

Bibliometric Analysis on the Concept of Managing and Integrating ERP (Enterprise Resource Planning) in the MSMEs (Macro, Small and Medium Enterprises) Sector

Muhammad Bahit*, Monika Handayani
 Computerized Accounting Study Program
 Politeknik Negeri Banjarmasin
 Banjarmasin, Indonesia

*bahit@poliban.ac.id, Monika.handayani@poliban.ac.id

Rudy Haryanto
 Business Administration Study Program
 Politeknik Negeri Banjarmasin
 Banjarmasin, Indonesia
 roedy96@poliban.ac.id

Abstract—This study presents a Bibliometric Analysis study on the concept of ERP (Enterprise Resource Planning) management and integration in the MSMEs (Macro, Small and Medium Enterprises) sector and aims to analyze how ERP implementation in managing transactions and business planning is integrated in real time, in order to produce marketing strategies that have an impact on increasing business results MSMEs. ERP is a computer-based system that is designed to process transaction management and business planning that is managed because it has many advantages such as information access, efficiency and automation of system control. Thirty-two papers were published in journal Q1-Q2 from 2015 to 2020 and classified based on the analyzed topics, namely ERP management and integration at MSMEs. The results of the analysis indicate the need for strategies that can be developed to help MSMEs in managing their business and financial reports by using an ERP system that is simple and easy to understand.

Keywords—*bibliometric analysis, ERP (Enterprise Resource Planning) and MSMEs (Macro, Small and Medium Enterprises)*

I. INTRODUCTION

The increasing need for operational efficiency & transparency in business processes as well as adequate data support (Business Intelligence) to make marketing strategy decisions are the main factors driving the growth of the Enterprise Resource Planning (ERP) software market globally. According to a report published by Allied Market Research on the use of ERP software globally in 2019 valued at \$ 35.81 billion and in 2016 it is projected to reach \$ 78.40 billion with a Compound Annual Growth Rate (CAGR) 10, 2% from 2019 to 2026 [1].

Among small and medium enterprise the use of ERP software technology can provide profitable opportunities for market growth [1]. This can be seen from the number of ERP adopted by SMEs to meet business needs [2]. By implementing

ERP, MSME players can integrate and optimize business processes and transactions in managed MSMEs [3]. And it can be increase customer response time and operational efficiency in the work process [4].

The importance of implementing ERP technology for MSEs is a great concern to a number of researchers and practitioners to be able to contribute to providing solutions for information system needs to increase market growth. Research conducted by Ruivo et al. [5] with survey data came from 883 SMEs in Europe to analyze individual productivity, management control, and customer satisfaction. The results of this study indicate that the use of ERP is an important factor in increasing productivity, management control, and customer satisfaction. In addition, project management and organizational culture are also important factors in an SME [6].

Although previous research has shown that ERP can increase productivity, management control, and customer satisfaction. However, the study literature on the importance of The Concept of Managing and Integrating ERP (Enterprise Resource Planning) in The MSMEs (Macro, Small and Medium Enterprises) Sector is still limited, both published in journals and proceedings.

Previous research has analyzed two hundred papers on ERP systems between 1998 and 2006 based on journal studies and conference papers [7]. This study classifies based on the topic and main results as well as a discussion of the research methods used. However, this study does not discuss ERP for MSMEs and the articles analyzed come from journals and proceedings

Therefore. This study aims to analyze the ERP bibliography of MSMEs from 2015-2020 by collecting articles from reputable journals Q1 to Q4 based on the rankings of the scimago website journals to answer the following questions.

1. How are ERP articles classified?
2. What is the trend of ERP research in The MSMEs?
3. What are future ERP as SMES topics that provide opportunities for further research?

II. METHODOLOGY

In this article, the bibliometric analysis method is based on the analytical method introduced by Fahimnia et al [8]. These five steps include defining search keywords, namely 'Enterprise resource planning (ERP) as SMEs', initial search results, refining search results, compiling initial data statistics, and data analysis which will be explained in detail in the following subsections:

2.1. Defining Search Keywords

A literature search was carried out in August 2020, using Publish or Perish (PoP) software with the keyword 'Enterprise resource planning (ERP) as SMEs'. All articles analyzed come from the Crossref database with a time span of 2015 to August 2020. The search establishes the provisions for articles analyzed to come from journals. So that articles from ebooks, proceedings, newspapers and magazines are not analyzed.

2.2. Initial Search Results

Initial search with Publish or Perish (PoP) software with the keyword 'Enterprise resource planning (ERP) as SMEs' as many as 116 articles from journals. Then, 103 articles published in English were selected. Apart from articles that are not published in English, we are also eliminate articles that are not relevant to keywords, which are not identified / Unidentified and as many as 41 articles, so the remaining journals are 62 articles. Table 1 shows a comparison of the metric data from the initial search.

TABLE I. DETAILED INITIAL SEARCH SCREENING CRITERIA

Initial Search Screening	Number of articles
No Relevant ERP as SMEs	35
Not In English (Indonesia, Arabic dan Portugis)	13
Unidentified/citation link only/rejected website	3
Double	3
Initial search screening criteria	62
Total	116

2.3. Refinement of The Search Results

Of the 116 initial search results, only 62 articles came from journals that met the criteria, then the articles were selected again based on the journal ranking using the Scimagojr website. Only articles published in journals Q1 to Q4 will be analyzed using VOSviewer. Of the 62 articles, only 32 articles were ranked Q1 to Q4 and the remaining 30 articles were excluded because they did not meet the requirements. Table 2 shows the results of the refinement of the search screening criteria

TABLE II. DETAILED REFINEMENT OF THE SEARCH SCREENING CRITERIA

Refinement of the Search Screening	Number of articles
Q1-Q4/None from Scimago list	30
Q1-Q4	32
Total	62

Then from 32 articles Q1 to Q4, title, abstract and author were checked to be compared with the initial search articles, namely 116 articles and the initial search screening criteria for 62 articles using PoP software. Table 3 shows the comparison of metric data from initial search and final refinement

TABLE III. COMPARISON METRICS

Source	Defining search keywords	Initial search results	Refinement of the search results
Papers	116	62	32
Citations	156	139	103
Cites/Year	31.2	27.80	19.60
Cites/Paper	1.34	2.11	3.06
Author/Paper	2.16	2.32	2.63
h-index	5	5	4
g-index	10	10	9
hI-norm	4	4	4
hI-annual	0.80	0.80	0.80

2.4. Compiling the Initial Data Statistics

Searches that are generated after the fix is downloaded are saved in the Mendeley software. All important information related to the paper, including title, author's name, abstract, keywords and journal specifications (journal publication, year of publication, volume, issue, and pages) is exported to RIS format for analysis so that articles can be classified by year (Figure 1 Year over year publication trend), ranking of journals (Figure 2. Total of Journals rankings which articles at analysis), country of origin of publication (Table 4. Country in which articles at analysis) and source of publication (Table 5. Journals publication sources).

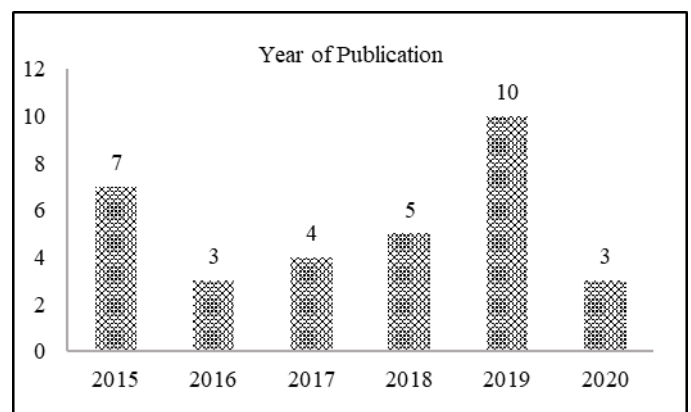


Fig. 1. Publication trends from year to year.

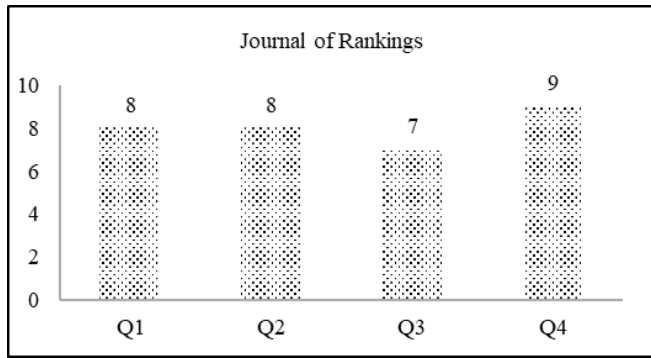


Fig. 2. Total of Journals rankings which articles at analysis.

TABLE IV. COUNTRY IN WHICH ARTICLES AT ANALYSIS

Country	Number of articles
China	1
Germany	1
Greece	1
India	5
Indonesia	1
Netherlands	2
Ukraine	1
United Kingdom	10
United States	10
Total	32

TABLE V. JOURNALS PUBLICATION SOURCES

Publisher	Number of articles
American Accounting Association	1
American Scientific Publishers	1
Blue Eyes Intelligence Engineering and Sciences Publication	1
Business Perspectives	1
Elsevier	3
Engg Journals Publications	1
IGI Publishing	4
Inderscience Enterprises Ltd	3
Institute of Advanced Engineering and Science (IAES)	1
Institute of Medico-Legal Publications	1
International Research Publication House	1
International Strategic Management Association	1
IOP Publishing Ltd.	1
John Wiley and Sons Ltd	1
Kassel University Press	1
Oriental Scientific Publishing Company	1
Science and Information Organization	2
Science Press	1
Taylor and Francis Ltd.	5
Wiley-Blackwell Publishing Ltd	1
Total	32

2.5. Data Analysis

This paper presents a bibliometric analysis for the term 'ERP' from the CrossRef database. The bibliometric review in this paper uses PoP software version 7.25.2877.7516 developed by Tarma Research Software Pty Ltd-Melbourne [9]. Pop software was launched in August 2020 with 116 papers with Cites / Paper 1.34. The purification of the results left 62 papers with Cites / Paper 2.11. Furthermore, the analyzed articles published in reputable journals with a ranking of Q1 to Q4 are 32 articles with Cites / Paper 3.06

III. RESULTS AND DISCUSSION

VOSviewer analysis was conducted based on title and abstract. The relationships with terms in the user of VOSviewer

was set to 10 terms and of the 950 terms and number of terms to be selected 15. after being analyzed using VOSviewer. there 3 clusters (red, blue and green), which showed the relationship between one topic and onether (Figure 3. Visualization topic area using VOSviewer using network visualization). The keyword frequency that most often appears in the red calaster is 'ERP' (68 events), followed by the words 'study' (54 events), 'interprise resource planning' (48 events), 'system' (40 events). Meanwhile, the frequency of keywords that most often appeared in the green calendar were 'ERP system' (35 events), 'implementation and factor' (32 events), and 'SMEs (21 events)'. Meanwhile, the keyword frequency that most often appears in the blue calaster is 'performance' (32 events), 'impact' (18 events), and 'research' (14 events).

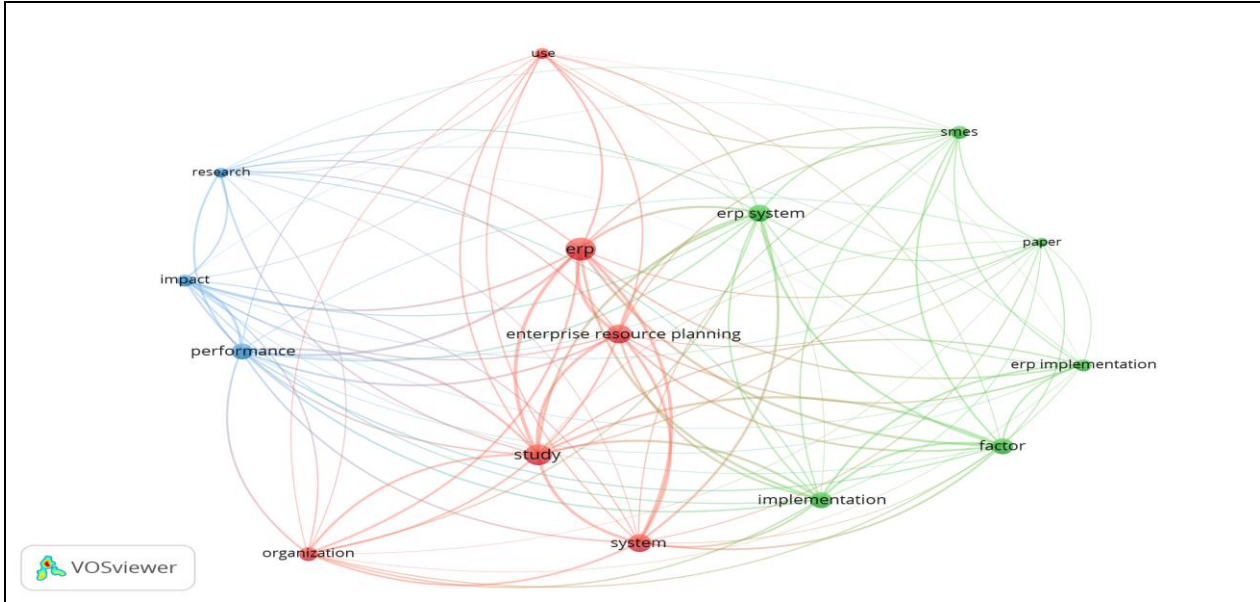


Fig. 3. Visualization topic area using VOSviewer using network visualization.

After taking into account the frequency of keywords that often appear. This study also mapped the year for each keyword frequency (Figure 4. Visualization topic area using VOSviewer using overlay visualization). From the figure, it

can be seen that the keyword frequency words that often appear and have a correlation with other studies occurred in 2017 to 2018.

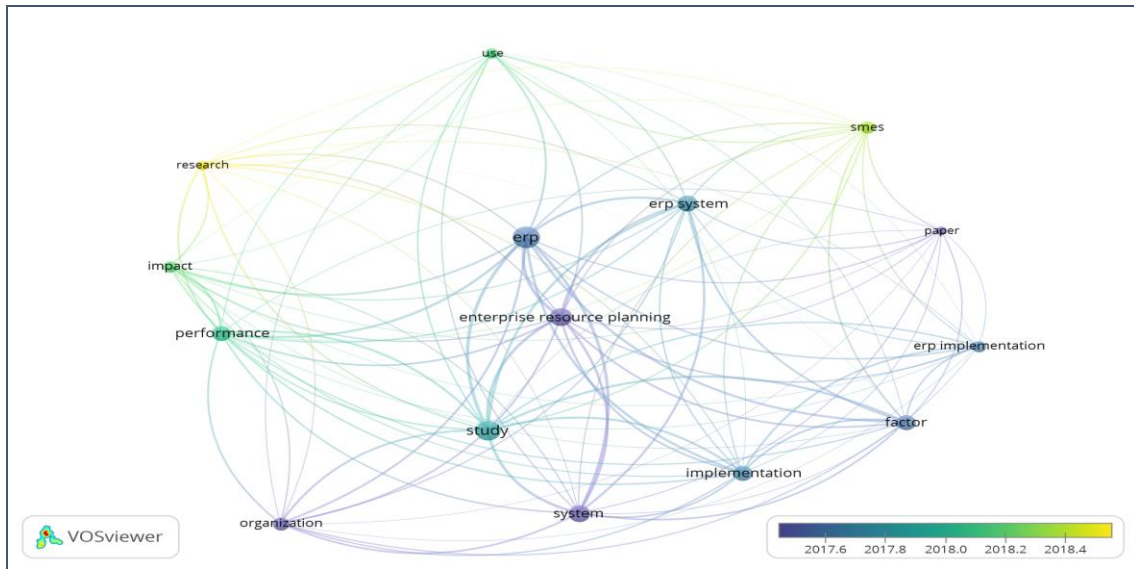


Fig. 4. Visualization topic area using VOSviewer using overlay visualization.

In addition to analyzing keyword frequency and year frequency of keywords, this study also analyzes the frequency of research based on keywords between 2015 and 2020 (Figure 5). Visualization of topic area using VOSviewer using density visualization). From the figure, it can be seen that the yellow color is thick, this shows that 32 articles from Q1 and Q2 have researched a lot about 'ERP', 'ERP system', 'study' and 'implementation'.

On the other hand, the Concept of Managing and Integrating ERP (Enterprise Resource Planning) in The MSMEs (Macro, Small and Medium Enterprises) Sector is still very limited. This can be seen from the visual color of SMEs which do not have a bright yellow color. Therefore, further research is needed on how the implementation of the Concept of Managing and Integrating ERP (Enterprise Resource Planning) in The MSMEs (Macro, Small and Medium

Enterprises) Sector, because according to Allied Market Research the use of ERP software in 2016 is projected to achieve \$ 78.40 billion at a Compound Annual Growth Rate

(CAGR) of 10.2% from 2019 to 2026 [1]. So that it becomes a great opportunity for researchers to develop ERP software for SMEs.

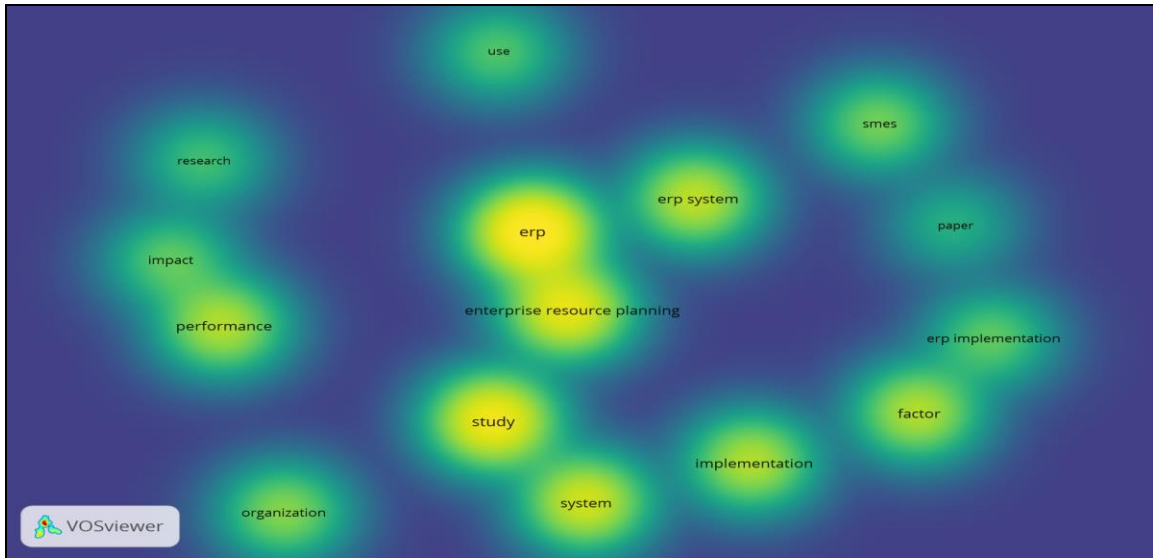


Fig. 5. Visualization topic area using VOSviewer using density visualization.

IV. CONCLUSIONS

This study analyzed 32 articles published in Q1 to Q2 based on the Scimago website with the theme 'Enterprise resource planning (ERP) as SMEs'. Meanwhile, an increase in the number of ERP research occurred in 2019. Meanwhile, in 2020 it has decreased. A decline in 2020 has become a natural thing. Because the analysis in 2020 only reached the month of August. While the research topics that are mostly done are still limited to ERP, ERP systems so that it is a great opportunity in the future to conduct research on ERP as SMEs.

REFERENCES

[1] R. Rake, "ERP Software Market by Component, Deployment Model, Business Function, Industry Vertical, and End User: Opportunity Analysis and Industry Forecast, 2019-2026," Allied Market Research, 2020.

[2] Y. Khaleel, A. Abuhamdah, M.A. Sara, and B. Al-Tamimi, "Components and analysis method of enterprise resource planning requirements in small and medium enterprises," *Int. J. Electr. Comput. Eng.*, vol. 6, no. 2, pp. 682–689, 2016.

[3] M.Y. Khan, M.K. Sabeel Rahman, V. Vishwa Mithra, and S. Sai Nikarika, "Enterprise Resource Planning (ERP) in security and planning system," *Biosci. Biotechnol. Res. Asia*, vol. 12, no. 2, pp. 391–393, 2015.

[4] J. Der Leu and L.J.H. Lee, "Enterprise resource planning (ERP) implementation using the value engineering methodology and Six Sigma tools," *Enterp. Inf. Syst.*, vol. 11, no. 8, pp. 1243–1261, 2017.

[5] P. Ruivo, T. Oliveira, and M. Neto, "Using resource-based view theory to assess the value of ERP commercial-packages in SMEs," *Comput. Ind.*, vol. 73, pp. 105–116, 2015.

[6] U. Jayawickrama, S. Liu, M. Hudson Smith, P. Akhtar, and M. Al Bashir, "Knowledge retention in ERP implementations: the context of UK SMEs," *Prod. Plan. Control*, vol. 30, no. 10–12, pp. 1032–1047, 2019.

[7] Y. Xu, N. Rahmati, and V.C.S. Lee, "A review of literature on Enterprise Resource Planning systems," 2008 *Int. Conf. Serv. Syst. Serv. Manag.*, pp. 1–6, Jun. 2008.

[8] B. Fahimnia, J. Sarkis, and H. Davarzani, "Green supply chain management: A review and bibliometric analysis," *Int. J. Prod. Econ.*, vol. 162, pp. 101–114, Apr. 2015.

[9] S.J. Benschman, "Anne-Wil Harzing: The publish or perish book: Your guide to effective and responsible citation analysis," *Scientometrics*, vol. 88, no. 1, pp. 339–342, Jul. 2011.