Money" field map at the international level in the last 29 years. The research data was obtained from the Scopus database using a document search service in April 2020, this study used a bibliometric approach. Analysis and visualization of data using the search results analysis feature on the Scopus service and the VOSViewer application [15]. VOSviewer tool is used to visualize and build a bibliometric network, network visualization can be researcher, country, academic affiliation, growth in number of studies, keywords, author collaboration and most cited research [16]. The survey identified keywords related to e-money to search and identify related articles from international researchers globally in the Scopus database, and obtained 269 academic documents published from 1990 to 2019. The study limits data collection to 2019 regardless of 2020 (not including 2020) so that the annual data obtained describe the condition of the study in one full year from January to December. This study performs a type of co-occurrence analysis with a keyword analysis unit and a full counting method using VOSViewer to obtain a keyword network.

3. Results and Discussion

This section will describe the increase in data yield by affiliation, country, subject field, field type, documents per year from source, documents per year from fields and documents cited, co-occurrence and author networks in the e-money field.

Figure 1 shows a list of research institutions in e-money publications. First Xidian University with 9 documents, then followed by the Chinese Ministry of Education with 4 documents, Feng Chia University with 4 documents, University of Washington, Seattle with 4 documents, Indonesian Computer University with 4 documents, Chinese University of Hong Kong with 4 documents. 3 documents. documents, Technische Universität Darmstadt with 3 documents, Beihang University with 3 documents, Beijing Post and Telecommunication University with 3 documents, and Brunel University London with 3 documents.

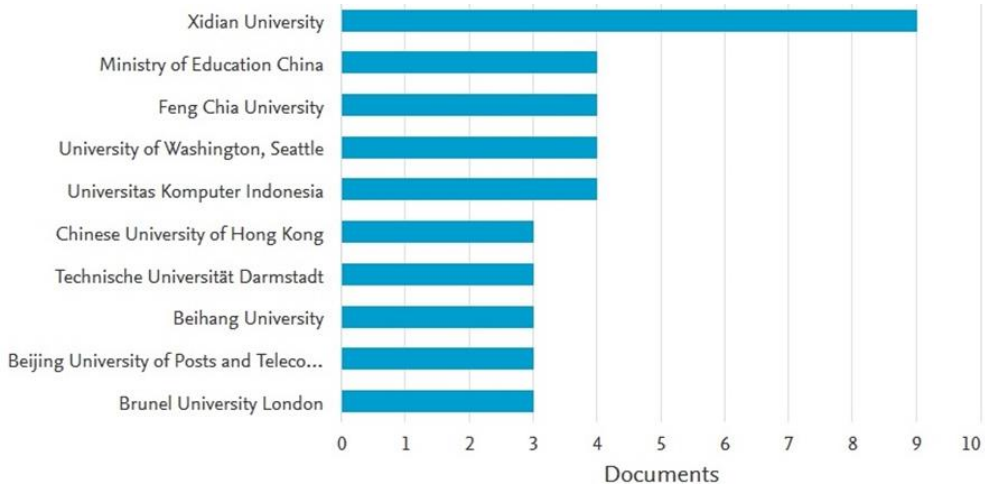

Fig. 1: Document Number by College Affiliation from E-Money Study.

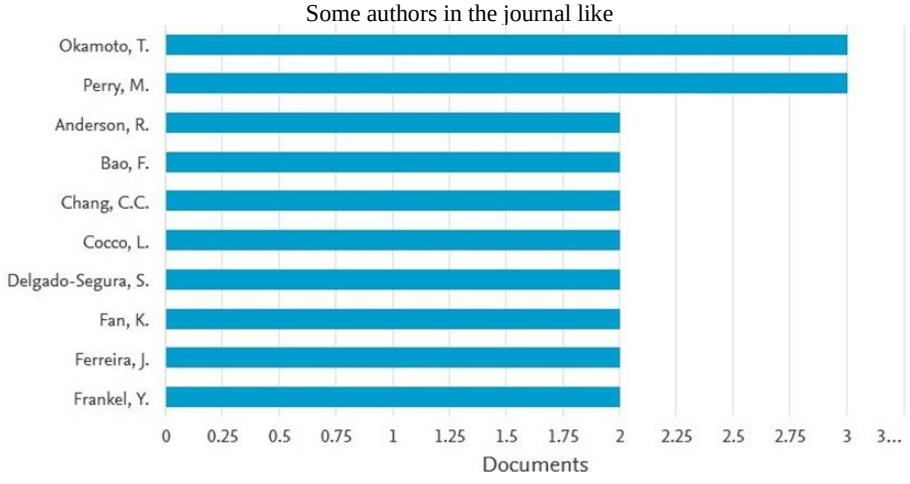

Fig. 2: Document Number by Author from E-Money Studies.

Figure 2 shows the authors who have the largest contribution to publishing in the e-money field. The authors with the most publications in the electronic money sector were Okamoto, T. with 3 documents, followed by Perry, M. with 3 documents, Anderson, R. with 2 documents, Bao, F. with 2 documents, Chang, CC with 2 documents, Cocco, L. with 2 documents, Delgado-Segura, S. with 2 documents, Fan, K. with 2 documents, Ferreira, J. with 2 documents, and Frankel, Y. with 2 documents

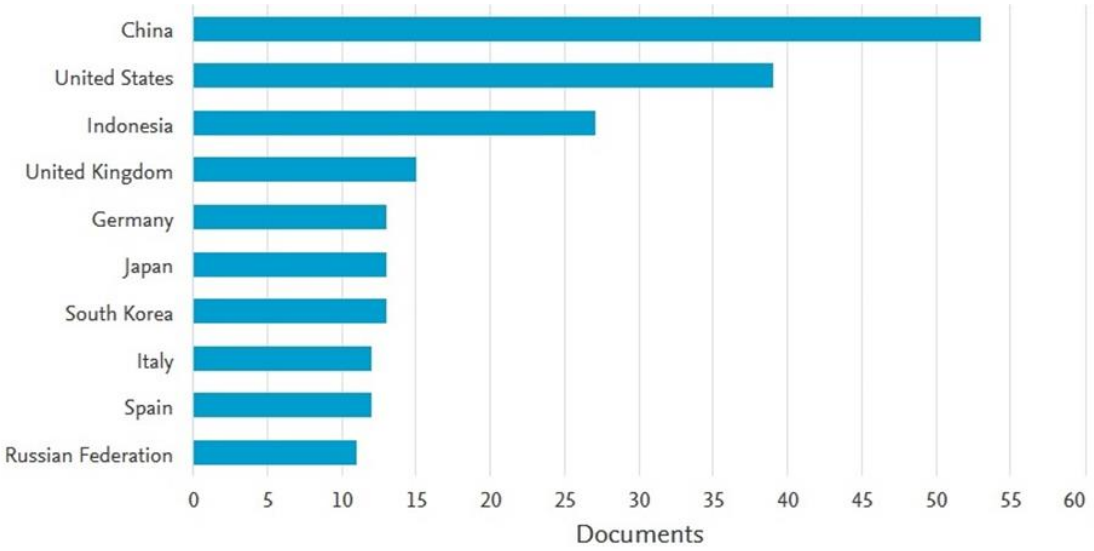

Fig. 3: Number of Documents by Country from the E-Money Study.

Figure 3 shows that the country with the largest publication contribution in the e-money sector is China with 53 documents, followed by the United States with 39 documents, Indonesia with 27 documents, the UK with 15 documents, Germany with 13 documents, Japan with 13 documents, South Korea with 13 documents, Italy with 12 documents, Spain with 12 documents, and the Russian Federation with 11 documents

3.4 Documents by Subject Area of the E-Money Study

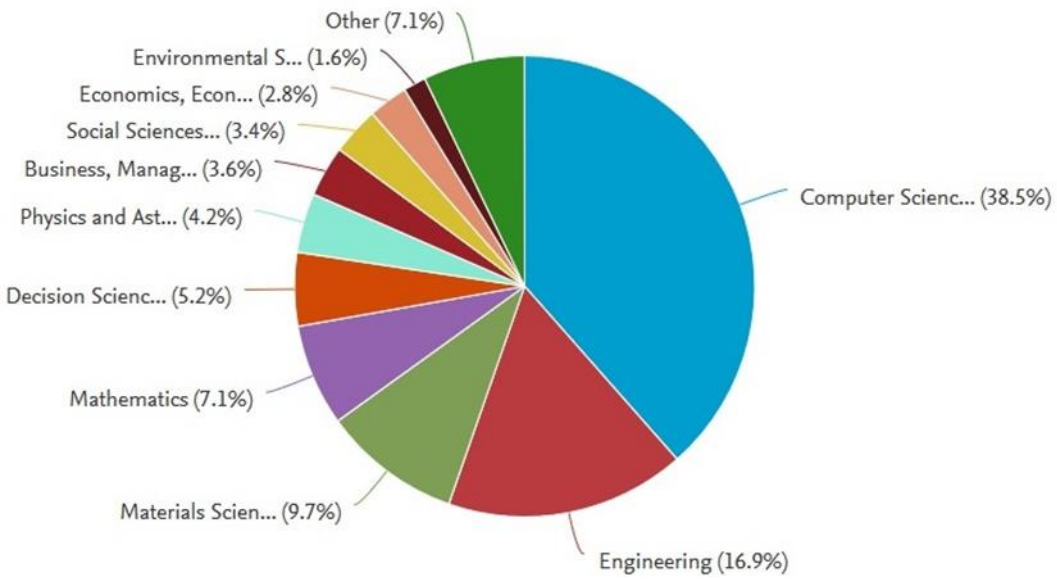

Fig. 4: Number of Documents by Subject Area of the E-Money Study.

The most intensive field of study in e-money publication is Computer Science (38.5%) with 194 documents; followed by Engineering (16.9%) with 85 documents; Materials Science (9.7%) with 49 documents, Mathematics (7.1%) with 36 documents, Decision Science (5.2%) with 26 documents; Physics and Astronomy (4.2%) with 21 documents; Business, Management and Accounting (3.6%) with 18 documents; IPS (3.4%) with 17 documents; Economics, Econometrics and Finance (2.8%) with 14 documents; and Environmental Science (1.6%) with 8 documents.

3.5 Frequently Typed Documents Documents from the E-Money Study

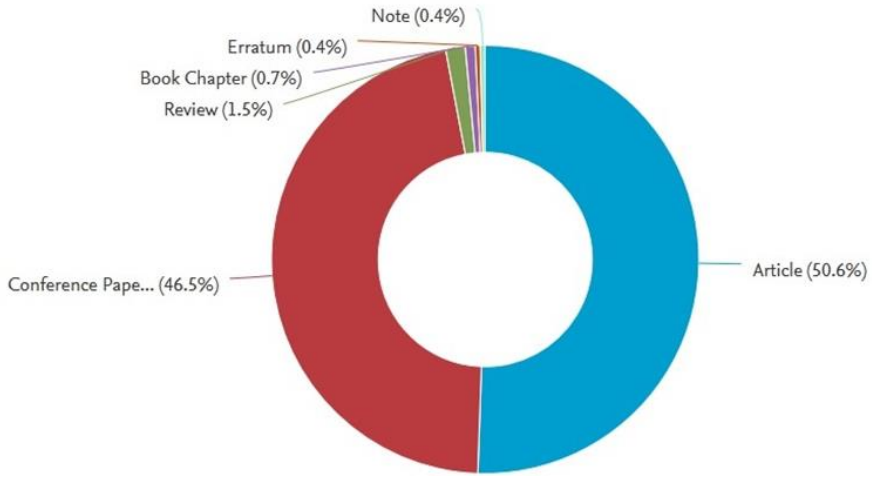

Fig. 5: Number of Documents by Subject Area of the E-Money Study.

The most common types of documents in e-money publications are Articles (50.6%) with 136 documents, followed by Conference Papers (46.5%) with 125 documents, Reviews (1.5%) with 4 documents, Book Chapters (0, 7%) with 2 documents, Erratum (0.4%) with 1 document, and Notes (0.4%) with 1 document.

3.6 Documents per year based on sources from E-Money Studies

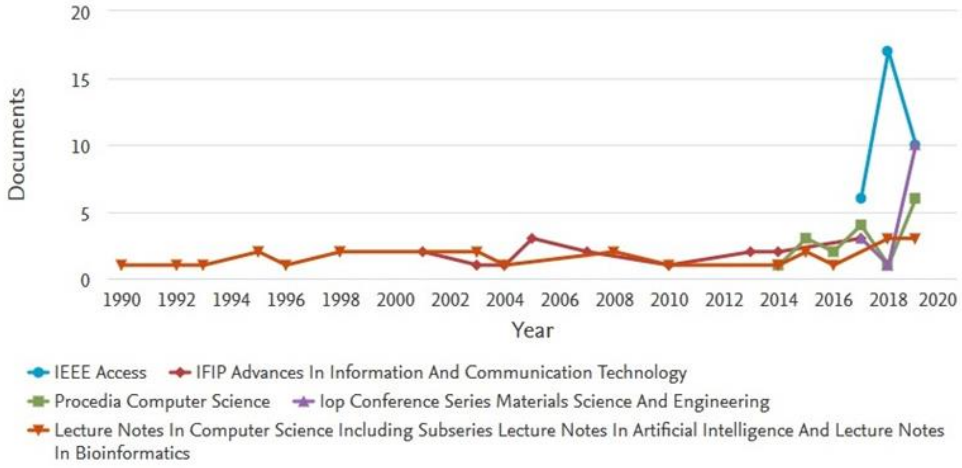

Fig. 6: Number of Documents Per Year Based on Sources from the E-Money Study.

The number of documents per year based on sources in international publications in the field of e-money is IEEE Access with 33 documents, followed by Lecture Notes In Computer Science including Subseries Lecture Notes In Artificial Intelligence and Lecture Notes In Bioinformatics with 24 documents, IFIP Advances in Information Technology and Communication with 17 documents, Procedia Computer Science with 17 documents, and IOP Conference Series Material Science And Engineering with 14 documents.

3.7 Annual documents of E-Money Studies

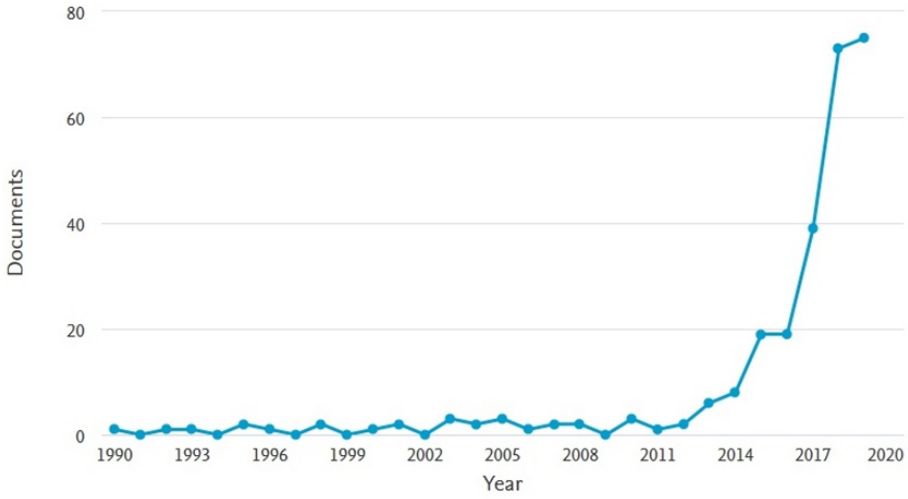

Fig.7: Number of Documents per Year from the E-Money Study.

In general, the number of publications of academic documents about e-money has increased every year. This can be seen in Figure 8, the highest publication peak in 2019 with 75 documents. Research on electronic money has been started since 1961. The number of international publications on electronic money shows an increasing trend every year. This can be seen in Figure 8, the peak of the highest publication in 2019, and it is also possible that in 2020 there will be an increase in research on e-money. The number of documents per year in e-money publications, namely in 2019 as many as 75 documents, in 2018 as many as 73 documents, in 2017 as many as 39 documents, in 2016 as many as 19 documents, in 2015 as many as 19 documents and in 2014 as many as 8 documents.

3.8 Documents quoted from E-Money Studies

The most cited international publication in the field of E-Money as a form of academic impact is the work of Androulaki, E., Barger, A., Bortnikov, V., (…), Cocco, SW, Yellick, J. cited in 2018 entitled Hyperledger Fabric: A Distributed Operating System For Permissioned Blockchains, citing 390 documents [17] .

3.9 Study Theme Map

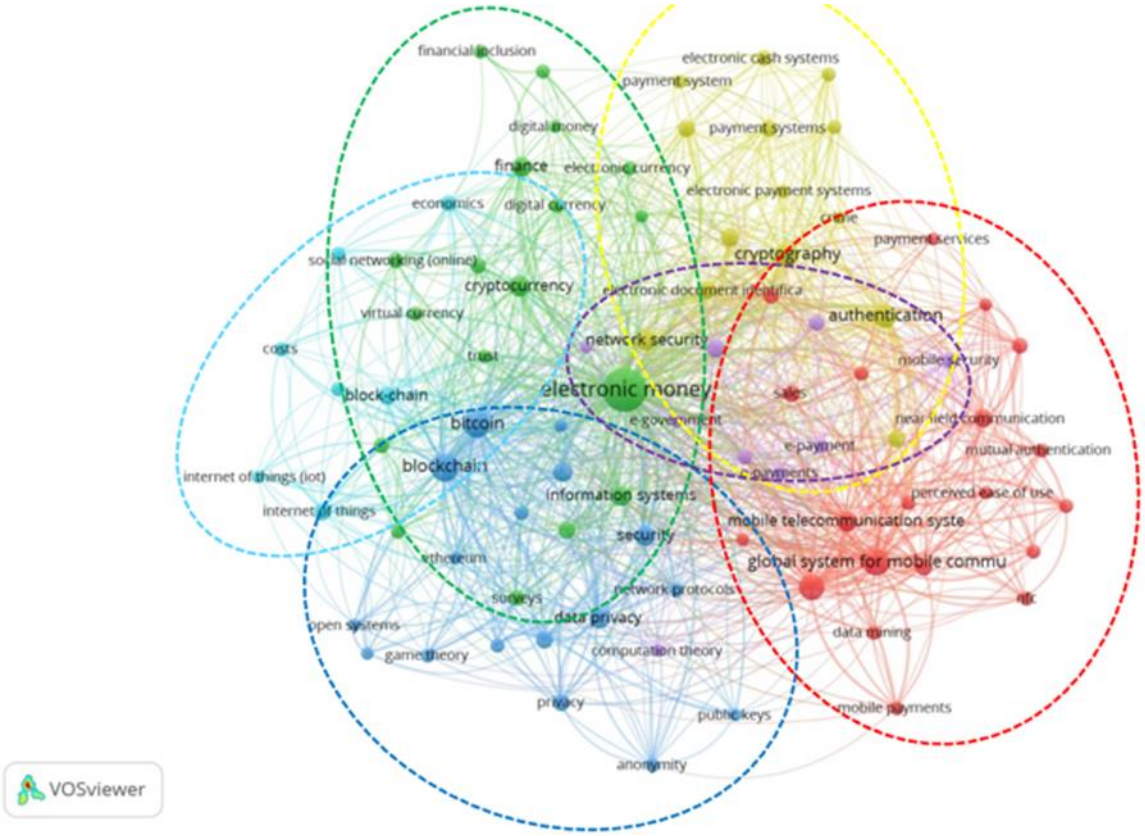

Fig. 8: Study Theme Map.

This study theme map is a method or strategy to present information in the form of concepts that are interconnected in a chain so that in the search for keywords e-money for the study theme map is built with the VOSViewer application. The criterion for the minimum number of documents related to a keyword is five repetitions. So, out of 1,967 keywords there are only 85 keywords that meet the threshold. From Figure 8. There are six groups of study themes based on research keywords related to e-money studies as follows:

1. Electronic Money Cluster (Green). This cluster is dominated by the keywords electronic money, electronic currency, virtual currency, digital currency, social network (online), and cryptocurrency. Most of these keywords relate to the theme of electronic money.
2. Communication cluster (Red). In this cluster we can find communication themes. This cluster is related to the mobile telecommunications system, the global system for mobile communication, mutual authentication, and short distance communication.
3. Cluster data (blue). In this cluster, we can find data themes. This cluster is associated with the keywords data privacy, privacy, open system, public key, and income system.
4. System cluster (Yellow). This cluster is dominated by the keywords payment system, electronic money system, electronic payment system, and network security.
5. Cluster computing (Purple). In this cluster we can find computing themes. This cluster is associated with keyword computing theory, e-payment, e-government, and mobile security.
6. Economic Cluster (Light Blue). In this cluster we can find economic themes. This cluster is associated with the keyword's economy, cost, and blockchain.

4. Conclusion

The results of this study indicate that there is a map and trend of increasing the number of international research in the field of "E-Money". The affiliated institution that has the largest contribution in the e-money field is Xidian

University with 9 documents. While the individual author with the most publications is Okamoto, T. with 3 documents. The country that has the largest contribution to publishing in the e-money sector is China with 53 documents. The field of study and the largest publication source in the e-money sector is Computer Science (38.5%) with 194 documents. The most widely issued type of document in the e-money sector is Article (50.6%) with 136 documents. The highest number of documents based on international publication sources in the e-money field is IEEE Access with 33 documents. The peak of the highest e-money publication occurred in 2019 with 75 documents. The most cited international publication in the field of e-money is the work of Androulaki, E., Barger, A., Bortnikov, V., (…), Cocco, SW, Yellick, J. The most cited amount was in 2018 entitled Hyperledger Fabric: A Distributed Operating System For Permissioned Blockchains, citing 390 documents. There are 2 patterns of international collaborative research groups in the field of e-money globally.

5. Contribution

As a practical implication, identifying the key themes in the e-money field leads to an understanding of the development of studies to understand general topics and contexts, as well as research gaps. With all this, new studies can be directed to address the lack of studies and advance knowledge in the field. The most researched theme also shows the contribution of research in the field of e-money to financial information and technology.

The researcher expects future researchers to analyze the contribution and explain the impact of e-money by measuring citations based on a combination of data obtained from Scopus & Web of Science.

Confession

We would like to thank our friends, teachers, parents, family, and Indonesia especially STIE Mahardhika Surabaya.

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