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Bibliometric Analysis of Studies in the Field of Aviation Management in the Post-Deregulation Period

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Abstract

Aviation management is a broad field of science that encompasses all kinds of managerial and operational processes, generally in the safe transportation of passengers and cargo within the aviation industry. However, this branch of science, which is still very young in the history of science, acts as a catalyst in the economy by adding high added value to the world trade volume. This industry, which gained momentum with the liberalization period after 1980, has an ecosystem in which strong organizational structures can hold. With its key functions such as safety management, human resources management, marketing management, and financial management in terms of its scope, it needs a visionary perspective with a working area within the airport management network. From this point of view, understanding the development processes of the field in the literature and revealing its relationship with other variables will provide a systematic and holistic perspective to the related literature. For this purpose, the bibliometric analysis method was used in this study, which was conducted in the field of aviation management. The study covers a process, especially from the liberalization period to the present. The purpose of this study in the field of aviation management is to create a perspective on the aspects in which the field offers mobility, the development, quality, and quantity of the process. In this context; In this content; Studies in the field of aviation management were taken from WEB of Science (VOSviewer). Word cloud and keyword maps were created covering the distribution of the studies by years, the authors who contributed the most to the field, the institutions, and journals according to the number of publications, and the languages used in the publications. The contribution levels of the studies to the literature and the areas in which the subject interacts are explained.

1. Introduction

The aviation industry is very broad and is one of the most important components of the ever-rising service class of the global economy. It has become one of the most important components of both personal life and international trade with its fast, reliable, and short-term deliveries, technical developments, new business models in the aviation industry, and discounted ticket prices to consumers. International air travel is not only a major industry in its own right but also critically important as a component of the world's ever-expanding economy (Button & Taylor, 2000, p. 3). When we look at the aviation industry academically, the first studies that come to mind and are encountered are in the mechanical and technical characteristics of the industry. However, aviation has a multi-disciplinary service feature in a very wide area. The field of Aviation Management covers all of the core business functions. In addition, when viewed from the focus of management functions, team-based work has a deep structure where the field of organizational communication is very wide. In aviation, especially the focus on safety and profit motive should be evaluated in terms of management dilemma. The need for the maximum performance of every employee in the organization for safe operations also affects the quality of the service. In this respect, the field of aviation management in which you are evaluated; covers a wide spectrum such as human resource management, marketing management, technology management, and stand management. The fact that the industry is rapidly affected by many economic, sociological, political, and technological changes and its place in the world economic wheel creates a prediction about the diversity of studies and studies to be done in this field. However, this study, which was carried out to take this foreknowledge one step further, it was aimed to create an academic map of the studies made after the liberalization period, which was a turning point for the aviation industry. The importance of this study is to see what kind of a spectrum the studies carried out in the relevant industry is spread, and to create a perspective on which parts are missing and which gaps are filled. However, as the results of the study present a time perspective, it will also provide important information to see the development direction of the field. In the first part of the study, a general introduction was made. In the second part, general information about aviation management is given. In the third part, methodology and method information are given.

In the fourth part of the study, the findings are presented, and in the last part, the results are given.

2. Aviation Management

The air transport industry, which is defined as the transportation of passengers, cargo, or mail from one point to another by using an aircraft for a certain fee (ICAO, 2009), has some unique features. The most important feature that distinguishes air transport from other industries is that it provides faster and safer access to points that are difficult to reach, compared to its competitors (Canöz, 2018). Developments in the field of liberalization in recent years have led to the development and growth of the industry's infrastructure. Accordingly, it is a industry that continues to grow rapidly and has not yet reached saturation. Air transport industry has a highly advantageous position compared to other transportation models in terms of safety, security, comfort, speed, and quality, both in terms of passenger transportation and freight transportation. Especially with the deregulation in the USA in 1978, which means the removal of legal borders, air transport industry has become a competitive field. After these developments, airline companies started a new strategy called a hub and spoke (Oktal & Küçükönal, 2007). Air transport industry, which is an important social and economic resource for countries, has grown continuously despite negative activities such as war, economic crisis, and terrorism, and an annual increase of 4% to 5% has been observed (SHGM, Annual Report, 2012). One of the most important indicators of this is the world economic activity, which came to a halt during the covid-19 period. Although every field in the world came to a standstill with the relevant crisis, when the effect of the crisis began to fade in 2021, it showed the feature of being the most important industry that quickly returned to the limits it had come before the crisis. However, the aviation industry has such a wide range of features as cost management, human resources management, customer relationship management, and service production. The size of this organization requires several business models and serious management stability for these models to be sustainable. The field of aviation management has to ensure both profitability and safe operations within this stability. Because the most important feature that distinguishes this industry from other service management is that the smallest mistakes have dire consequences such as paying with human life. Therefore, the aviation industry has a structurally complex and spiral ecosystem. Airline companies in the aviation industry operate around the clock by adopting the concept of uninterrupted service. Airline companies, which have to serve all day long, work in shifts to increase the efficiency of the business and not overload the employees. This system increases the need for qualified employee employment (Karasu, 2007). This situation necessitates effective human resources management. Because several specialized workforces cannot be substituted in the industry. Training this workforce is time-consuming and costly. Another importance of human resources management in aviation management is related to safety management. In aviation, the sustainability of a company in terms of management depends on both economic profitability and safe operations. Approximately 75% of the accidents in aviation are due to the human factor (Xue ve Fu (2018). Therefore, safety management is considered an important field of study within aviation management. It is important in terms of customer relationship management that the human resource also has the feature of providing the service. As it is known, the determinant of service quality is the customer. At this point, marketing management also represents an important area in aviation management. Aviation management, when evaluated academically, has a wide scope such as risk management, airport management, ground handling management and airline management.

3. Methodology

Bibliometric analysis is a multidisciplinary mainstay that provides the opportunity to look at research from a broad perspective to improve the level of development of studies in the literature (Samiee & Chabowski, 2012;369). Bibliometrics is used to classify documents by quantitatively analyzing bibliographic data from scientific publications (Mao et al., 2015). Bibliometrics is a research method that includes the analysis of processes and features related to documents (Thelwall, 2008: 606). The purpose of bibliometric research; the development of the pace of the studies over time, the policies followed by the institutions where the publications are made, and the evaluation of the situation. Periodic examination of the countries in which bibliometric analysis is carried out provides the opportunity to understand the scientific infrastructure and the perspective of the field. This analysis also allows for different evaluations depending on the relevant field (Al, et al., 2012). Bibliographic analysis helps researchers discover the spread and impact of work in a particular field. At the same time, basically; It offers a perspective on measuring the effects on the formation of an individual, publication, or journal-based scientific field (Kraus et al., 2012). The bibliometric analysis includes statistical methods to identify qualitative and quantitative changes in a particular scientific research top to profile publications on the subject, and detect trends within a discipline (Rey-Martí et al., 2016: 1652). These methods, together with a systematic, transparent and reproducible review process, have the potential to improve the quality of the relevant science field (Zupic and Čater, 2014: 430). This method includes profiling, clustering, and visualization studies of publications (De Bakker et al., 2005); It gives information about mutual relations and the impact capacity of subjects, journals, authors, countries, and institutions (Krauskopf, 2018). In addition, examining the keywords in the relevant title is aimed to create a perspective on the transactional relationship readership with other areas and variables. The Web of Science Core Collection database was used in this analysis to obtain data. All bibliometric analyzes were performed via VOSviewer 1.6.16 software (Van Eck & Waltman, 2010), which is frequently used in bibliometric analyses. With VOSviewer, keywords defining the field, important themes, and band bibliographic match links between author and journals are visualized with network and density maps. Web of Science is recognized as the most comprehensive citation program for intensive data research work (et al, al 2018). For this reason, the VOSviewer analysis tool was used to map and visualize the data in the study. The number of publications, citation networks, authors, journals, countries, the scope of publication years, and the word cloud obtained from the studies have been visually transferred within the scope of this research.

4. Findings

The first data obtained as a result of the analysis was on the distribution of studies in this field by years. The data obtained are presented in figure 1. Looking at the transferred data, it is

seen that the first publication in the post-liberalization period in the aviation industry was made in 1985. There appears to have been small numbers of progress over the next 10 years. However, it can be said that as of 2011, the orientation to the field of aviation management has started. After this year, it is seen that interest in the field has increased regularly, and the number has reached its highest level in 2020. The reason for seeing 1 publication in 2022 is that the research was conducted in the first month of this year.

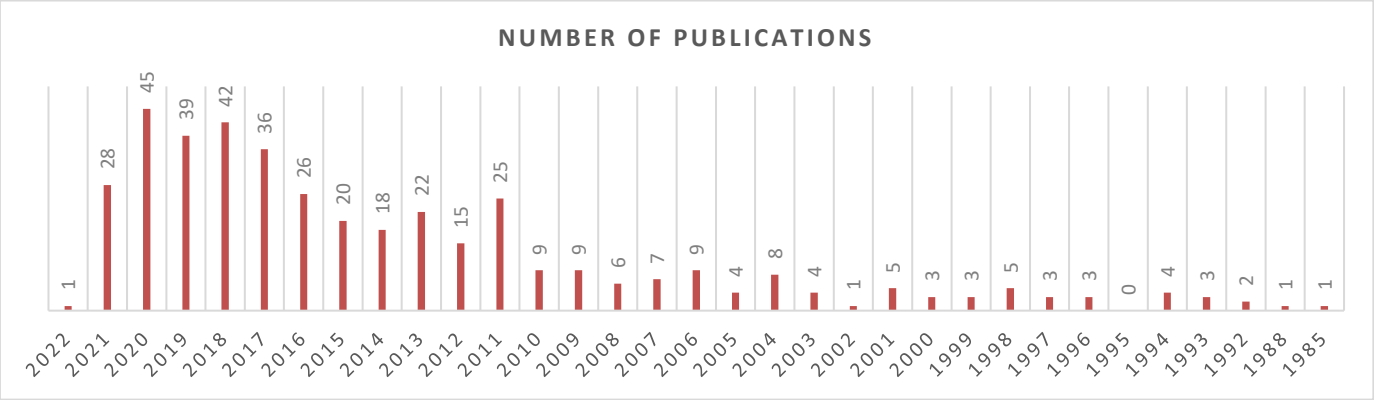

Figure 1. Distribution by years.

Table 1. Top countries

Country	Number of Publications	Percentage	Citations
USA	65	16.12%	926
Peoples R China	42	10.42%	245
Germany	34	8.43%	269
Spain	33	8.18%	343
Italy	31	7.69%	352
Türkiye	30	7.44%	148
Australia	23	5.70%	441
Poland	17	4.21%	25
England	16	3.97%	295
Brazil	14	3.47%	105
Canada	12	2.97%	237
Portugal	11	2.7%	110
Netherlands	9	2.23%	17
Taiwan	8	1.98%	78
New Zealand	7	1.73%	226
Greece	7	1.73%	37
Romania	5	1.24%	11
India	5	1.24%	22
France	5	1.24%	66
Switzerland	4	0.99%	38
Austria	4	0.99%	70
Malaysia	4	0.99%	70
Iranian	4	0.99%	8
Norway	4	0.99%	37
Singapore	4	0.99%	39
Belgium	3	0.74%	17
Colombia	3	0.74%	0
Saudi Arabia	3	0.74%	23
Pakistan	2	0.49%	0
Finland	2	0.49%	32
Denmark	2	0.49%	70
Israel	2	0.49%	53
South Africa	2	0.49%	5
Ireland	one	0.24%	3
Chile	one	0.24%	9
Croatia	one	0.24%	0
Indonesia	one	0.24%	13
Lithuania	one	0.24%	5
Russia	one	0.24%	one
Slovenia	one	0.24%	13
South Korea	one	0.24%	92
Thailand	one	0.24%	3
Wales	one	0.24%	6
Algeria	one	0.24%	one
Latvia	one	0.24%	5
Morocco	one	0.24%	one
Bosnia Herceg	one	0.24%	3
Cyprus	one	0.24%	one

Another point that was investigated as a result of the analysis was the extent to which countries contributed to this field. A total of 62 countries were found. It is seen in table 1 that the country that contributed the most to the field among the countries found was the USA with 65 publications. Afterward, the list continues with China with 42 publications, Germany with 34 publications, Spain with 33 publications, Italy with 31 publications, and Türkiye with 30 publications. Table 1 shows the most cited countries in the relevant field. It was created according to the citation values in the VOSviewer program. The USA ranks first with 65 publications and 926 citations. Australia is in 7th place in the publication ranking and is in second place with 441 citations. Italy is in the 3rd place with 352 citations, Spain is in the 4th place with 343 citations, and Italy is in the 5th place with 92 citations. On the other hand, England ranks 6th with 79 citations, despite being the country with the most publications.

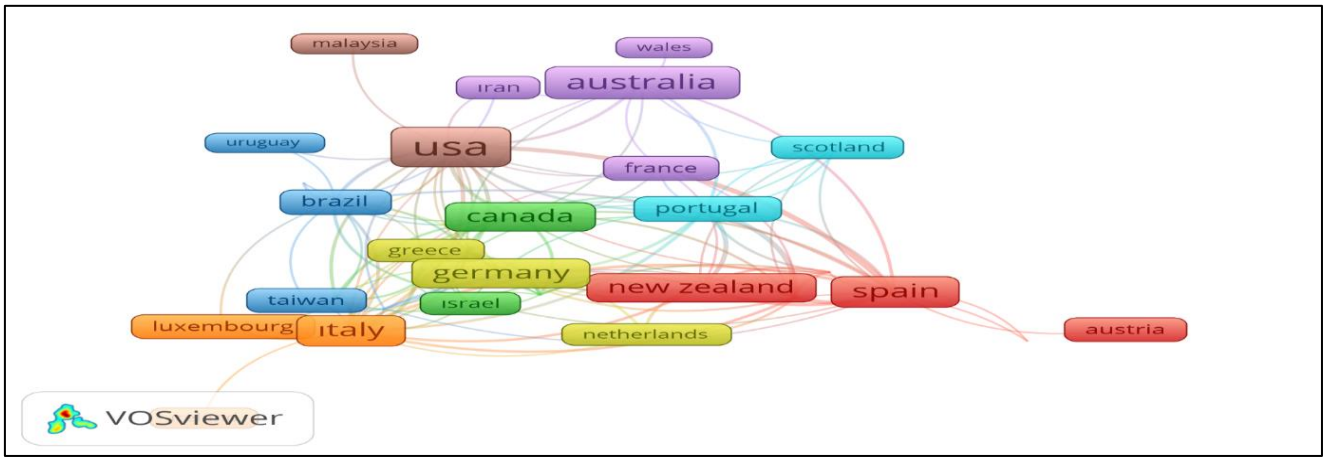

Figure 2. Citation of countries on VOSviewer

Another data obtained was on the authors who contributed the most to the field. Looking at the authors cited in table 2; Ayşe Küçük Yılmaz, Maria Freese, Jerrold Belant, and Travis Devault became the most published authors with 6 publications. The authors of countries such as Türkiye, the USA, and the Netherlands are registered as the publishers that contribute the most to the field.

Table 2. Top contributing authors

Author	Number of Publications	Country	Institute
Ayse Kucuk Yilmaz	6	Türkiye	Anadolu University
Maria Freese	6	Netherlands	Delft University of Technology
Jerrold L. Belant	6	USA	State University of New York
Travis L. Devault	6	USA	University of Georgia
James A Martin	5	USA	University of Iowa
Ender Gerede	4	Türkiye	Eskisehir Technical University
Guiming Wang	4	USA	Mississippi State University
Jose I. Castillo-Manzano	4	Spain	University of Seville
Paola DiMascio	4	Italy	Sapienza University Rome
Ian M. Humphreys	4	USA	University of Washington
Laura Moretti	4	Italy	Sapienza University Rome
Jacek Skorupski	4	Poland	Warsaw University of Technology

At this point, the country with the highest number of publications maintained its position in first place in the context of USA authors. In the following, writers from Italy, Spain, Türkiye, and, Poland drew attention. In table 3, the most published journals in the field are given. In this context, the Journal of Air Transport Management ranks first with 57 publications and 889 citations. After that, there was a big difference. Research in Transportation Business and Management ranked second with 10 publications. In the data in Table 3, the most cited journals are cited. From this point of view, although Tourism Management has published 4 publications, it has ranked second in the citation ranking. Another noteworthy journal is Transportation Research Part E-Logistics and Transportation Review, which ranked third with 170 citations.

Table 3. Distribution of the number of articles published by journals

Q. No.	Journal	Record	Citation
one	Journal of Air Transport Management	57	889
2	Research in Transportation Business and Management	10	117
3	Sustainability	7	13
4	Aircraft Engineering and Aerospace Technology	5	15
5	Transportation Research and Record	5	20
6	Tourism Management	4	242
7	Transportation Research Part E-Logistics And Transportation Review	4	170
8	European Journal of Transport and Infrastructure Research	4	13
9	Transport Policy	4	76
10	Aviation	4	7

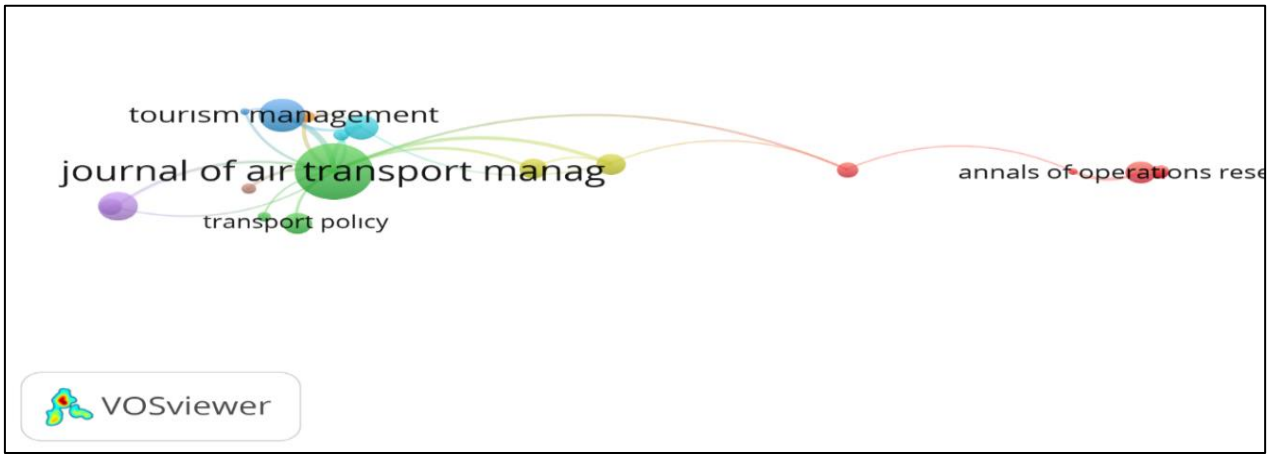

Figure 3. Citation of journals on VOSviewer

In table 4, institutions are listed according to the number of publications. Anadolu University and Helmholtz Association took first place here. Türkiye and Germany have been noteworthy countries at this point. It is seen that the USA, which is in first place in the citation order and the publication order, lags at this point. In figure 4, the most cited institutions are mapped. In this context, Waikato University formed the largest cluster with 188 citations. Then, British Columbia University ranked second with 178 citations. Anadolu University, which is in first place, fell behind in the citation ranking with 66 citations. In general, it is seen that there is an inverse proportionality between the number of publications and the number of citations.

Table 4. Distribution of documents by different institutions

Q. No.	Institution	Records	Percentage
one	Anadolu University	17	3,54%
2	Helmholtz Association	17	3,54%
3	German Aerospace Center Dlr	16	3.34%
4	Mississippi State University	7	1.46%
5	Hong Kong Polytech University	7	1.46%
6	University of British Columbia	5	1.05%
7	University Polytechnic Madrid	5	1.05%
8	University of Sydney	5	1.05%
9	NASA	5	1.05%
10	Embry Riddle Aeronaut University	5	1.05%
11th	Eskisehir Technic University	5	1.05%

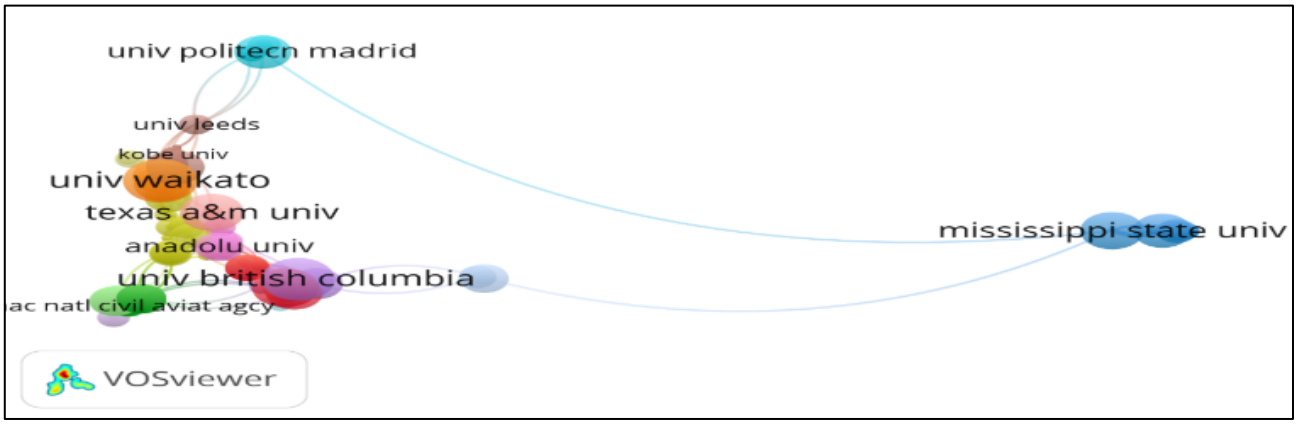

Figure 4. Citation of instituions on VOSviewer

In table 5, the language of the publications made as the last metric data was investigated. It was determined that 97.7% of the studies conducted were in English, and Spanish and Turkish were the languages that followed them. In Figure 5, the word cloud consisting of the titles of these publications is included. The feature of this transferred data is that it provides information about which words are the most repeated. Obtained in the word cloud made accordingly; It has been observed that studies related to sub-variables such as airport, airline, air transport, service quality, civil aviation, and risk management have been conducted.

Figure 5. Co-occurrence of author keywords on VOSviewer

Table 5. Distribution of Documents in various languages

Q. No.	Language	Records	Percentage
one	English	393	97.27%
2	Spanish	5	1.24%
3	Turkish	3	0.74%
4	Chinese	2	0.49%
5	Croatian	2	0.49%
6	French	one	0.24%
7	Italiy	one	0.24%

5. Conclusion

This study aims to provide new researchers a perspective on the developmental characteristics of studies in the field, related issues, leading authors and institutions, as well as a quantitative performance evaluation by looking at the metric features of the studies in the field of Aviation Management. These data will enable the researcher to make qualitative comments by transferring the quantitative metrics of journals, authors, countries, institutions, and citations. As a result of the analysis, it was on the distribution of studies in the field of aviation management by years. Looking at the transferred data, it is seen that the first publication in the post-liberalization period in the field of aviation management was made in 1985. There appears to have been small numbers of progress over the next 10 years. However, it can be said that as of 2011, the orientation to the field of aviation management has started. After this year, it is seen that interest in the field has increased regularly, and the number has reached its highest level in 2020. The reason for seeing 1 publication in 2022 is that the research was conducted in the first month of this year. According to the results of the research made based on countries, a total of 62 countries were found. It has been determined that the country that contributes the most to the field is the USA with 65 publications. When evaluated in terms of world aviation history, the fact that America is known as the base and initiator of aviation supports this conclusion. Afterward, this order was followed by China with 42 publications, Germany with 34 publications, Spain with 33 publications, Italy with 31 publications, and Türkiye with 30 publications. Of course, the most important academic development criterion in this ranking is not only the number of publications. In addition to the quantitative contribution of these publications to the literature, it is an important criterion to measure their qualitative strength. In this respect, another result of the research is given over the number of citations. According to the results of the research, the USA ranks first with 65 publications and 926 citations. It ranks 7th in the Australian publication ranking and second with 441 citations. While Italy ranks 3rd with 352 citations, Spain 4th with 343 citations, England ranks 5th despite being the country with the highest number of publications with 295 citations.

On the other hand, England ranks 6th with 79 citations, despite being the country with the most publications. At this point, it can be said that the quality of the publications, not the quantity, comes to the fore and contributes more to the literature. The number of publications and citations is very important in terms of literacy development in countries. However, at this point, it is also important to coresearchhe the authors. At this point, when we look at the authors who contributed the most to the field; Ayşe Küçük Yılmaz, Maria Freese, Jerrold Belant and Travis Devault became the most

published authors with 6 publications. At this point, while the country with the highest number of publications is the USA in terms of authors, the authors from Türkiye Netherlands Italy, Spain Poland, which are lower in the number of publications, drew attention. At this point, the fact that the contribution to the relevant field in Türkiye is remarkable is considered important in terms of the contribution to the literature. Another criterion as important as countries and authors in the research is the journals in which they are published and the number of citations received by these journals. In this context, the Journal of Air Transport Management ranks first with 57 publications and 889 citations. After that, there was a big difference. Research in Transportation Business and Management ranked second with 10 publications. Although Tourism Management has published 4 publications, it ranked second in the citation ranking. Another noteworthy journal is Transportation Research Part E-Logistics and Transportation Review, which ranked third with 170 citations. Expert Systems with Applications, which was too far behind to enter the ranking table due to a large number of journals published in the field and the necessity of making a limitation in terms of the table, took place as the fourth most cited journal with 126 citations. This result is considered an important quality indicator in terms of the number of citations to the journal. One result of the research is to reveal the institutions in the countries where the publication is made. At this point, the aim is to point out an institution that has the qualifications to be considered as the authority in that country. In this respect, the most surprising result is that the USA, which is by far the leader in the number of publications, ranks 4th in the ranking of institutions. When the field literature is examined healthily, this is a normal result. Because the USA is the first and largest representative of the relevant field in the world, the number of institutions is very high. When we look at the institutions of other countries, the institutions that published the most were Anadolu University in TÜRKİYE and the Helmholtz Association in Germany. However, since the result that reveals the quality more deeply is related to the citation received by the institution, Waikato University formed the largest cluster with 188 citations. Then, British Columbia University ranked second with 178 citations. Anadolu University, which is in first place, fell behind in the citation ranking with 66 citations. In general, it is seen that there is an inverse proportionality between the number of publications and the number of citations. In addition, it was determined that 97.7% of the studies conducted were in English, and it was understood that Spanish and Turkish were the languages that followed them. In the word cloud pool where the titles of their research were examined, it was seen that studies related to sub-variables such as airport, airline, air transport, service quality, civil aviation, and risk management were conducted. For researchers who want to do research in this related field; He is experienced in human resources management, logistics management, financial management in aviation. Because it is a big budget with the progress of the place to be taken from the human in the information given to the focal points of the past researches.

Ethical approval

Not applicable.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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