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Decision Support Systems Literature (2000–2026): A Scopus-Based Bibliometric Study of Research Patterns and Emerging Themes

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ABSTRACT

The current research tries to map and analyze the scientific field of the research in the topic of Decision Support Systems (DSS) from 2000 to 2026 with the help of bibliometric analysis with data collected in the Scopus database. Bibliometric analysis in this paper will be used to study co-authorship networks, citations networks, and keyword co-occurrences in order to understand research collaborations, influential literature in the field, and evolving themes of the scientific discussion. The analysis shows that the research in DSS has been increasing with each year and is characterized by inter-disciplinary nature, being closely related to information systems, computer science, and management disciplines. As for co-authors, the analysis showed the presence of clusters of co-authoring that includes leading researchers, institutions, and even countries, but there is still not much interaction between the clusters. Citations networks were dominated by theoretical articles that are related to healthcare and methods, however, in the last few years, there was a noticeable trend towards artificial intelligence-driven studies. Finally, analysis of keywords shows the development of theme clusters from clinical decision support systems to machine learning and other modern themes like sustainability. This study provides a comprehensive overview of the intellectual structure and development trajectory of DSS research, offering valuable insights for researchers and practitioners in identifying future research directions and opportunities for interdisciplinary collaboration.

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1. INTRODUCTION

The fast progress in information technologies over the last twenty years has made a huge impact on the way organizations handle information and make important decisions [1]. In today's world of information overload and complicated decision-making situations, intuition and personal experience cannot be relied upon alone, thus the need for a system capable of aiding in improving the decision-making process [2], [3]. The concept that has gained immense popularity in recent years in this respect is that of the Decision Support System. Having started off as a mere idea back in the seventies, it has developed much over the years, incorporating databases, artificial intelligence, and human-computer interface [1].

In fact, the development of studies related to decision support systems has

gained prominence especially after the turn of the millennium, owing largely to advancements made in big data technology, cloud computing, and machine learning [4]. It is the technological advances that have allowed for the decision support systems to evolve into adaptive and intelligent models that can cope with large volumes of data in real time [2], [5]. This has led to an explosion of DSS in diverse areas, such as healthcare, finance, logistics, agriculture, and policymaking. There have also been efforts by scholars to improve the accuracy, usability, and compatibility of DSS with modern technologies, such as AI and IoT [6].

Alongside the advancement of technology, there has been an increase in the number of scholarly papers written about DSS, highlighting the multidisciplinary approach to DSS research. Papers from diverse fields such as information systems, management sciences, computer science, and operational research have been produced. The contributions from other disciplines have provided a rich background in terms of methodology and theory for DSS research, but they have also led to fragmentation within the body of DSS literature. Knowledge development tends to happen in silos, with little connection made among different research streams.

Bibliometric analysis can be considered an effective methodology in addressing this problem [7]. Through a rigorous analysis of the large amounts of scientific literature, bibliometric methods allow for mapping the intellectual framework of a discipline, discovering key authors and organizations, revealing collaborative networks, and identifying new trends in research. The use of tools like VOSviewer makes it possible to visualize the intricate connections between keywords, citations, and coauthorship [8]. Bibliometrics become especially important when discussing DSS due to its fast development and multidisciplinary character.

However, despite the ever-growing body of literature on DSS, a few comprehensive bibliometric analyses have been conducted covering long periods and analyzing research trends. Most of the existing researches tend to concentrate on narrow subdomains, relatively short periods of time, or certain methodologies. As a result, they fail to give an account of how the domain has developed in general. Furthermore, no attempts have been made to incorporate emerging topics in DSS research, like the use of artificial intelligence in the design of decision support systems, sustainable decision-making systems, and real-time analytics for decision making. A comprehensive bibliometric analysis utilizing the database, for example, Scopus, is needed to conduct a systematic review of DSS literature.

Despite the significance of Decision Support Systems (DSS) as a topic of academic interest and practical applications in various fields, there is insufficient literature that offers a holistic approach to understanding the trends, development history, and potential future directions of DSS literature in the long run. Current studies appear to be narrow in scope, isolated from one another, or centered only on certain elements of DSS. Therefore, it becomes problematic to understand the intellectual structure of DSS and possible avenues for future research. In order to address this problem, a bibliometric study must be conducted with a large database. This study aims to conduct a comprehensive bibliometric analysis of Decision Support Systems literature from 2000 to 2026 using the Scopus database.

2. METHODS

The current study adopted a bibliometric research design to critically examine the evolution of DSS literature between 2000 and 2026. The information used in this study was extracted from the Scopus database because of its broad scope of scholarly literature that covers quality publications across different scientific fields. A search strategy was developed by using specific keywords like "Decision Support System," among others. The search engine searched for the keyword combination only in the title, abstract, and keywords of the paper.

The inclusion criteria were based on articles and conference papers written in English in the stipulated period, while the exclusion criteria comprised unrelated subjects and duplicated papers.

In order to conduct and present the findings of the bibliometric networks, this research employs the tool known as VOSviewer, which allows for the representation of scientific knowledge using network visualization methods. These include co-authorship analysis (which helps to establish trends in research collaboration), citation analysis (which helps to establish influential sources in the literature), and keyword co-occurrence analysis (which helps to identify prominent and emergent trends in research). The outcomes are displayed via network, overlay, and density graphs.

3. RESULTS AND DISCUSSION

3.1 Co-Authorship Analysis

The study of co-authors is done in order to understand the cooperation between authors, institutions, and countries within the body of literature of Decision Support Systems (DSS). It enables us to map out how the scientific community interacts with each other, who the major players are, and what research clusters are prevailing.

1. Author-level Visualization

This visual representation of the authorship collaboration network shows the structure of collaboration between researchers in the Decision Support Systems (DSS) field according to the bibliometric data of Scopus. This graph created with the help of VOSviewer shows how the researchers collaborate by showing nodes that represent authors and links showing how those authors collaborated. The size of each node depends on the citation and publication impact of that particular author.

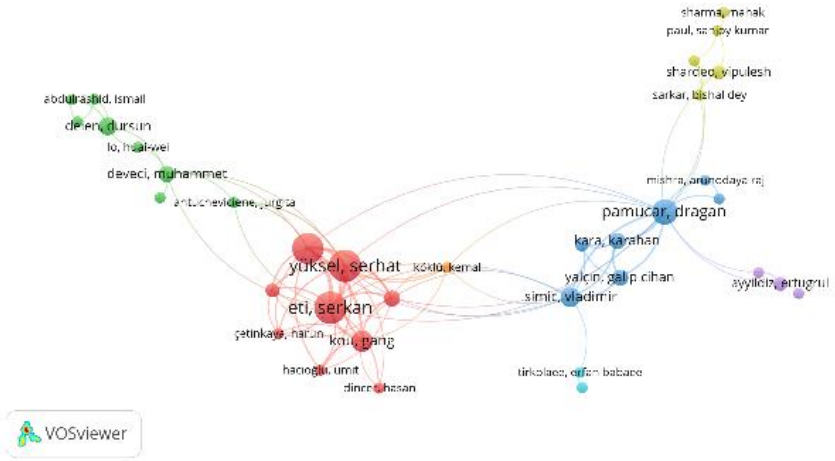

Figure 1. Author-level Visualization

Source: Data Analysis

The graph shows some clear clustering of the collaboration, thus, suggesting that the research on DSSs is a group-based endeavor and not an individual pursuit. It can be seen that the red cluster is one of the most important ones since it seems that there is considerable cooperation among the researchers within it. Authors like Vasil Serban and Eti Serkan seem to be the most important connecting points within this cluster due to the size of their nodes and many connections they have. The green and blue clusters are examples of the other two groups of collaborating authors but they look slightly less dense. In addition to this, it can be seen that while the interconnections between the clusters exist, their scope is somewhat restricted. This implies that the collaboration amongst researchers from different clusters is not as well developed as one might expect.

The research carried out on decision support systems appears to be rather fragmented, with researchers engaging in cooperation in certain networks or themes but not necessarily in interdisciplinary ones.

2. Institution-level Visualization

Figure 2 shows a co-authorship network at the institutional level in the DSS research field. In the network analysis using VOSviewer software, collaboration between institutions/departments is shown based on collaborative papers found in Scopus. The nodes in the network represent institutions/departments, while the lines indicate collaboration between them, with the size of the nodes representing their contribution to the field.

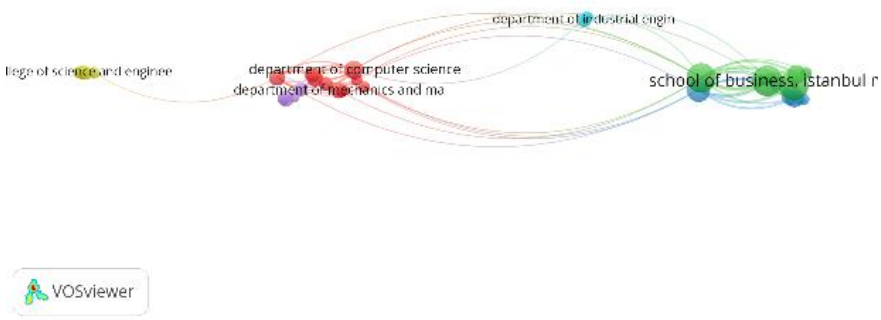

Figure 2. Institution-level Visualization

Source: Data Analysis

The diagram clearly indicates that collaborations among institutions in the area of DSS have been structured in a way that consists of different clusters, with some institutions taking the lead as hub institutions. One of those institutions is School of Business, Istanbul, which features prominently in the blue cluster. The location at the center, along with the connecting lines, shows that this institution serves as a focal point in terms of knowledge exchange and collaborations with other institutions. Departments of Computer Science and Department of Industrial Engineering can be seen to constitute another cluster within the field of DSS research.

Furthermore, the network analysis shows that although there are distinct collaborations among the institutions, the ties among them are rather linear and low in density, implying that the institutional collaboration is still evolving and not yet fully developed. The existence of bridging nodes that connect clusters signifies interdisciplinary collaboration among them, especially among engineering, computer science, and business-related domains. Nevertheless, the lack of ties among clusters provides a good chance to extend institutional collaboration and strengthen their contribution to DSS studies around the world.

3. Country-level Visualization

Figure 3 shows the co-authorship network of the Decision Support Systems (DSS) research field at the national level. Created using the VOSviewer software, the figure depicts the pattern of international collaboration in the field of research by the number of co-authored articles recorded in the Scopus database. In this network, the nodes represent the countries, where the size of the node denotes the amount or importance of the contribution, and the lines joining these nodes depict the cooperation between them.

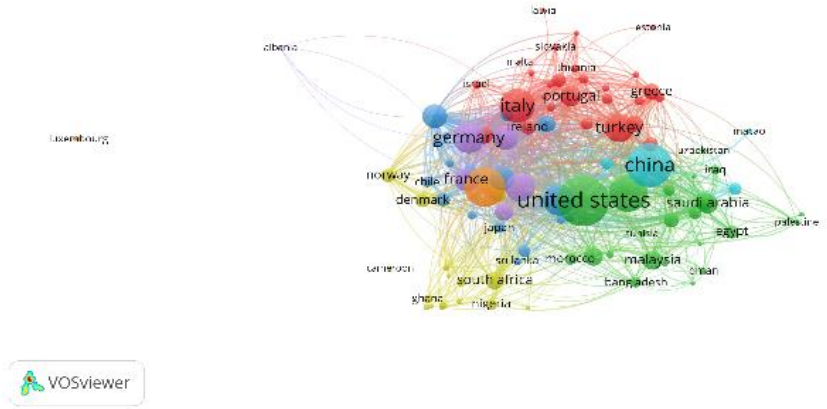

Figure 3. Country-level Visualization
Source: Data Analysis

As shown from the figure above, the study of DSS is highly internationalized, with many nations acting as key nodes within global collaboration networks. The United States acts as the major node within the network, pointing out that it plays a significant role in terms of both research production and collaboration with other nations. It has strong links with many nations like China, Saudi Arabia, among others, creating a green cluster, showing that there is collaboration among nations in different regions. Also, there is an evident green cluster involving Europe, where nations like Germany, Italy, France, among others, show that collaboration among nations is strong because of common academic networks and research frameworks.

On the other hand, as evident from the diagram, the world DSS research network is increasingly integrating emerging and developing nations such as Malaysia, South Africa, and Bangladesh into its network. Even though their node sizes are relatively small, it can be clearly seen that their inclusion within the network and their connectivity suggest that they too are increasingly becoming part of international collaborative research efforts. In this context, it may also be stated that some regions do not seem to have connectivity at all.

3.2 Citation Analysis

Citation analysis is employed to assess the significance and influence of scholarly articles, authors, and DSS studies. Through citation analysis, the present study is able to identify key citations and influential authors who have played an important role in the development of the field of DSS.

Table 1. The Most Impactful Literatures

Citations	Authors and year	Title
3905	[9]	A survey of methods for explaining black box models
3026	[10]	Transparent reporting of a multivariable prediction model for individual prognosis or diagnosis (TRIPOD): The TRIPOD statement
2805	[11]	A survey of trust and reputation systems for online service provision
2542	[12]	Systematic review: Impact of health information technology on quality, efficiency, and costs of medical care
2271	[13]	The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm
2265	[14]	A state-of the-art survey of TOPSIS applications

Citations	Authors and year	Title
2196	[15]	Improving clinical practice using clinical decision support systems: A systematic review of trials to identify features critical to success
2192	[10]	Transparent reporting of a multivariable prediction model for individual prognosis or diagnosis (TRIPOD): The TRIPOD statement
2136	[16]	Revolutionizing healthcare: the role of artificial intelligence in clinical practice
1911	[17]	2019 European League Against Rheumatism/American College of Rheumatology Classification Criteria for Systemic Lupus Erythematosus

Source: Scopus, 2026

Based on Table 1, the literature that has had the greatest impact on DSS research seems to be concentrated among very highly cited review articles and methodologies, especially those dealing with healthcare and artificial intelligence. This is exemplified by important research conducted by [9] and [10] concerning the use of explainable models and standards for DSS. Also, fundamental literature produced by [11] and [12] regarding trust mechanisms and technologies of health care information plays an important part. Moreover, there are many healthcare-related articles that have been influential, like the study by [15]. Finally, there are some relatively new publications that seem to signify an increasing trend toward using artificial intelligence in DSS.

3.3 Keyword Co-Occurrence Analysis

Keyword Co-occurrence Analysis is conducted to discover the concepts and themes in the area of DSS. Through keyword analysis, one will be able to identify important research topics and themes in the field, as well as understand the future trends in DSS research.

1. Network Visualization

The co-occurrence network of the keywords depicts the theoretical framework and development trends of DSS studies by using indexed papers from Scopus. This is done using the VOSviewer tool, which provides the linkages among frequently used keywords in which the size of the nodes represents the importance of that particular keyword while the links depict how often two keywords co-occur. Different clusters of keywords in various colors indicate the main topics of research.

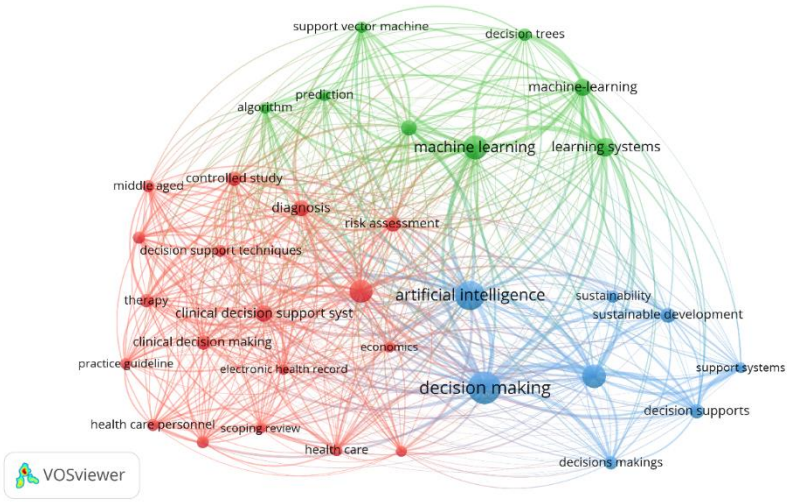

Figure 4. Network Visualization

Source: Data Analysis

Figure 4 shows three primary thematic groupings that make up the DSS research domain. The first group highlighted in red consists mainly of applications in the healthcare sector, given that keywords like "clinical decision support system," "clinical decision-making," "diagnosis," "therapy," and "electronic health records" belong to this cluster. This means that the healthcare sector is still one of the best-established and extensively researched areas for DSS applications. The high degree of interconnectedness among these keywords is an indication of a mature research domain that extensively applies DSS to enhance clinical performance, optimize therapy choices, and increase the efficiency of the healthcare system.

This cluster focuses on the technological and methodology background of DSS with a predominance of keywords such as machine learning, support vector machine, decision trees, prediction, and algorithm. The inclusion of this cluster is evidence of the increased use of sophisticated computing methods within DSS, focusing mainly on the areas of prediction and intelligent systems design. Machine learning, which acts as an important node within this cluster, shows the significance of machine learning in upgrading traditional DSS to advanced DSS. The presence of links within this cluster suggests that the rate of growth and development in this field is high.

Blue Cluster revolves around decision making methodologies and larger context of applications, and its key words include decision making, artificial intelligence, decision supports, sustainability, and sustainable development. Thus, it shows that there has been some extension of DSS research beyond the realm of technology to more strategically and interdisciplinary fields like sustainability and management of complex systems. Artificial intelligence has been positioned at the crossroads of different clusters as an integrating factor linking innovations in technology with decision making.

2. Overlay Visualization

The overlay visualization of keyword co-occurrences brings a temporal view of changes in the development of themes in DSS research. Compared to traditional network visualizations, the present figure uses colors that reflect the average publication year of the keyword; therefore, the darker the shade, the older the keyword, while lighter shades of yellow represent keywords used in recent times. Thus, the visualization reveals not only popular themes but also developing ones.

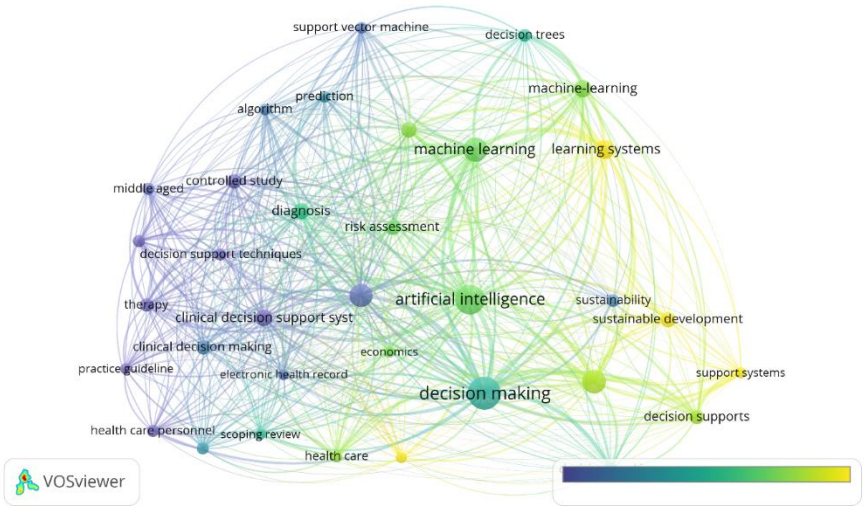

Figure 5. Overlay Visualization

Source: Data Analysis

This diagram demonstrates that the initial stages of DSS studies, depicted in darker blue and purple colors, were characterized by focusing on applications related to the healthcare industry and fundamental concepts of decision support. The keywords such as clinical decision support system, therapy, diagnosis, practice guideline, and health care personnel prevail during this initial stage, which indicates that DSS started being used initially in medicine. Thus, such subjects as structured knowledge systems and evidence-based practice prevailed at that time. It may be assumed that healthcare became the base of DSS researches.

With the advancement of time towards the green nodes on the timeline, the thrust in DSS studies turns towards the development of technology, especially involving artificial intelligence and machine learning. Machine learning, support vector machine, decision tree, prediction, and algorithms start becoming popular keywords in this process. In this phase, there is a shift towards the importance of an intelligent system that could handle complicated data sets and predict results out of them. Artificial intelligence becomes the center of attention during this shift, which reflects its significant influence.

The last cluster is defined by nodes colored in yellow, where the focus of DSS literature shifts towards areas that are even more general and strategic than before, namely decision-making, decision-supports, sustainability, sustainable development, and support systems. Such a trend means that DSS applications are becoming wider and more complex, going beyond conventional spheres. It should be mentioned that the increasing appearance of keywords associated with sustainability shows the growing role of DSS in solving sustainable issues.

3. Density Visualization

Visualization based on the density of keyword occurrences can provide a view into the concentration and emphasis in DSS research from an intensity aspect. In this kind of visualization, colors denote the occurrence and prominence of keywords, with bright-colored regions being highly studied areas (yellow), while darker-colored regions correspond to emerging or less-studied areas (green to blue). Through the use of this visualization technique, the key areas in DSS research can be determined.

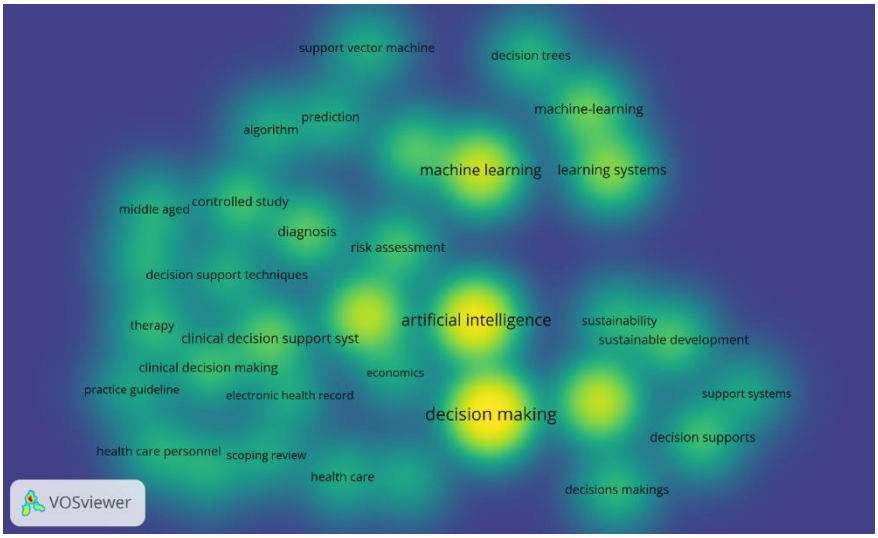

Figure 6. Density Visualization

Source: Data Analysis

The graph suggests that the primary research foci revolve around decision making and artificial intelligence, which can be noticed to be among the brightest spots on the map. That is to say that these issues are at the heart of the field of study and are interrelated

with many others. Another bright spot, machine learning, also confirms the increasingly important role played by data-driven and intelligent methods in decision support. Decision-making, artificial intelligence, and machine learning, together, constitute the three main aspects of current DSS studies. Moreover, there are many more secondary clusters around the main topics. For example, the cluster related to the medical industry is also quite dense. The healthcare-related keywords like clinical decision support system, therapy, diagnosis, and electronic health record form moderately dense clusters. This shows their significance but not at the same level as the primary clusters. Furthermore, the sustainability and sustainable development topics are also forming clusters, which are less dense than the primary clusters.

Discussion

The results obtained from this bibliometric analysis show that there has been significant development and change within the field of research on Decision Support Systems (DSS), especially between the years 2000 and 2026. The rising number of publications, combined with the involvement of multiple fields of knowledge, demonstrates that DSS has become an extremely interdisciplinary research area. The origins of DSS research can be traced back to structured decision models and application in specialized fields, including health care; however, through time, DSS research has become more sophisticated and diversified. The results of the authorship network show that DSS research has a nature of collaboration, but these collaborations can be described as cluster-based because the level of interconnection between clusters is very low. The main contributors and centers are regarded as nodes that are responsible for pushing the development of research within clusters. Nevertheless, the fact that the links between clusters are weak indicates that the field is somehow fragmented; collaborations take place only within certain geographical locations or thematic areas.

In terms of citations, the domination of high-cited review papers and methods shows the value of fundamental science and its role in forming the area of decision support systems. The influential publications usually deal with systematic reviews, methodology of decision making, and implementation of technologies in areas like health care. It means that there is value for synthesis and methodology that can be the base for innovation. However, the presence of recently cited papers about artificial intelligence shows the development in technological aspect of decision support. The analysis of co-occurrences, overlays, and densities of keywords provides an overall indication of the development of themes within the study of DSS. From being primarily based on applications in the healthcare sector, the topic has gradually moved towards using artificial intelligence and machine learning methodologies. More recently, there has been significant movement in other areas, including sustainability and complex decision-making situations. This reflects the move from domain-specific DSS to a more intelligent form of DSS that involves the use of artificial intelligence as a bridging idea between the two ends.

These findings indicate that DSS research is undergoing a period of maturity and transformation, where well-established application domains and new technology advancements coexist simultaneously. In spite of having solid grounds and effective knowledge structures, there are still chances for developing cooperation among researchers and integrating various streams of studies, as well as exploring new topics like sustainability and decision analytics in real time. Thus, further investigations must be concentrated on encouraging cooperation among different specialists and utilizing new technologies, which will keep the area up-to-date.

4. CONCLUSION

The present study presents a thorough bibliometric review of research in the area of Decision Support Systems (DSS)

between 2000 and 2026, and shows how this area has developed and become much more complicated. According to the results obtained, the research area in question has evolved from domain-based studies, especially in health care, into a highly technological area that uses artificial intelligence and machine learning as core aspects. Research cooperation demonstrates the existence of significant research clusters, but a higher level of interaction between countries and scientific fields is still required. Citation analysis underlines the significance of basic studies, while keyword analysis indicates that novel topics have been introduced, including sustainability and intelligent decisions. It is clear that the research area remains vital, and its further development is conditioned by the extent of collaboration and technological progress.

REFERENCES

[1] A. Artelt and A. Gregoriades, "Supporting organizational decisions on How to improve customer repurchase using multi-instance counterfactual explanations," *Decis. Support Syst.*, p. 114249, 2024.

[2] G. Hoogenboom *et al.*, "Decision Support System for Agrotechnology Transfer Version 4.5. Volume 1: Overview," *Int. Consort. Agric. Syst. Appl. Univ. Hawai*, 2003.

[3] A. Yousaf, V. Kayvanfar, A. Mazzoni, and A. Elomri, "Artificial intelligence-based decision support systems in smart agriculture: Bibliometric analysis for operational insights and future directions," *Front. Sustain. Food Syst.*, vol. 6, p. 1053921, 2023.

[4] F. Gault, *Handbook of innovation indicators and measurement*.

[5] J. Li, M. Nazir Jan, and M. Faisal, "Big data, scientific programming, and its role in internet of industrial things: a decision support system," *Sci. Program.*, vol. 2020, no. 1, p. 8850096, 2020.

[6] K. Tsiamas and S. Rahimifard, "A simulation-based decision support system to improve the resilience of the food supply chain," *Int. J. Comput. Integr. Manuf.*, vol. 34, no. 9, pp. 996–1010, 2021, doi: 10.1080/0951192X.2021.1946859.

[7] N. Donthu, S. Kumar, D. Mukherjee, N. Pandey, and W. M. Lim, "How to conduct a bibliometric analysis: An overview and guidelines," *J. Bus. Res.*, vol. 133, pp. 285–296, 2021.

[8] N. Van Eck and L. Waltman, "Software survey: VOSviewer, a computer program for bibliometric mapping," *Scientometrics*, vol. 84, no. 2, pp. 523–538, 2010.

[9] R. Guidotti, A. Monreale, S. Ruggieri, F. Turini, F. Giannotti, and D. Pedreschi, "A survey of methods for explaining black box models," *ACM Comput. Surv.*, vol. 51, no. 5, pp. 1–42, 2018.

[10] G. S. Collins, J. B. Reitsma, D. G. Altman, and K. G. M. Moons, "Transparent reporting of a multivariable prediction model for individual prognosis or diagnosis (TRIPOD): the TRIPOD statement," *J. Br. Surg.*, vol. 102, no. 3, pp. 148–158, 2015.

[11] A. Jøsang, R. Ismail, and C. Boyd, "A survey of trust and reputation systems for online service provision," *Decis. Support Syst.*, vol. 43, no. 2, pp. 618–644, 2007.

[12] B. Chaudhry *et al.*, "Systematic review: impact of health information technology on quality, efficiency, and costs of medical care," *Ann. Intern. Med.*, vol. 144, no. 10, pp. 742–752, 2006.

[13] E. L. Chaikof *et al.*, "The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm," *J. Vasc. Surg.*, vol. 67, no. 1, pp. 2–77, 2018.

[14] M. Behzadian, S. K. Otaghsara, M. Yazdani, and J. Ignatius, "A state-of the-art survey of TOPSIS applications," *Expert Syst. Appl.*, vol. 39, no. 17, pp. 13051–13069, 2012.

[15] K. Kawamoto, C. A. Houlihan, E. A. Balas, and D. F. Lobach, "Improving clinical practice using clinical decision support systems: a systematic review of trials to identify features critical to success," *Bmj*, vol. 330, no. 7494, p. 765, 2005.

[16] S. A. Alowais *et al.*, "Revolutionizing healthcare: the role of artificial intelligence in clinical practice," *BMC Med. Educ.*, vol. 23, no. 1, p. 689, 2023.

[17] M. Aringer *et al.*, "2019 European League Against Rheumatism/American College of Rheumatology classification criteria for systemic lupus erythematosus," *Arthritis Rheumatol.*, vol. 71, no. 9, pp. 1400–1412, 2019.