İSTANBUL UNIVERSITY PRESS

Journal of Transportation and Logistics
JTL 2024, 9 (2), 343–352
DOI: 10.26650/JTL.2024.1387238

REVIEW ARTICLE

Deciding the Criteria for Software Selection: A Bibliometric Review

Bükra Doğaner Duman[1], Mehmet Gürtürk[2], Mehmet Adak[3], Esma Koç[4]

[1]İstanbul University, Transportation and Logistics, İstanbul, Türkiye
[2](Res. Assist.), Çanakkale Onsekiz Mart University, International Trade Logistics and Management, Çanakkale, Türkiye
[3](Prof. Dr.), İstanbul University, Transportation and Logistics, İstanbul, Türkiye
[4]Xinerji Technology, R&D Unit Researcher, İstanbul, Türkiye

ABSTRACT
With the increase in global competition, there has been an increase in research on how to increase business efficiency and profitability. One area of focus is how businesses choose which software to use. A successful software implementation starts with choosing the right product to meet the organization's specific needs; besides the time, effort, and cost of implementation, poorly chosen software can reduce an organization's market share. However, choosing the right product can be extremely time consuming and daunting. In this study, literature was reviewed using the dimension.ai database, and bibliometric analysis was performed using VOSviewer software. Based on the analysis, the analyzed articles were clustered into groups. The most studied countries in this field were Turkey, the USA, and India. Analytic Hierarchy Process (AHP) was the most frequently used method for evaluating software selection criteria. In addition, Fuzzy and Hybrid methods, which are frequently used in recent years, are also among the methods used. The study also lists the most frequently used criteria, identifies the shortcomings of the studies, and presents new criteria for the current needs of enterprises. Finally, recommendations for future studies and the industry are provided. The findings of this study will both help the marketing and sales teams of software product companies to develop key points and enable end-user organizations to make informed decisions when choosing software packages.

Keywords: Software Selection, Bibliometric Review, VOSviewer

1. Introduction

Outsourcing is defined as the transfer of some of a business's activities to external suppliers or the transfer of business processes from internal sourcing to outsourcing. To gain a competitive advantage, businesses commonly prefer outsourcing because it can improve productivity, basic capabilities, flexibility, and quality, and reduce risks and costs while keeping up with innovations.

In today's intensely competitive business environment, businesses aim to carry out their activities accurately and on time while quickly expanding their market share by increasing customer satisfaction. They can realize this goal by continuously monitoring and effectively managing their systems. These systems have become more complex, so business functions like sales, management, marketing, accounting, procurement, supply, research and development, human resources, and finance use monitorable information technologies to ensure fast, accurate, and reliable flow of information across interconnected processes and units. Businesses can implement this holistic perspective through Enterprise Resource Planning (ERP) software. Since software is generally outside a business's field of activity, outsourcing is preferred.

Choosing a software package is challenging because it entails a thorough analysis of numerous competing factors to satisfy the business's requirements. Therefore, researchers are trying to identify more effective criteria for assessing and choosing software packages. The present study aims to review previous research on evaluating and selecting software packages and provide a basis to improve the software selection process. Accordingly, we address the following research questions:

RQ1: How can the VOSviewer program help to examine the relationship between articles?
RQ2: Which methods do businesses use to select software?
RQ3: How does the literature contribute to evaluating and selecting software packages?
RQ4: How are articles about software selection criteria distributed in the literature? How can these articles be grouped?

Corresponding Author: Bükra Doğaner Duman **E-mail:** bukra.doganer@gmail.com
Submitted: 07.11.2023 • **Revision Requested:** 11.01.2024 • **Last Revision Received:** 26.01.2024 • **Accepted:** 17.02.2024 • **Published Online:** 04.03.2024

RQ5: What are the software selection criteria based on the literature?

To address these RQs, a detailed literature review was conducted using the dimension.ai database to identify all relevant studies. This search revealed 140 potentially relevant articles regarding software selection, which were then examined in more detail with VOSviewer, a frequently used bibliometric analysis program. This identified several articles to exclude, so the analysis continued with 89 articles. These articles were divided into four groups for further detailed analysis using VOSviewer to address the research questions and provide guidance for future studies. In the second part of the study, the software selection criteria listed in the literature were examined and reorganized to create a standard and address the current needs of businesses.

The rest of this paper is organized as follows. Section 2 describes the research method. Section 3 presents the program applications and detailed analysis. Section 4 lists and analyzes the criteria specified in the reviewed studies. Section 5 concludes.

2. Methodology

This study used publication data sourced from the dimensions.ai database, which was selected for its large dataset, including the number of citations per article, as well as the fact that it gives an API (Application Programming Interface) for doing searches using a particular DSL (Domain Specific Language). The database was searched using the keywords "software selection" and "criteria". The search, which was conducted in August 2023, identified 140 articles.

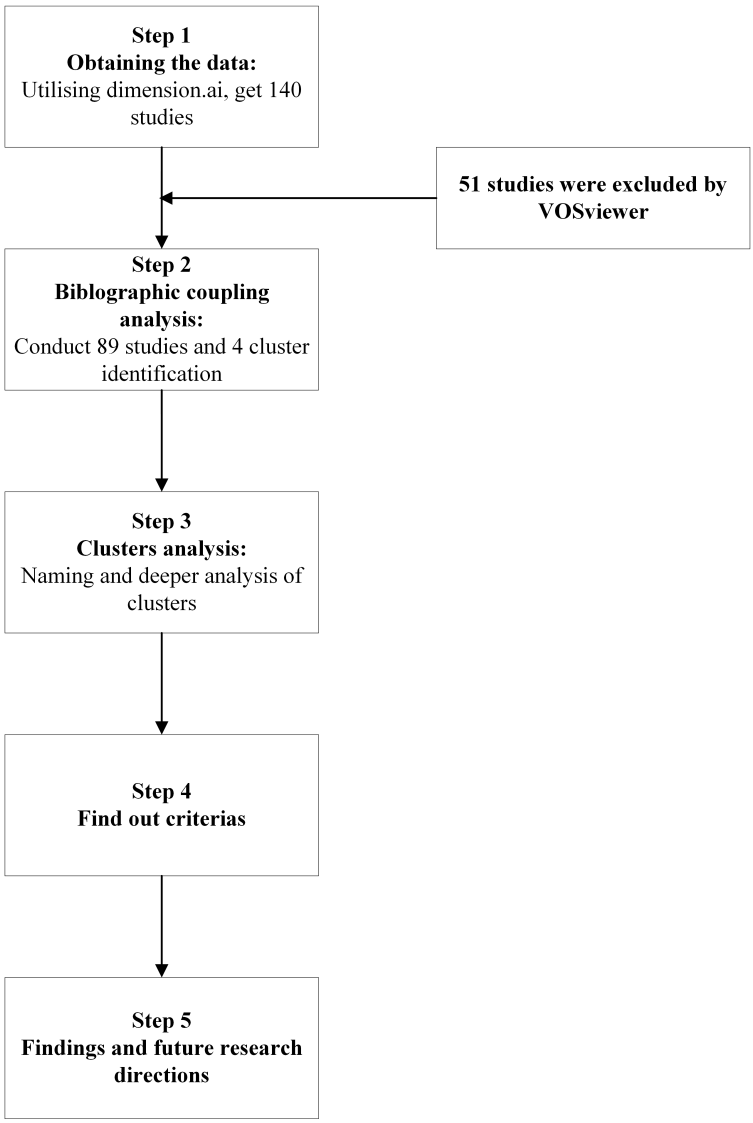

Figure 1. Flowchart of the Systematic Review

As shown in Figure 1, 140 studies were screened using the dimension.ai database during the identification stage, although 51 records were excluded because they fell outside the study's purview. Based on a more thorough review of the relevant literature, 37 additional studies were disqualified at the eligibility stage, leaving 52 studies for the comprehensive literature review. The following sub-sections provide information about the research for the four distinct clusters (Cluster A, Cluster B, Cluster C, and Cluster D).

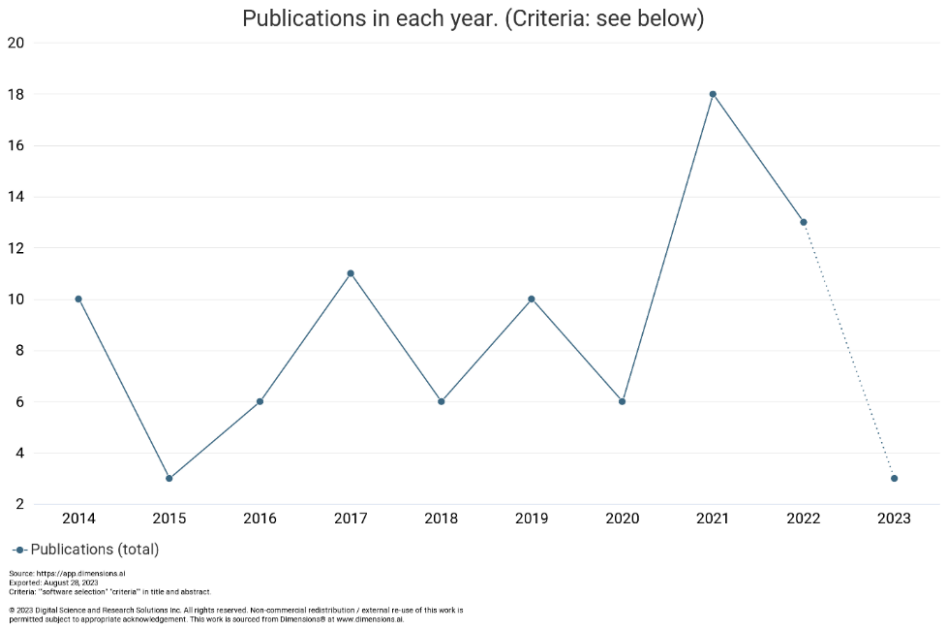

Figure 2. Changes in the Number of Relevant Studies per Year

Figure 2 shows the distribution of studies on software selection criteria by year. Since 2014, the largest number of studies (18) were conducted in 2021, followed by a considerable decrease, probably due to the pandemic period after 2020, which hindered academic research within companies.

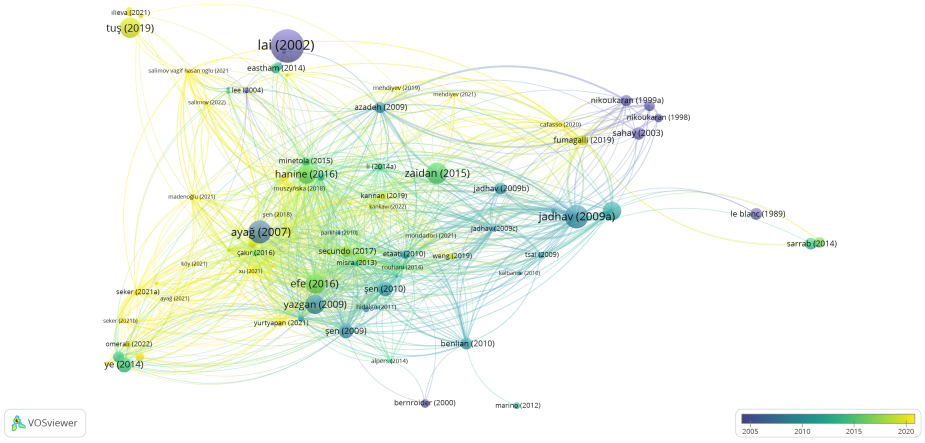

Figure 3. Distribution of Studies by Year

Figure 3 shows the studies color-coded by year of publication, with darker colors representing older articles and lighter colors representing more recent articles. The lines between articles indicate that the articles are related to each other. Articles with a large circle are associated with more articles, while articles with a relatively smaller circle have fewer associations. Looking at the figure, it can be seen that articles written in 2004 and around 2004 are few but are cited by many articles. Articles written after 2010 show that the topic remains popular today.

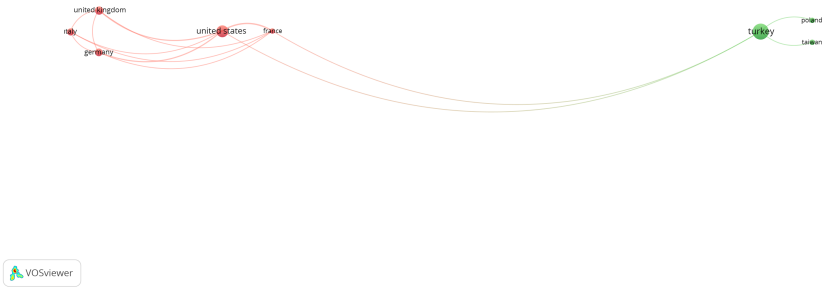

Figure 4. Relationship map of the countries where the studies are based

The countries with the highest number of articles published are Turkey, the USA, India, China, the UK, and Germany—however, the ranking changes when we look at the number of citations. The most cited countries are Turkey, China, India, the USA, UK and Germany, respectively. Figure 4 shows a map of the citation relations of countries. According to the map, the studies conducted in Turkey, Poland, and Taiwan are divided into one group concerning each other, while the other group includes the UK, Germany, Italy, the USA, and France. The relationship between the two groups is not strong. There is a relationship only between Turkey and USA and France. Turkey being the most cited country may affect this.

2.1. Bibliographic coupling analysis

In literature reviews, bibliographic coupling is frequently used to cluster relevant works logically to identify distinct groupings. When two papers cite the same study, this is known as bibliographic coupling (Mollaoglu et al., 2023; Small and Koeing, 1977). This approach assumes that two works that cite a third work are likely to be connected, necessitating their inclusion in the cluster solution generated by a visualization map (Mass-Tur et al., 2021).

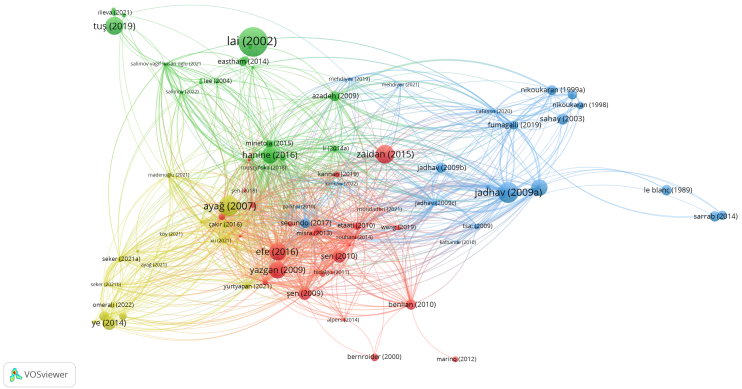

Figure 5. Bibliographic Coupling Network Map for Studies of Software Selection Criteria

Bibliographic coupling analysis was used to identify existing trends and knowledge gaps in the literature on software selection criteria. When the articles from the database were loaded into the VOSviewer program, the program extracted articles from the data pool that were not related to other articles or that differed from other articles for different reasons. As a result, the remaining analysis was completed with 89 studies. Figure 4, which shows the analysis results of the study, shows four clusters coded with red, green, blue, and yellow colors representing clusters A, B, C, and D, respectively. Details on the clusters will be given in the rest of the study. The clustering of the studies is a method offered by the program that facilitates a more detailed examination and

analysis of the studies to be presented to the readers. with this method, trends in the studies can be followed more easily. As in Figure 3, in this figure, each circle represents an article. The size of the circles indicates the strength of the relationship of the studies with other articles. The larger the circle of the study, the more related it is. When we look at the clusters, we see that most of the articles are concentrated in the center and have intense relations with articles from different clusters. this shows us that the articles in the field are generally shaped around the same topics and that they cite each other. There are a few different articles (Bernroider et al. 2020; Marino 2012; Ilieva 2021; Sarrab 2014) that differ from the studies in other clusters.

3. Cluster Analysis

The following subsections examine the four clusters that emerged from the VOSviewer analysis and the articles in these clusters. The clustering process is applied by the VOSviewer program to make the analysis of the articles easier and more systematic. Looking at the general situation of the clusters, it was seen that clustering was made according to the methods applied in the articles. In this context, the AHP method was the most used and was applied in every cluster. The other clusters were interpreted based on the most applied methods other than AHP to help future studies. The articles that were not written in English or Turkish or were not related to the subject were excluded from the analysis.

Cluster A: AHP Method

Cluster A included 16 research papers (15 journal articles and 1 book chapter). This cluster is shown in red color in Figure 5. The AHP method was the most used in this cluster. Therefore, the cluster is located near the center of the map and is strongly connected to all other clusters. Regarding the specific studies, Benlian and Hess (2010) used the Survey method to evaluate software and Office Systems selection criteria. In the study, surveyors were selecting custom ERP systems. They ranked reliability and functionality as the highest priorities. Ease of implementation and support were ranked as the lowest. Also, the cost factor ranked only fifth among the seven factors. Şen et al. (2009) used the Enterprise Software Selection Method (ESSM), a mathematical programming model. This program assists decision-makers in the enterprise software selection process, after that Şen and Baraçlı (2010) used the Fuzzy Quality Function Deployment (QFD) approach that focuses on translating functional requirements formed with linguistic variables into non-functional criteria. Many researchers have used the Analytic Hierarchic Process (AHP) method in this cluster. For instance, the use of the AHP method in research is evident in works by Şen et al. (2019), Efe (2016), Misra (2013), Zaidan (2015), Hidalgo et al. (2011), Kannan (2019), and Çalışkan et al. (2019). Additionally, Çalışkan et al. (2019) employed PROMETHEE to finalize their research, a method favored for assessing binary "YES-NO" questions within the resolution process. Furthermore, Kannan et al. (2019) crafted a hybrid technique for the selection of software packages for a specific firm, integrating the AHP, TLBO, and TOPSIS approaches.

Zahedi et al. (2011) used a Fuzzy Quality Function Deployment (F-QFD) approach to suggest a software selection method. They conducted a case study to choose the best among 10 software companies. In this cluster, there are two articles written by Rohani on this subject. In the first article, Rouhani and Ravasan (2014) used the F-TOPSIS method for software selection. In the second one, Rouhani (2017) used the Fuzzy Superiority and Inferiority Ranking (FSIR) method. Khaled and Idrissi (2011) applied The Measuring Attractiveness by a Categorical Based Evaluation Technique (MACBETH) to express the decision maker's preferences according to the adopted criteria. Lastly, Alpers et al (2014) has issued a conference paper on this topic. In the study, they developed the Selection Approach for ERP systems (SCAPE) method. They also built a comprehensive database covering systems and vendors of ERP software systems.

Cluster B: TOPSIS Method

Cluster B, which contains 13 research articles (10 journal articles and 3 conference proceedings), is shown in green in Figure 5. It is located near the center of the map and appears to be connected to all other clusters. This cluster also contains articles for which the AHP method was used (Lai, et al., 2002; Maram et al., 2019; Okudan, 2007; Azadeh, et al., 2010; Hanine et al., 2016). In addition, the TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) method stands out as the most widely used method. Hanine et al. (2016) applied Fuzzy TOPSIS to specify the software selection criteria while Zulkifli et al. (2010) and Guezguez et al. (2015) applied TOPSIS to evaluate software selection criteria. Oglu conducted three studies applying different methodologies to functionality, price, usability, and reliability: the Sugeno Integral method (Oglu, 2020); F-AHP (Oglu and Qizi, 2021); and F-TOPSIS (Oglu, 2022). Eastham et al. (2015) applied Hierarchical Decision Modeling (HDM) to project management software selection while Tuş and Adalı (2019) used a new combination of CRITIC and WASPAS methods in a case study of selecting software to meet a company's need for tracking employees' working hours.

Cluster C: Hybrid Methods

Cluster C with 16 research articles is the cluster furthest from the center. It is shown in blue color on the map. Hybrid methods are the most commonly used methods in the cluster. Since it is not a method used in other clusters, it is not very connected to other clusters and is far from the center. Nikoukaran, Hlupic, and Paul (1998) presented a comprehensive list of criteria structured in a hierarchical framework for evaluating simulation software. They categorized issues related to criteria for simulation software

evaluation into seven main groups and several sub-groups. Nikoukaran and Paul (1999) discussed the findings of a literature review on the choice of simulation software. They divided the many research contributions into four groups: strategies for selecting simulation software, procedures for evaluating simulation software, standards to be applied during the evaluation process, and suggestions on the topic. Nikoukaran, Hlupic, and Paul (1999) identified and listed software selection criteria.

Jadhav and Sonar have three studies in this cluster. Jadhav and Sonar (2009a) reviewed research on the evaluation and selection of software packages. They determined that AHP is frequently used and there is no common list of software evaluation criteria. Jadhav and Sonar (2009b) analyzed software selection comparatively using AHP, Weighted Scoring Method (WSM), and Hybrid Knowledge Based System (HKBS). They found that the HKSB method was better than AHP and WSM in terms of computational efficiency, flexibility in problem-solving, reuse of information, and consistency and presentation of evaluation results. Jadhav and Sonar (2011) applied HKBS to software selection. AHP, which is frequently used, as mentioned above, was also used in Cluster C by several researchers (Kankavi and Kocaoglu, 2022; Secundo et al., 2016; Fumagalli et al., 2019; Zakria et al., 2010).

By combining research and practitioner insights, Bjarnason (2023) used method engineering to iteratively design a software selection technique for a specific company, and then validate it through a focus group and implementation. Tsai et al. (2009) investigated ERP software selection criteria as a determiner of software and information quality, and ERP success while Sahay and Gupta (2003) addressed software selection as a supply chain solution. Parkhill et al. (2010) conducted a single-company case study of software selection using Multiple Criteria Decision Analysis (MCDA). Finally, Sarrab and Rehman (2014) conducted a case study to apply their proposed quality criteria to eight different open-source software programs, divided between open-source network tools and learning management systems.

Cluster D: Fuzzy Methods

There were 15 research articles in cluster D. It is shown in yellow color in Figure 5. Fuzzy methods were mostly used in this cluster. Ayağ and Özdemir (2007) used the Fuzzy Analytic Network Process (F-ANP) for software selection rather than the standard method of AHP because the latter cannot accommodate various interactions, dependencies, and feedback between higher- and lower-level elements. Yurtyapan and Aydemir (2021) used MACBETH to suggest a novel strategy for handling uncertainty in ERP software selection. Garg et al. (2022) used SWARA to evaluate criteria weights and COPRAS to rank alternatives using the Complex Intuitionistic Fuzzy Soft (CIFS) context.

Within this cluster, various other methods were used for criterion identification and weighting, including TODIM and TOPSIS (Seker and Kahraman, 2021) MULTIMOORA (Li, 2014), Delphi technique and TOPSIS (Çakır, 2016), Fuzzy COPRAS (Madenoglu, 2021; Omerali and Kaya, 2021), and F-AHP and F-TODIM (Tolga, 2018).

4. Software Selection Criteria

The analysis conducted on the Dimension.ai database identified 140 articles related to software selection criteria. Of these, most aimed at determining the criteria for software selection while the remaining studies mostly applied the criteria. Notably, a detailed analysis of the criteria did not reveal any common list (Jadhav and Sonar, 2009a). Another noteworthy element was that the criteria do not meet the current needs of businesses, with new applications developed to spread sustainable activities, especially in state institutions. The inadequacy of the criteria for meeting these and similar situations prevents businesses from meeting their current needs.

In this study, we aimed to facilitate software selection for businesses by focusing on these two factors. Therefore, the criteria mentioned in the reviewed studies were pooled and simplified to create a common language.

Table 1 shows the articles analyzed and the criteria used. The authors used criteria in different ways but with the same scope. This study aims to bring together and simplify the various criteria in the literature to provide a more streamlined and accessible approach for businesses going through the software selection process. Since it is aimed to create a common language for the criteria, an attempt has been made to group the criteria. It has been observed that the criteria recommended to be used in software selection are generally concentrated in the areas of cost, functionality and ease of use. In addition, there are some studies that add vendor performance to the evaluation criteria.

Figure 6 shows the list of criteria generated. Some studies used 4 criteria, while others used up to 40 criteria. For ease of implementation, the number of criteria was kept at an average number and the criteria were analyzed and grouped under seven main headings. The main criteria given in Table 1 are divided into sub-criteria. This provides an overview of the criteria used in the literature.

Table 1. Criterias Listed From the Literature

Criterias	Authors
Technology	Sahay 2003; Şen 2009; Şen 2010; Fumagalli 2019; Hidalgo 2011; Rouhani 2017; Azadeh 2010; Nikouran 1999; Lai 2002; Efe 2016; Kankavi 2022; Yurtyapan 2021; Seker 2022;
Cost & Pricing	Sahay 2003; Şen 2009; Şen 2010; Zulkifli 2010; Hidalgo 2011; Nikouran 1999; Eastham 2015; Lai 2002; Ayağ 2007; Şen 2019; Benlian 2010; Efe 2016; Khaled 2011; Okudan 2007; Hanine 2016; Oglu 2022; Parkhill 2010; Yurtyapan 2021; Seker 2022; Garg 2022; Madenoglu 2021; Çakır 2016
Features	Sahay 2003; Şen 2009; Şen 2010; Zulkifli 2010; Hidalgo 2011; Azadeh 2010; Eastham 2015; Şen 2019; Benlian 2010; Khaled 2011; Maram 2019; Okudan 2007; Oglu 2022; Oglu 2021; Oglu 2020; Kankavi 2022; Jadhav 2009; Yurtyapan 2021; Omerali 2021;
Customization	Sahay 2003; Şen 2009; Şen 2010; Zulkifli 2010; Fumagalli 2019; Hidalgo 2011; Rouhani 2017; Nikouran 1999; Tolga 2018; Štemberger 2015; Khaled 2011; Misra 2013; Maram 2019; Oglu 2022; Oglu 2021; Oglu 2020; Kankavi 2022; Parkhill 2010; Çakır 2016
Services	Sahay 2003; Şen 2009; Şen 2010; Zulkifli 2010; Fumagalli 2019; Hidalgo 2011; Rouhani 2017; Azadeh 2010; Tolga 2018; Hanine 2016; Seker 2022; Omerali 2021;
Vendor	Sahay 2003; Şen 2009; Şen 2010; Zulkifli 2010; Fumagalli 2019; Rouhani 2017; Azadeh 2010; Lai 2002; Ayağ 2007; Zahedi 2011; Štemberger 2015; Çalışkan 2019; Efe 2016; Hanine 2016; Kankavi 2022; Parkhill 2010; Yurtyapan 2021; Seker 2022; Garg 2022; Omerali 2021; Madenoglu 2021; Çakır 2016
Others	Sahay 2003; Şen 2009; Şen 2010; Zulkifli 2010; Fumagalli 2019; Nikouran 1999; Eastham 2015; Ayağ 2007; Zahedi 2011; Benlian 2010; Khaled 2011; Misra 2013; Maram 2019; Jadhav 2009; Parkhill 2010; Yurtyapan 2021; Garg 2022; Madenoglu 2021; Çakır 2016

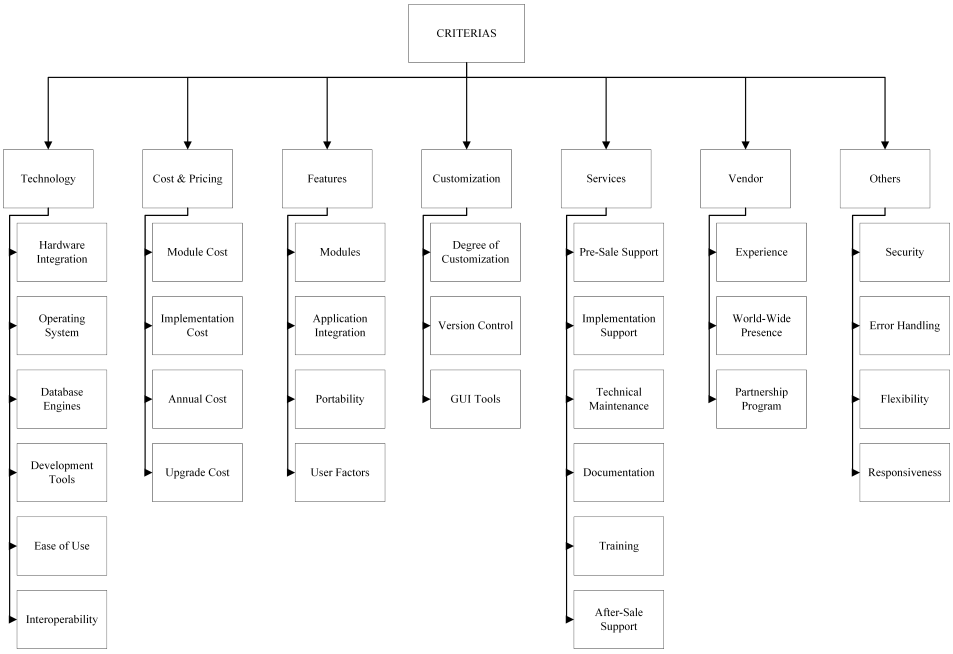

Figure 6. Hierarchical List of Criteria

5. Conclusion

In conclusion, this research provides a comprehensive overview and analysis of software selection criteria and methods. By consolidating and simplifying various criteria from the literature, it offers a more streamlined and accessible approach for enterprises embarking on the software selection process. The emphasis on creating a common language for these criteria further enhances the utility and applicability of this research in practical settings. VOSviewer software was used to analyze the studies. The VOSviewer program groups studies to facilitate the analysis of studies. In this study, the studies were categorized into four groups. As can be seen in Figure 5, the articles are very closely related to each other. This may be due to the frequent use of some methods in the literature. Therefore, it isn't easy to create homogeneous clusters. Looking at the clusters in general, it is seen that the AHP method is the most commonly used method and is used in every cluster. The use of different methods in future studies will diversify the literature. TOPSIS method is expressed as the second cluster. AHP and TOPSIS methods are generally used together in the literature. Hybrid methods and Fuzzy methods were used in the third and fourth clusters formed by researchers who wanted to differentiate from the literature. These methods, which are used to obtain the most comprehensive results by minimizing the influence of the experts assisted in the analysis and which have attracted attention recently, will continue to be used frequently in the future.

This study will be a guideline for future studies. The categorization of the literature will be useful for other researchers interested in the current state of software package selection and evaluation, as well as for practitioners who need information on how to evaluate specific types of software packages. While the software selection methodologies presented in the reviewed studies mostly follow the same procedures, very little work has yet been done to develop a general approach to the selection of all types of software packages. Therefore, a general software selection technique and evaluation criteria are proposed based on the literature review. The most important steps in evaluating software packages are identifying the criteria to be considered, assigning a weight to each criterion, creating a rating scale for each criterion, calculating the score, ranking the options and selecting the best one.

Many papers provide a preferred list of evaluation criteria for evaluating a particular software package; however, there seems to be a lack of a common list. Software evaluation criteria are not clearly defined and explained in the literature. The precise meaning of a criterion depends on the evaluator's interpretation, so authors may use different wording for the same criterion in the same literature, thus creating confusion and uncertainty for the software evaluator. To overcome this problem, we have presented generic lists of evaluation criteria that can be applied in the evaluation of any software program. Future work could create guidelines and develop an expert system to facilitate the decision-making process. This study used articles from a single database. Future work could extend the scope of the analysis by using different databases. In addition to this study, studies can be conducted on the use of software on a sectoral basis.

Peer Review: Externally peer-reviewed.

Conflict of Interest: Authors declared no conflict of interest.

Financial Disclosure: Authors declared no financial support.

Author Contributions: Conception/Design of Study- M.A., M.G.; Data Acquisition- B.D.D., E.K.; Data Analysis/ Interpretation- B.D.D., M.G.; Drafting Manuscript- M.A., M.G., B.D.D.; Critical Revision of Manuscript- E.K.; Final Approval and Accountability- M.A., M.G., E.K., B.D.D.

Note: The Editor-in-Chief was not involved in the evaluation, peer-review and decision processes of the article. These processes were carried out by the Co-Editor-in-Chief and the member editors of the editorial management board.

ORCID IDs of the authors

Bükra Doğaner Duman	0000-0002-9770-9838
Mehmet Gürtürk	0000-0002-8417-1274
Mehmet Adak	0000-0002-7788-1227
Esma Koç	0001-0730-9129

REFERENCES

Alpers, S., Becker, C., Eryilmaz, E., & Schuster, T. (2014). A Systematic Approach for Evaluation and Selection of ERP Systems. Lecture Notes in Business Information Processing.

Ayağ & R. G. ÖzdemİR (2007) An intelligent approach to ERP software selection through fuzzy ANP, International Journal of Production Research, 45:10, 2169-2194, DOI: 10.1080/00207540600724849

Azadeh, A., Shirkouhi, S. N., & Rezaie, K. (2010). A robust decision-making methodology for evaluation and selection of simulation software package. Int J Adv Manuf Technol, 47, 381-393.

Benlian, A., & Hess, T. (2011). Comparing the relative importance of evaluation criteria in proprietary and open-source enterprise application software selection – a conjoint study of ERP and Office systems. Info Systems J, 503-525.

Çakır, S. (2016). Selecting appropriate ERP software using integrated fuzzy linguistic preference relations Fuzzy TOPSIS Method. *International Journal of Computational Intelligence Systems*, 9(3), 433-449.

Çalişkan, E., Aksakal, E., Çetinyokuş, S., & Çetinyokuş, T. (2019). Hybrid Use of Likert Scale-Based AHP and PROMETHEE Methods for Hazard Analysis and Consequence Modeling (HACM) Software Selection. *International Journal of Information Technology & Decision Making, 18*(5), 1689–1715.

Eastham, David James Tucker, Sumir Varma & Scott Matthew Sutton (2014) PLM Software Selection Model for Project Management Using Hierarchical Decision Modeling With Criteria From PMBOK® Knowledge Areas, Engineering Management Journal, 26:3, 13-24.

Efe, An Integrated Fuzzy Multi-Criteria Group Decision Making Approach for ERP System Selection, *Applied Soft Computing Journal* (2015)

Fumagalli, Adalberto Polenghi, Elisa Negri & Irene Roda (2019) Framework for simulation software selection, *Journal of Simulation, 13*(4), 286-303.

Garg, H., Vimala, J., Rajareega, S., Preethi, D., & Perez-Dominguez, L. (2022). Complex intuitionistic fuzzy soft SWARA - COPRAS approach: An application of ERP software selection. AIMS Mathematics, 7(4), 5895–5909.

Ghulam Zakria, Z. G. (2010). We are selecting and prioritizing key factors for CAD/CAM software in small- and medium-sized enterprises using AHP. Front. Mech. Eng. China, 5(2), 157-164.

Guezguez, W., Zaini, R., & Quqandi, E. (tarih yok). A multi-criteria decision-making model for software selection to build e-portfolio. 2015 Fifth International Conference on e-Learning.

Hanine, M., Boutkhoum, O., Tikniouine, A., & Agouti, T. (2016). Application of an integrated multi criteria decision making AHP TOPSIS methodology for ETL software selection. SpringerPlus 5.

Hidalgo, A., Albors, J., & Gómez, L. (2011). ERP Software Selection Processes: A Case Study in the Metal Transformation Sector. Intelligent Information Management, 1-16.

Jadhav, A. S., & Sonar, R. M. (2009a). Evaluating and selecting software packages: A review. Information and Software Technology, 51, 555-563.

Jadhav, A., & Sonar, R. (2009b). Analytic Hierarchy Process (AHP), Weighted Scoring Method (WSM), and Hybrid Knowledge Based System (HKBS) for Software Selection: A Comparative Study. Second International Conference on Emerging Trends in Engineering and Technology.

Jadhava, A. S., & Sonar, R. M. (2011). Framework for evaluation and selection of the software packages: A hybrid knowledge based system approach. The Journal of Systems and Software, 84, 1394–1407.

Kannan, A. S., Balamurugan, S. A., & Sasikala, S. (2019). A Novel Software Package Selection Method Using Teaching–Learning Based Optimization and Multiple Criteria Decision Making. IEEE Transactions on Engineering Management.

Khaled, A., & Idrissi, M. A. (2011). A Learning Driven Model for ERP Software Selection Based on the Choquet Integral: Small and Medium Enterprises Context. Communications in Computer and Information Science.

Li, Z.-H. (2014). An Extension of the MULTIMOORA Method for Multiple Criteria Group Decision Making Based upon Hesitant Fuzzy Sets. Hindawi Publishing Corporation Journal of Applied Mathematics.

Madenoğlu, F. S. (2021). Bütünleşik Entropi-COPRAS Yöntemi ile KKP Yazılımının Seçimi. *Yönetim ve Ekonomi Araştırmaları Dergisi, 19*(4), 14-29.

Maram, V., Sultan, S. J., Omar, M. B., & Bommisetty, V. N. (2019). Selection of Software in Manufacturing Operations Using Analytic Hierarchy Process. AIP Conference Proceedings 2138, 040016.

Mas-Tur, A., Roig-Tierno, N., Sarin, S., Haon, C., Sego, T., Belkhouja, M., ... & Merigó, J. M. (2021). Co-citation, bibliographic coupling, and leading authors, institutions, and countries in the 50 years of Technological Forecasting and Social Change. Technological Forecasting and Social Change, 165, 120487.

Misra, S. K., & Ray, A. (2013). Integrated AHP-TOPSIS Model for Software Selection Under Multi-criteria Perspective. Driving the Economy through Innovation and Entrepreneurship, 879-890.

Mollaoglu, M., Altay, B. C., & Balin, A. (2023). Bibliometric Review of Route Optimization in Maritime Transportation: Environmental Sustainability and Operational Efficiency. Transportation Research Record, 03611981221150922.

Nikoukaran, J., & Paul, R. J. (1999). Software selection for simulation in manufacturing: a review. Simulation Practice and Theory, 7, 1-14.

Nikoukaran, J., Hlupic, V., & Paul, R. J. (1998). Criteria for Simulation Software Evaluation. Proceedings of the 1998 Winter Simulation Conference.

Nikoukaran, J., Hlupic, V., & Paul, R. J. (1999). A hierarchical framework for evaluating simulation software. Simulation Practice and Theory, 7, 219-231.

Oglu, S. V. (2020). Software Selection Based of Sugeno Integral. Scholarly Publisher RS Global, 7(59).

Oglu, S. V. (2022). Selectıın of Software on Base of Fuzzy TOPSIS Method. Scholarly Publisher RS Global, 3(75).

Oglu, S. V., & Qizi, D. J. (2021). Software Selection on Base of Fuzzy AHP Method. *International Academy Journal Web of Scholar, 1*(21).

Okudan, G. (2006). A multi-criteria decision-making methodology for optimum selection of a solid modeller for design teaching and practice. *Journal of Engineering Design, 17*(2), 159-175.

Omerali & Tolga Kaya | (2022) Augmented Reality Application Selection Framework Using Spherical Fuzzy COPRAS Multi-Criteria Decision Making, Cogent Engineering, 9:1, 2020610

Rouhani, (2017)," A fuzzy superiority and inferiority ranking based approach for IT service management software selection ", Kybernetes, 46

(4).

Rouhani, A., & Ravasan, A. Z. (2014). A Fuzzy TOPSIS based Approach for ITSM Software Selection. International Journal of IT/Business Alignment and Governance, 5(2).

Secundo, G., Magarielli, D., Esposito, E., & Passiante, G. (2017). Supporting decision-making in service supplier selection using a hybrid fuzzy extended AHP approach. *Business Process Management Journal, 23*(1), 196-222.

Seker, S., & Kahraman, C. (2022). A Pythagorean cubic fuzzy methodology based on TOPSIS and TODIM methods and its application to software selection problems. Soft Computing, 26, 2437–2450.

Small, H. G., & Koenig, M. E. (1977). Journal clustering using a bibliographic coupling method. Information processing & management, 13(5), 277-288.

Stemberger, Vesna Bosilj-Vukšić & Mojca Indihar Jaklić (2009) Business Process Management Software Selection – Two Case Studies, Economic Research- Ekonomska Istraživanja, 22:4, 84-99

Şen, A. Y., Semiz, N., Güneş, B., Algül, D., Gergin, Z., & Dönmez, N. D. (2019). The Selection of a Process Management Software with Fuzzy Topsis Multiple Criteria Decision Making Method. Proceedings of the International Symposium for Production Research 2018, 150-167.

Şen, C. G., & Baraçlı, H. (2010). Fuzzy quality function deployment based methodology for acquiring enterprise software selection requirements. Expert Systems with Applications, 37, 3415–3426.

Şen, C. G., Baraçlı, H., Şen, S., & Başlıgil, H. (2009). An integrated decision support system dealing with qualitative and quantitative objectives for enterprise software selection. Expert Systems with Applications, 36, 5272–5283.

Tolga, C. (2018). Evaluation of ERP software with fuzzy AHP integrated TODIM method. *Sakarya University Journal of Science, 22*(5), 1351-1370.

Tuş, A., & Adalı, E. A. (2019). The new combination with CRITIC and WASPAS methods for the time and attendance software selection problem. OPSEARCH. Yurtyapan, M. S., & Aydemir, E. (2022). ERP software selection using intuitionistic fuzzy and interval grey number-based MACBETH method. Grey Systems: Theory and Application, 12(1), 78-100.

Zaidan, B.B. Zaidan, Hussaen Muzamel, Ahmed Haiqi, M.L. Mat Kiah, Mohamed Abdulnabi, Multi-Criteria Analysis for OS-EMR Software Selection Problem: A Comparative Study, Decision Support Systems (2015)

How cite this article

Doğaner Duman, B., Gürtürk, M., Adak, M., & Koç, E. (2024). Deciding the criteria for software selection: A bibliometric review. *Journal of Transportation and Logistics, 9*(2), 343-352. https://doi.org/10.26650/JTL.2024.1387238