A Bibliometric Analysis: A Comparative Perspective on the Digitalization of Decision-Making Processes

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Abstract

The bibliometric analysis comparative perspective on the chosen research topic appears and is imposed in a context of necessity due to the popularization of the digital phenomenon. A trend that also affects and changes classical management, making research in the field an important need for both practitioners and researchers, allowing new theories to be identified or even classical ones to be modified. In this sense, the main objective of this paper is precisely to confirm the hypothesis that in the context of decision-making in organizations, digitalization should not be seen as a singular reality, but should be extended to its elements. The paper also focuses on creating a topical framework, establishing the trend of the chosen research topic and presenting possible future directions. Thus, the research will focus on the use of a bibliometric analysis carried out using the VOSviewer software, as well as on the interpretation of the data of the two analyzed networks. The data selection was carried out in two series for the period 2015–2025, both consist only of articles written in English and are extracted from the Web of Science Core Collection. The first dataset contains 823 articles, while the second one includes 2,936 articles. The research results bring a novel element to the field precisely through the comparative perspective of the analysis. They will contribute to a better understanding of the most relevant aspects of the digitalization of the decision-making process and will highlight the scope of the subject.

Keywords

Digitalization, decision making, bibliometric analysis, organizations.

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Introduction

The digitalization of the decision-making process is becoming an integral part of management and the use of digital technologies is on a normalization trend among managers and organizations; implications that have also led to the growth of studies in the field, thus reflecting the importance and notoriety of the subject for researchers. In this regard, this paper aims to analyze the current situation of the size of the specialized literature in the area of the subject of digitalization of the said process. It is notable that in this matter some studies consider presenting the evolution of research in the field to be something difficult to achieve (Calderon-Monge and Ribeiro-Soriano, 2023), while others believe that there are gaps in theoretical research in areas related to the use of digital features in the decision-making process (Di Vaio, Hassan and Alavoine, 2022). The literature also highlights the fragmentation of these studies, which can create uncertainty in the theoretical area (Bevilacqua et al., 2025). Therefore, the study aims to determine the current state of knowledge in the field and to conduct a bibliometric analysis of the specialized literature, aimed at creating a current context, determining its trend and laying the foundation for possible future research. In this sense, the paper is focused on an exploratory approach, with a structure intended to provide a coherent and practical context. Its configuration includes a presentation of the specialized literature, which

also has the role of deepening the visions of the chosen field of study and which aims to present the conceptual framework; this part being followed by the research methodology, namely the presentation and explanation of the chosen research method and its implications for the study; followed by the results and discussion's part where the results of the research will be presented. The final research results should demonstrate that digitalization is not present in the decision-making process as a singular element, but rather it is encountered through its specific components, such as artificial intelligence, which tends to gain more relevance than the phenomenon of digitalization itself. Additionally, regarding the relevance of the study, it can be said that the comparative approach through bibliometric analysis is not commonly encountered in practice. That is precisely why this study is highly important for complementing the specialized literature with a different perspective, one that aims to highlight current trends in the chosen field of study.

1. Review of the scientific literature

The literature marks the rise of the trend of digitalization of the decision-making process through the prism of bibliometric studies; some authors are of the opinion that the use of such analyses in research can have a guiding role (Ossiannilsson et al., 2024). Moreover, studies in the field of digitalization of the said process and those in related fields, such as the use of AI, also serve as trend setters for those fields, allowing authors to determine certain future directions (Ruiz-Real et al., 2020). Certain authors have managed to identify key areas where AI in relation to sustainable development, has managed to make a significant contribution to the management of organizations (Sulich, Sołoducho-Pelc and Grzesiak, 2023). The usefulness of a bibliometric approach in the matter is largely due to the role it plays in identifying existing patterns in the research area (Trif and Dumitrașcu, 2024), which helps determine the specific features of the digitalization of the said process that have not yet been explored or those that do not have such a high influence on decision-making and which will either cease to exist in the future or undergo radical changes. An impact assessment for the chosen study area is given by the works that highlight the significant difference between the pre and post Covid-19 periods, highlighting the evolution and rapid adaptation of the decision-making process, respectively leadership, to digital technologies (Espina-Romero et al., 2023), while other authors have also managed to highlight the changes in perspectives between these two periods, comparatively analysing the different approaches to data driven decision making (Lagzi et al., 2025). Additionally, through the quantitative analysis of scientific literature, it can be also noted that the process by which AI starts from the elaboration of data and is materialized by its exploitation in various areas also contributes to the said process (López-Robles, et al., 2019), thus emphasizing the ways of using digitalization in decisions. In addition to these, academic efforts in the field of bibliometric approaches have also managed to identify the fundamental role that big data processing has in reconfiguring studies in the area of information management (Ragazou et al., 2023), which at the same time implies a change in perspectives in the decision-making area. In a study analysing the implications of remote work and management, two different approaches were applied, namely a quantitative analysis through VOSviewer and a qualitative one through respondents, a comparison that allowed the identification of major differences between the approaches taken by researchers and respondents, namely the fact that the former focus on digital transformation, supply chain and others, while the respondents focus on aspects related to decision-making, organizational culture and others (Mirakyan and Berezka, 2022). With the help of quantitative studies, it was also possible to determine the relationship between digitalization, decision-making and performance measurement systems and the impact of digitalization on the decision-making process and the role it plays in PMS were highlighted in this context (Sahlin and Angelis, 2019). It can be emphasized that the digital environment brings a series of advantages to the said process, which in turn serves management in a positive way.

2. Research methodology

In order to achieve the proposed objectives, the paper aims to research from a comparative perspective the phenomenon of digitalization in the context of the decision-making process in organizations and the elements of digitalization in the same context. Thus, the present study focuses on the quantitative analysis of certain works indexed in the Web Of Science Core Collection, on which a bibliometric analysis will be performed. The popularity of this research methodology is often emphasized in the specialized literature (Donthu, et al., 2021) and it involves the application of quantitative techniques to bibliometric data (Broadus, 1987). In terms of research methodology, the study focused on using two different data sets, but on which the same filters were applied, namely: the type of work (respectively article), the time period in which the articles were published (2015-2025) and the language of writing (English). For the first dataset, terms were primarily selected to reflect the phenomenon of digitalization in its general context, namely:

digitalization, digitization, digital transformation, digital technologies; alongside these, additional terms were used to reflect the context in which digitalization is situated, namely: decision-making, decision process, organizational decision-making, organization, enterprise, business and corporation. For the second dataset, terms were used to capture the elements of digitalization applied in the decision-making process, namely: artificial intelligence, machine learning, data-driven, big data and predictive analytics, and for the context in which they are found, the same terms were used as in the first set. The selection of the keywords used to generate data for the two series was not random, this being marked by the notoriety that the elements of digitization have in practice, such as the aforementioned AI. The interpretation of the data sets extracted was carried out through the prism of two different tools, namely VOSviewer for network mapping and Excel for cross-tabulation interpretation, respectively performing comparative analyses in PivotTables. Also, within the practical part an equation was applied to determine percentage differences between the data. The chosen research methodology is intended to portray both in an interactive manner (network map) the links between items and the size of the clusters, but also to present from a statistical point of view the number, relevance and differences between the clusters, items, of the two data sets. This approach is extremely useful for validating the initial hypothesis, namely the fact that in recent practice the digitalization of the decision-making process is not seen so much through its unitary character but rather through its elements. Moreover, the chosen research approach is the most appropriate for the subject of this paper, mainly because bibliometric analysis allows for an objective quantitative examination of the scientific literature and accurately reveals its trends.

3. Results and discussion

When it comes to the digitalization of the decision-making process, several perspectives must be taken into account, namely the fact that in the context of decision-making, both in literature and in practice, the phenomenon of digitalization is not found in a singular format, but it can be encountered through the prism of its elements, respectively the particularities that it encompasses, such as the tools used in practice (AI, big data). The paper aims to present two different perspectives, namely the one focused on the connection of digitalization as a singular element with decision-making and the connection of its tools or particularities with the decision-making process.

In the network of digitalization and decision-making in organizations part, a total of 823 articles that met the network and relevance requirements were extracted; and based on the data obtained a network map was created using the VOSviwer software (Figure no. 1). Its main purpose was to portray the strong links between the elements related to the digitalization of the decision-making process and to highlight the most relevant terms used in the literature.

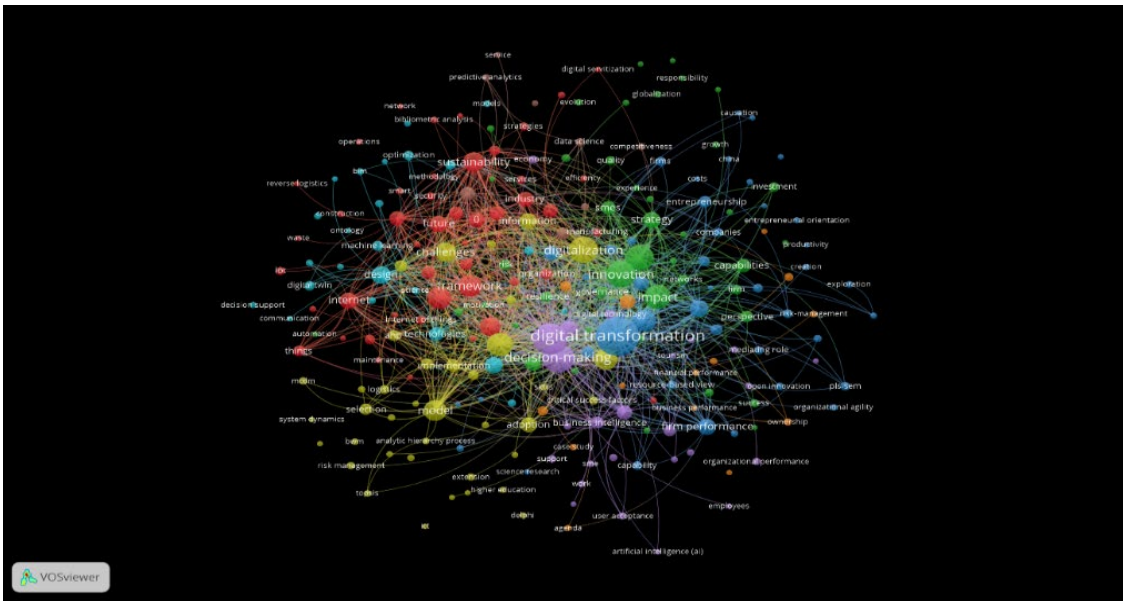

Figure no. 1. VOSviewer network map for digitalization and decision-making

According to the visual network generated by the software, it can be seen that the most "powerful" terms encountered in this context are those of "digital-transformation", "digitization" and "innovation", which

states that within the decision-making process, digitalization is often not directly associated with it but is connected to decision-making through the innovation it brings and the technologies it offers. The figure also shows the strong connection between decision-making and the digital context. Leaving aside the less relevant elements visible in the map, it can be said that the frequency of using the digital environment in the decision-making process is high, thus taking into account the total number of 823 articles compared to the analyzed time period, namely the one between 2025-2015. Further, in a more detailed analysis of the collected data, respectively in terms of items and clusters, the existence of clusters that are very similar in number of items is indicated (Table no. 1).

Table no. 1. Clusters and items list

Clusters	Items
1	46
2	43
3	42
4	38
5	25
6	24
7	14
8	8
General total	**240**

The data processed in VOSviewer were exported and interpreted in Excel, where the clusters and items of the database were grouped by means of a PivotTable; summing up a total number of 8 clusters and a total number of 240 items, thus presenting their groupings and the relevance of each cluster in particular. An analysis of the occurrence that items in each cluster have was also performed in order to determine the size of the frequency with which they are encountered (Table no. 2).

Table no. 2. Occurence of items from each clusters

Clusters	Items	Sum of weigh <Occurrences>
1	46	848
2	43	744
3	42	783
4	38	770
5	25	526
6	24	293
7	14	136
8	8	100
General total	**240**	**4200**

From these interpretations it can be seen that although cluster no. 2 has more items than the third, this aspect does not necessarily reflect a higher occurrence for the items, but in regards to the first 4 clusters it can be stated that their items have a high occurrence value in the database used for the research, which indicates their high use in practice, therefore a relevance for the research area. Next, in order to consolidate the study, a filtering of the first 5 most frequently encountered items and their frequency of occurrence was carried out (Table no. 3).

Table no. 3. Occurrence of first 5 items

Items	Sum of weigh <Occurrences>
decision-making	127
digital transformation	231
digitalization	109
innovation	108
management	146
General Total	**721**

Therefore, regarding the 5 most prevalent items, it can be determined that they are found very frequently in the same context, which indicates a high degree of use of digitalization in the context of: digital changes and innovation in decision-making management. However, it should be noted that in other studies, clusters

such as decision support systems or information management also stood out due to their scale (Trif and Dumitrașcu, 2024).

In the network of elements of digitalization and decision-making in organizations part and in a comparative manner, another database was also analyzed, this one is not focusing on digitalization as a whole, but on its particularities in terms of the elements it has and which are often encountered in practice in organizations. For this part, a total of 2,936 articles corresponding to the network and relevance requirements were extracted, therefore a visibly higher number than in the case of the first part, thus being a significant difference calculated in the following formula:

$$Percentage\ difference = ((2936 - 823) / 823) \times 100 \approx 256{,}7\% \quad (1)$$

Aspects that affirm the hypothesis that digitalization in the context of the decision-making process should not be analyzed only through a perspective restricted to the term itself but extended to its elements most frequently encountered in practice and which researchers, according to the formula above, seem to use much more often. For example, in other studies, artificial intelligence is broken down and analyzed through its application in multiple fields, such as management intelligence (López-Robles, et al., 2019) .Therefore, based on the collected data, a new network map was created, one that marks the density and connections of the data set (Figure no. 2).

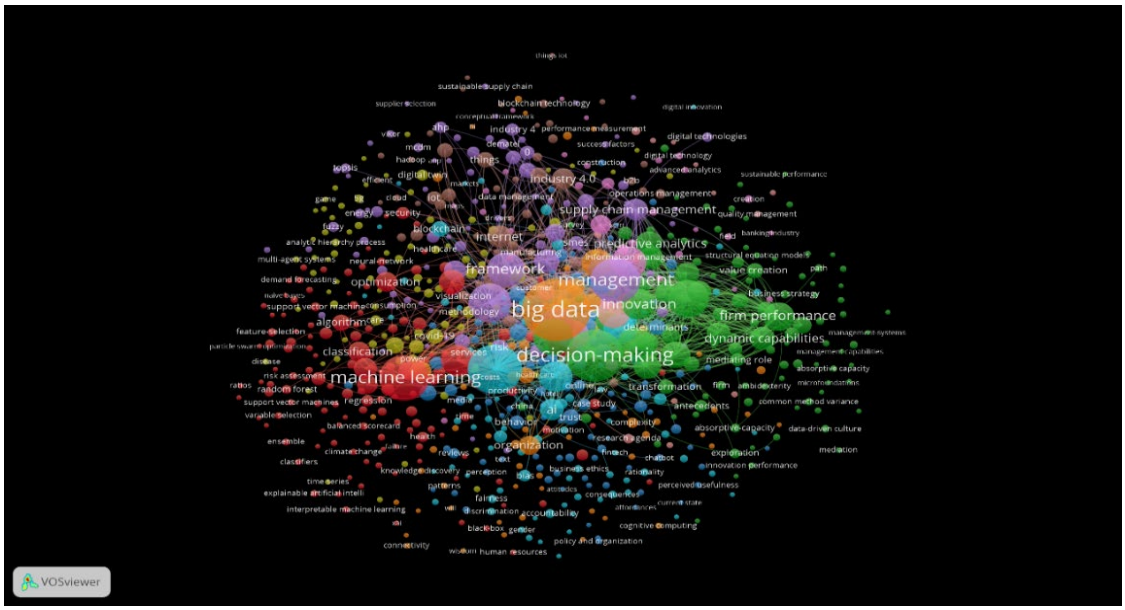

Figure no. 2. VOSviewer network map for digital elements and decision-making

A first considerable difference for the second map is given by the size of the term decision-making; which is much more visible in this context and which confirms the general hypothesis of the study, namely the fact that decision-making is encountered more often in the context of elements related to digitalization; and as for these elements, the most visible in the network can be highlighted as "big data" and "machine learning". However, in a similar study, researchers identified a cluster focused on the existence of opposing visions regarding decision-making in the context of sustainable development, thus identifying the use of AI under the VUCA (volatility, uncertainty, complexity and ambiguity) phenomenon as an important element of the digitalized decision-making process (Nikseresht et al., 2022). Also, in an analysis of the most frequently encountered keywords related to the digitalization of management and business, Covid-19 was identified at the top of the list and some researchers believed that this hierarchy can be explained by the perspective of the influence that the pandemic had on the use of digital technologies and which ultimately created the advantages of data-driven decisions (Talafidaryani, Jalali and Moro, 2023). Nevertheless, it can be observed that in the present analysis, this term no longer holds such significant relevance.

Comparatively, the much more obvious presence of the items: management and innovation, should also be noted, which implies that they are much stronger in this context. In terms of the total number of items and clusters, the accumulated data once again indicates a remarkable difference between the two maps (Table no. 4).

Table no. 4. Clusters and items list

Clusters	Items
1	145
2	114
3	112
4	91
5	81
6	81
7	66
8	56
9	35
10	13
Total general	**794**

From the data presented in the table it can be seen that although the total number of clusters is not significantly higher, in terms of items the situation is notable, as there are high differences of items per cluster. As a comparative example, Cluster no. 1 from both series can be highlighted, the difference in volume between them being the following:

$$Percentage\ difference = ((145 - 46) / 46) \times 100 \approx 215{,}22\% \quad (2)$$

In terms of occurrence, the situation of the second data set also indicates a higher number of occurrences, thus also related to the much higher number of items and similar to the previously presented situation, the cluster with the highest number of items does not equal a higher occurrence (Table no. 5).

Table no. 5. Occurrence of items from each clusters

Clusters	Items	Sum of weigh<Occurrences>
1	145	2627
2	114	3860
3	112	1532
4	91	953
5	81	2371
6	81	1778
7	66	1678
8	56	1183
9	35	763
10	13	258
Total general	**794**	**17003**

Cluster 2 validates the previous assumption that a high number of items≠high number of occurrences, which indicates that it is not the number of items that makes that cluster strong but their frequency in the network. In this sense, for the second data set, the 5 most frequently encountered items are the following (Table no. 6).

Table no. 6. Occurrence of first 5 items

Items	Sum of weigh <Occurrences>
artificial intelligence	449
big data	710
decision-making	508
machine learning	376
Management	384
Total general	**2427**

Within this analysis, one can observe the strong presence of the ”big data” item in the context, but also the appearance of some items also present in the previously analyzed data set, which led to the performance of a comparative analysis of these appearances (Table no. 7).

Table no. 7. Comparison of the first 5 items from each data set

Item	Occurrence 1st data set	Occurrence 2nd data set	% Difference
decision-making	127	508	300%
digital transformation	231	0	-100%
digitalization	109	0	-100%
innovation	108	0	-100%
management	146	384	163%
artificial intelligence	0	449	-
big data	0	710	-
machine learning	0	376	-

From the comparative analysis of the 5 most frequently encountered items of the two network data sets, the percentage difference of the 2 items found in both situations is highlighted. Therefore, from the perspective of the individual analysis of each data set, the following aspects can be determined:

- For the first data set, a lower relevance is identified, indicating the existence of a lower interest in analyzing the decision-making process in organizations in the simple context of digitalization, digital technologies or digitization.
- For the second data set, a higher relevance is identified, indicating the existence of a much higher interest in analyzing the decision-making process in organizations in the context of elements related to digitalization.

From a comparative perspective of the two data sets, the future direction of the research area can be determined, namely the fact that it does not focus much on digitalization as a phenomenon in itself but on its utility, namely on the elements related to the use of digitalization in practice.

Conclusions

The research results show the increasing trend of digitalization of the decision-making process in organizations; only by reporting to the total number of articles used in the two data sets, namely 3759, it can be determined that in terms of research and specialized literature there is a high interest in the phenomenon of digitalization and its particularities, which automatically indicates a much higher use of them in practice in organizations. In terms of future directions, the findings of the work suggest deepening the implications that digital technologies have in the decision-making process in organizations, which indicates a possible separation of the elements of digitalization depending on their use in practice, some of them retaining their relevance while others will either undergo substantial changes in order to remain in practice, or will disappear and be replaced by other tools or new features. The relevance of the results of this study is due in principle to the novelty and topicality of the research topic, as well as to the chosen research method, namely the comparative bibliometric analysis. By this method a reference framework is created for future research or for practitioners, but also an evaluation and portrayal of the current situation is presented, thus confirming the basic hypothesis of the research, namely the fact that in the current context, the digitalization of the decision-making process in organizations should no longer be analyzed only from an individual perspective, but it must be extended to what happens in practice, namely to its particularities most often encountered in management. In terms of limitations, the study faced the lack of similar research, specifically those focusing on comparative bibliometric analyses. In conclusion, the present work can imply that by using a comparative perspective of bibliometric analysis, trends can be determined, hypotheses regarding the impact of a phenomenon in a given context can be confirmed, but also, as in the present case, the most relevant aspects of a chosen research topic can be identified without being limited to a generic framework. As a potential extension of this study, future studies could explore the emergence or even the disappearance of certain elements within the digitalization of the decision-making process

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