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Enterprise Resource Planning Systems: A Systematic Literature Review

Tran Thi Thu Ha
University of Labour and Social Affairs, Hanoi, Vietnam

Corresponding Author: **Tran Thi Thu Ha**

Abstract
An enterprise resource planning system is a business software package that allows organizations to integrate business functions such as customer care management, finance, manufacturing, logistics, administrative reporting, and management project, human resources, purchasing management; share data, provide communication information throughout the enterprise; automate business processes; and create and enable access to real-time information in a database. This article aims to evaluate research trends on resource planning systems in enterprises based on documents in the Google Scholar database in the years 2010–2023. The results show a growing interest in research on evaluating enterprise resource planning systems, with the highest number of articles in 2013 (65 articles published) and 2012 (55 articles published). And 2022 is the year with the least number of articles published (14 articles). Finally, the keyword analysis identified a variety of content that will be important research points for future research.

Keywords: ERPS, Systematic Literature Review, VOSviewer

1. Introduction

In the current period, the competitive structure in industries is being greatly affected by the speed of technological development. This situation is an inevitable result of the development of new science and technology, especially the enterprise resource planning system (ERPS) in corporate governance. ERPS, designed to integrate the operational processes and functions of the enterprise value chain, are commercial software packages that "enable common database connectivity for all financial, human resources, supply chain information, customer information". There have been many studies in many different countries on enterprise resource planning systems. Therefore, in this study, it helps readers grasp the development and information quality of the current situation of "enterprise resource planning systems deployed in enterprises" through the frequency of use of the word key, number of citations, and number of times the author and co-authors were cited over time. At the same time, it helps future researchers know the trends of this topic over time.

The article clarifies the following research questions, including Q1: What is the number of articles about resource planning systems in enterprises published from 2010 to 2023? Q2: What topics are the keywords used grouped into? And have these keywords changed and gained strength over time?

To answer the above questions, the study reviewed 492 articles published in the period 2010-2023. Research conducted through bibliometric analysis makes a great contribution to the research community because through bibliometrics, a valuable amount of information can be collected about a topic. By reflecting on what has been done and what needs future research, the article aims to add to the literature on different methods and contexts to assist researchers of resource planning systems in enterprise. The research is divided into parts: Defining the conceptual foundation, applied methods, research results and concluding remarks.

2. Theoretical basis

ERPS is a business software package that enables organizations to automate business processes, create and enable access to real-time information in a database, share data, provide communication information throughout the enterprise, and integrate business functions like customer care management, finance, manufacturing, logistics, project management, human resources, and purchasing management. ERPS removes communication problems and redundant data by enabling all company divisions to access the same database. ERPS is a software that unifies and oversees resources both inside and outside the company. These resources consist of finances, materials, and human resources. Furthermore, ERPS serves as an architect for information

systems, integrating data across departments and maximizing information for both internal and external users through a single database.

Business operations gain greatly from the efficiency of ERPS use (Al-Fawaz, 2008) [1]. To convert data to the new system, using ERPS requires a lot of procedures, preparation time, training, and staff training. Therefore, the success of using ERPS effectively depends on a number of factors, including the project manager's support, financial resources, the board of directors' commitment to support, the project implementation plan, the ability to work as a team, selecting the appropriate ERPS, user involvement, and efficient coaching and training. The studies cover a wide range of topics on ERPS use in the post-implementation period, from user adoption, to user satisfaction, and business restructuring. For example, materials handling processes, financial management and accounting processes, version upgrade issues, technical support services and decision support are mainly forecasting and planning tools organization. Studies have explored the effectiveness of ERPS functions such as accounting, manufacturing, marketing, strategic management, project and resource management, human resources management, supply chain management, sales management goods and orders, business performance management.

ERPS implementation enables businesses to concentrate on enhancing business management, production, and process optimization. ERPS facilitates data integration, delivering timely information, improved data quality, precise data analysis, and more efficient decision-making. Reasonable inventory levels, supply chain coordination, and first-rate customer service are further advantages. ERPS is a big initiative that needs a lot of financial resources, managerial change, and commitment. As a result, difficulties pertaining to the installation, transition, and approach processes as well as other challenges like storage, data quality, and ERPS project management greatly worry implementing enterprises. Therefore, the core elements of successful ERPS implementation play an important role because the technology product life cycle is short; quick change; success factor change (Amoako-Gyampah, K. 2004) [2]. Implementing an ERPS involves all operations, departments, people, and business process restructuring of the organization. Management issues of successful ERP implementation such as how to effectively deploy ERPS; how does the change management strategy work? Is a topic of interest in ERPS implementation? The ERPS implementation process starts from the intention to use to actual implementation and use.

3. Method

This study uses the systematic literature review method SLR (Systematic Literature Review) of Tranfield *et al*. (2003) [6]. Sample selection for the study was based on PRISMA (priority items for systematic reviews and meta-analyses) originally proposed by Liberati *et al*. (2009) [4] and updated in 2021 by Page *et al*. (2021) [5]. The PRISMA flow diagram is based on three steps: Identification, screening, and study inclusion.

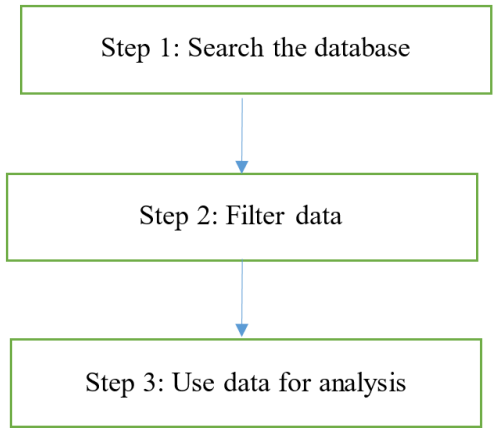


Fig 1: Research process

As a first step, the authors began by selecting a database to collect articles to include in the study. The database chosen is Google Scholar, known as a free database, accessible mainly through a database of reference documents in all fields. Research and evaluation of resource planning systems in enterprises, so this is a highly scientific database for data collection. Data collected on December 27, 2023, with the use of the following keywords “ERPS”. A total of 492 results were found from Google Scholar from 2010 to 2023.

In the second step, the author group screened to remove inappropriate documents through technical screening and content screening. For technical screening, documents are in the form of: Encyclopedia, Editorials, Short communications, Mini reviews, Book chapters will be eliminated by deselecting. For content screening, documents are pre-read to remove documents with irrelevant content even though they contain search keywords. The results after filtering showed that all 492 results met the filtering conditions for inclusion in the study.

The remaining number of documents after the two steps were analyzed with an overview of the SLR (systematic literature review) document system and entered into VosViewer software to analyze keywords and co-citation analysis. The results of SLR analysis are presented in tables and graphs. The results of bibliometric analysis will be presented in visual form. From the analysis results, the study finds popular research directions, names the research directions, and suggests future research directions.

4. Results

4.1 Statistics on year of publication

From 2010 to 2023, a total of 492 articles on enterprise resource planning systems were indexed in Google Scholar with an average of 35 articles published each year. The highest number of articles was in 2013 (65 articles published) and 2012 (55 articles published). And 2022 is the year with the least number of articles published (14 articles). The statistical results of the year of publication show that researchers are showing a decreasing interest in evaluating resource planning systems in businesses.

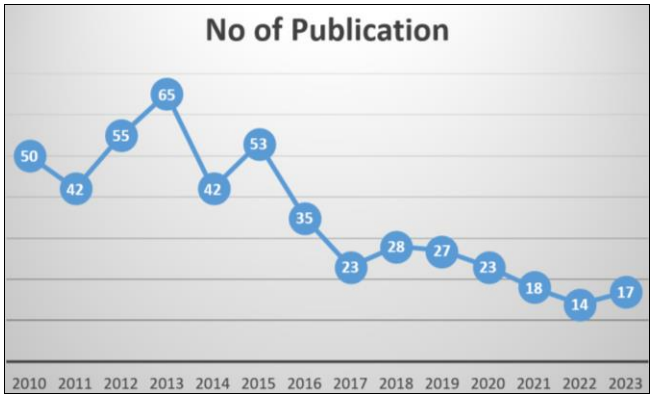


Fig 2: Chart of the number of studies over the years

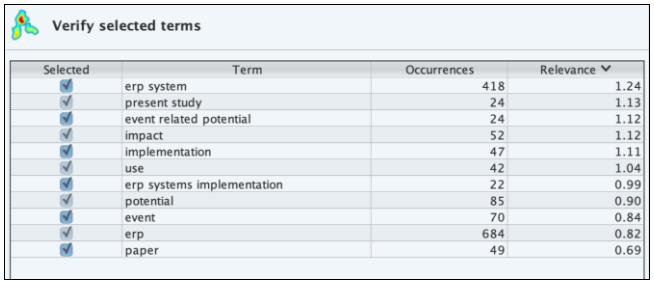
Statistics by number of citations are shown in Table 1. The article "The Oxford handbook of event-related potential components" by author SJ Luck, ES Kappenman, published in 2011 is the article with the highest number of citations. with 1346 citations. According to statistics, the period from 2011 to 2012 was the period when articles about enterprise resource planning systems received the most attention.

Table 1: Articles with the most citations

Cites	Authors	Title	Year
1346	SJ Luck, ES Kappenman	The Oxford handbook of event-related potential components	2011
1276	B Blankertz, S Lemm, M Treder, S Haufe, KR Müller	Single-trial analysis and classification of ERP components-a tutorial	2011
940	AM Norcia, LG Appelbaum, JM Ales.	The steady-state visual evoked potential in vision research: A review	2015
656	RS Weinstein, AM Lopez, BA Joseph, KA Erps…	Telemedicine, telehealth, and mobile health applications that work: Opportunities and barriers	2014
646	SV Grabski, SA Leech…	A review of ERP research: A future agenda for accounting information systems	2011
525	NA Badcock, P Mousikou, Y Mahajan, P De Lissa…	Validation of the Emotiv EPOC® EEG gaming system for measuring research quality auditory ERPs	2013
512	G Hajcak, A Weinberg, A MacNamara…	ERPs and the study of emotion	2012
511	A Nicholson, MC Lowe, J Parker.	Systematic review and meta-analysis of enhanced recovery programmes in surgical patients	2014
465	JM Krueger, MG Frank, JP Wisor, S Roy	Sleep function: Toward elucidating an enigma	2016
419	AM Brouwer, MA Hogervorst, JBF Van Erp.	Estimating workload using EEG spectral power and ERPs in the n-back task	2012
408	R Seethamraju	Adoption of software as a service (SaaS) enterprise resource planning (ERP) systems in small and medium sized enterprises (SMEs)	2015

4.2 Keyword analysis results

In the keyword analysis section, research and select keywords that appear 20 times or more. Keywords are evaluated by the software based on the number of occurrences and total link strength. Keyword analysis results can be exported into files as images. The keyword analysis results are as follows:



Selected	Term	Occurrences	Relevance
☑	erp system	418	1.24
☑	present study	24	1.13
☑	event related potential	24	1.12
☑	impact	52	1.12
☑	implementation	47	1.11
☑	use	42	1.04
☑	erp systems implementation	22	0.99
☑	potential	85	0.90
☑	event	70	0.84
☑	erp	684	0.82
☑	paper	49	0.69

Fig 3: Keywords appearing multiple times

The group of keywords that appear 20 times or more includes erp system, present study, event related potential, empact, implementation, use, erp systems implementation, potential, event, erp, paper. The keyword “erp” is the keyword that appears the most with 684 occurrences. Next is the keyword "erp system" which is the second most frequent keyword with 418 appearances.

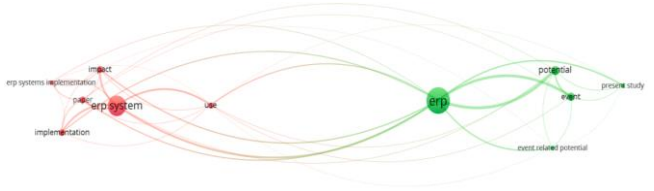


Fig 4: Co-occurrence networks

Fig 4 shows the keyword network. Note that the larger the circle, the more times it appears; the thicker the line connecting the two keywords, the greater the frequency of occurrences. Related keywords are grouped into groups, each group is a separate color. Looking at the image, it can be seen that the keywords are divided into 2 groups, with 39 links and total link strength of 1290. Group 1 is represented by red links with the keywords erp system, erp system implementa, impact, implementation, paper, and use. Group 2 is represented by green links with keywords erp, event, event related potential, potential, and present study. With 2 research directions and 11 popular keywords, the results show that the research content on resource planning systems in enterprises is not comprehensive. Future studies can base on that to choose research directions to fill the gap, or analyze more deeply.

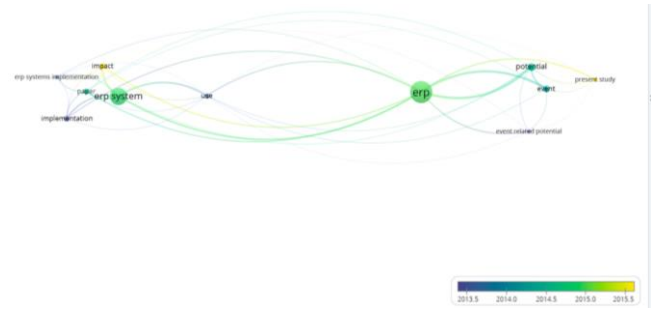


Fig 5: Keyword network over time

In addition, the results from the VOSviewer tool have shown the time of keywords appearing. Dark colors represent keywords researched from the first years (2013), in recent studies, keywords have appeared in brighter colors. The keyword appearance time chart shows that erp system

and erp are the keywords that have received the most attention recently.

4.3 Co-authorship analysis

To explore the trend of collaboration in enterprise resource planning system research, this study conducted an analysis of co-authorship relationships between individual authors and between organizations. According to Benoit *et al.* (2018) [3], the analysis results help improve understanding of research collaboration and help discover influential researchers. Fig 6 presents the co-authorship network map. These are authors who have participated in many articles on enterprise resource planning systems, specifically 3 or more articles. Of which, J Van participated in writing 22 articles, H Thienpont participated in writing 9 articles, M Haddara participated in writing 8 articles.

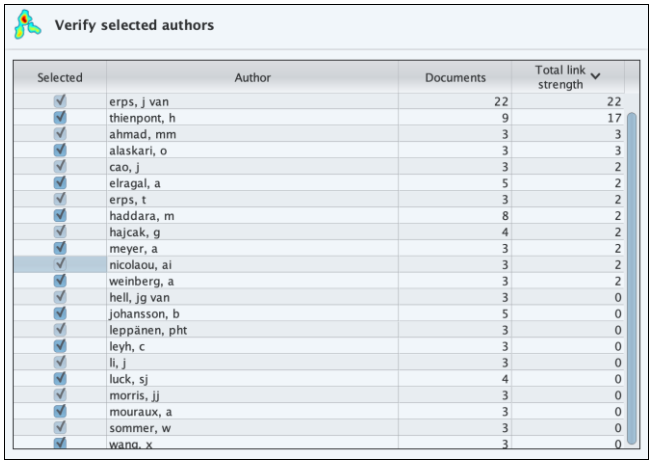


Fig 6: Co-authors appear multiple times

5. Conclusion

In this study, we evaluated global publications on enterprise resource planning systems indexed in the Google Scholar database published between 2010 and 2023 to provide insights in terms of publication quantity, publication journal, keyword network and co-authorship network. This study used bibliometric methods with the help of several statistical and data visualization applications to explore research trends in the content of enterprise resource planning systems.

Research results show that there were a total of 492 articles on enterprise resource planning systems indexed in Google Scholar from 2010 to 2023. The highest number of articles was in 2013 (65 articles published).) and 2012 (55 articles published). And 2022 is the year with the least number of articles published (14 articles). In terms of keywords, appearing 20 times or more include erp system, present study, event related potential, empact, implementation, use, erp systems implementation, potential, event, erp, paper. The keyword “erp” is the keyword that appears the most with 684 occurrences. Next is the keyword "erp system" which is the second most frequent keyword with 418 appearances.

The research results have contributed to the general theoretical basis, serving as a basis for reference studies on enterprise resource planning systems. Data collected from richer sources such as Scopus or Web of Science are suggestions for further research on enterprise resource planning systems, in addition, future studies can evaluate the literature. Have a systematic resource planning system in specific areas.

6. References

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