6 (3): 334-345 (2022)

Journal of Aviation

https://dergipark.org.tr/en/pub/jav

e-ISSN

Contribution of Scientific Production to Air Logistics: A Bibliometric Analysis from the 70s to the Present

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Article Info

Received: June, 06. 2022
Revised: June, 17. 2022
Accepted: July, 27. 2022

Keywords:
Bibliometric Analysis
Air Logistics
Air Transportation
Bibliometrix
Web of Science

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RESEARCH ARTICLE

https://doi.org/10.30518/jav.1121377

Abstract

With increased performance expectations based on speed and agility in logistics flow and supply chain processes, air logistics has gained popularity as a research area. Although more and more papers are published each year on this subject, to the best of our knowledge, a comprehensive bibliometric academic publication review has not been presented so far to contribute to the intellectual structure of the literature. Therefore, this study aims to investigate the last 5 decades' intellectual basis of air logistics studies that can be evaluated in the field of social sciences. For this purpose, a total of 398 articles have been accessed to be used in the bibliometric analysis of studies published in the literature of air logistics, and these data have been provided from the Core Collection Database of Web of Science (WOS). The research data consists of articles published in English in the WOS database between 1971 and 2019. Books and papers published in all other languages were not included in the research. The Bibliometrix (Biblioshiny) package of the statistical software program R was used for the analysis and visualization of the data. Research findings indicate that air logistics research has increased greatly, especially in the last 10 years. The most productive countries are the United States, China, and Canada, respectively, while the most published journal is the Journal of Air Transport Management, which has continued to increase its number of publications since 1995. Although there are no tear restrictions in this study, the number of publications on air logistics in the field of social sciences is still insufficient.

1. Introduction

The sectoral share of air transportation, which is one of the highly developed and dynamically growing types of transportation, is huge and contributes directly to the economic, political, and social processes of international trade (Kwasiborska, 2016: 51; Yilmaz and Flouris, 2017: 25). The rapid globalization of the world after the 1980s increased functional interactions between countries, and this caused air transport in particular to gain popularity (Wang et al., 2019). Thanks to the advances in technology, the increase in the number of aircraft and the establishment of new airline companies have reduced the airline costs, making it easier for real and legal persons to carry out their transportation and shipment activities by air (Lin et al., 2019: 43). In 2017, 53.9 million metric tons of freight valued at approximately 5.6 trillion dollars, which corresponds to 35% of the world's total trade volume, were transported (IATA, 2018: 48). Therefore, air transport plays a vital role in the global economy (Lin et al., 2019: 43).

Especially in recent years, studies such as model development for location and mode selection at airports, timing and routing optimization for airline companies and air transportation, special substance transportation by airline, team, and operations management are frequently discussed in the literature (Gokasar and Gunay, 2017; Wei and Vaze, 2018; Munari and Alvarez, 2019; Padrón and Guimarans, 2019; Zhao and Zhang, 2019; Kinene et al., 2020). Although the increase in research on air logistics in the literature is noticeable, a bibliometric analysis research has not been conducted by revealing the intellectual structure in this regard in a comprehensive way. In order to eliminate the related deficiency, in this study, it was aimed to present an overview of author, journal, citation, keyword, and country information of the air logistics research published in the Web of Science database between 1971 and 2019 using various bibliometric analysis techniques and to identify trends in this regard.

2. Theoretical Review

2.1. Air Transportation

Air transportation, which has become one of the important competitive parameters of this age, provides the fastest delivery of goods and services to the point of consumption while creating a great economy with both passenger and freight transportation (Erturgut, 2016). Air transportation is an essential part of air logistics and can most simply be defined as the transposition of people, cargo, or mail over the air by an air

vehicle, providing space and time benefit (Wensveen, 2016: 13; Gerede, 2002: 9).

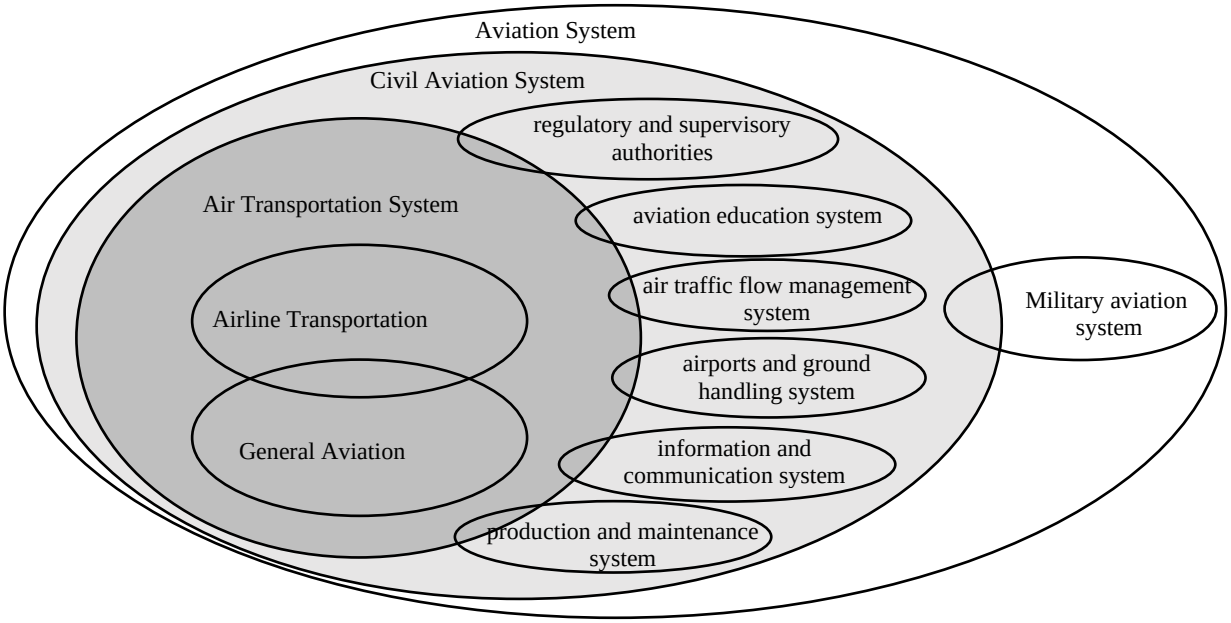

Figure 1. Aviation System and Subsystems

Source: (Gerede, 2002: 8).

The concepts of airline transportation and aerial transportation are different concepts and often confused. The concept of aerial transportation covers air transport and general aviation activities in general. Airline transportation, on the other hand, has a commercial purpose and is defined as "the transport of passengers, freight and mail by air vehicles on a scheduled or non-scheduled basis" (Erturgut, 2016). A general overview of the aviation system (Gerede, 2002: 6), which houses all components of aviation as interdependent but in separate series of parts, is presented in Fig. 1.

Aerial transportation has been mostly associated with cargo and shipping in literature. Aerial cargo transportation is carried by large aircraft such as passenger aircraft, cargo aircraft, or charter aircraft. In terms of passenger aircraft, cargo transportation is carried out at the scheduled dates and times for passengers in general (Tomanne, 2012). In the air cargo supply chain, forwarders, airlines, and shippers are the main actors. Forwarders are divided into IATA forwarders and other forwarders. IATA forwarders promote cargo and receive cargo and make it suitable for transportation. Other Forwarders have not been approved by IATA even though they do the same work as IATA forwarders (Chalermkiat et al., 2013). The freight designated as cargo is delivered to the shippers by the forwarders. The shippers load the cargo onto the aircraft on the tariff determined by the airlines (Singhaseni et al., 2013). A general framework of airline cargo transport is shown in Fig. 2.

The following are three main topics of air logistics literature reviewed: (1) The selection of hub-and-spoke location problems at airports, (2) optimization models in air transportation, and (3) economic impacts of international air transportation and the airline industry. These subjects are frequently studied in air logistics literature.

2.1.1. Hub-and-spoke Location Problem

In the literature, the hub location problems at airports are studied quite frequently. Parsa et al. (2019: 1379) stated that studies aimed at identifying and formulating single-purpose models such as p-hub median, hub covering, and p-hub center were widely included in the literature especially before 2000. The hub location problem has become the field of research for the first time with a quadratic mathematical formulation that O'Kelly founded in 1987 to minimize transportation costs (Bryan and O'Kelly, 1999: 275; O'Kelly 1987: 393). Aykin (1995), Campbell (1994), and Ernst and Krishnamoorthy (1996) are other important studies in which formulations were developed for the hub location problem before the 2000s. Bryan and O'Kelly (1999), on the other hand, aimed to highlight the most important ones by making a general review of the formulations developed until that day.

Today, the hub location and rotation problem studies, which are mostly more compatible with real-life and take into account sustainability and uncertainties in logistical flow, are conducted. Yang et al. (2016) addressed the planning and optimization of the intermodal hub-and-spoke network, taking into account the mixed uncertainties in both shipping cost and travel time. Real et al. (2018) presented a mixed integer programming formulation to model both local and global streams, highlighting that networks developed for routing local or global streams contain different factors. Alamur and Kara (2008), Adler and Smilowitz (2007), Shen et al. (2021), and Parsa et al. (2019) are the examples of other studies carried out in the context of aeronautical base hub location problems.

2.1.2. Planning and Modelling of Air Transportation Networks

Although air transportation is less affected by geographical conditions than road and rail (Lin, 2012), it emerges in a wide range of contexts, such as technological and transport infrastructure, social phenomena, and biological systems, and its network structure is becoming more and more complex (Barrat et al., 2004). Guimera et al. (2005), who analyzes the global structure of the worldwide air transport network highlighting the relevant complexity, determined the central

locations in the global air transport network and stated that the existence of these structures cannot be explained solely on the basis of geographical constraints and that cultural and geopolitical considerations should also be taken into account.

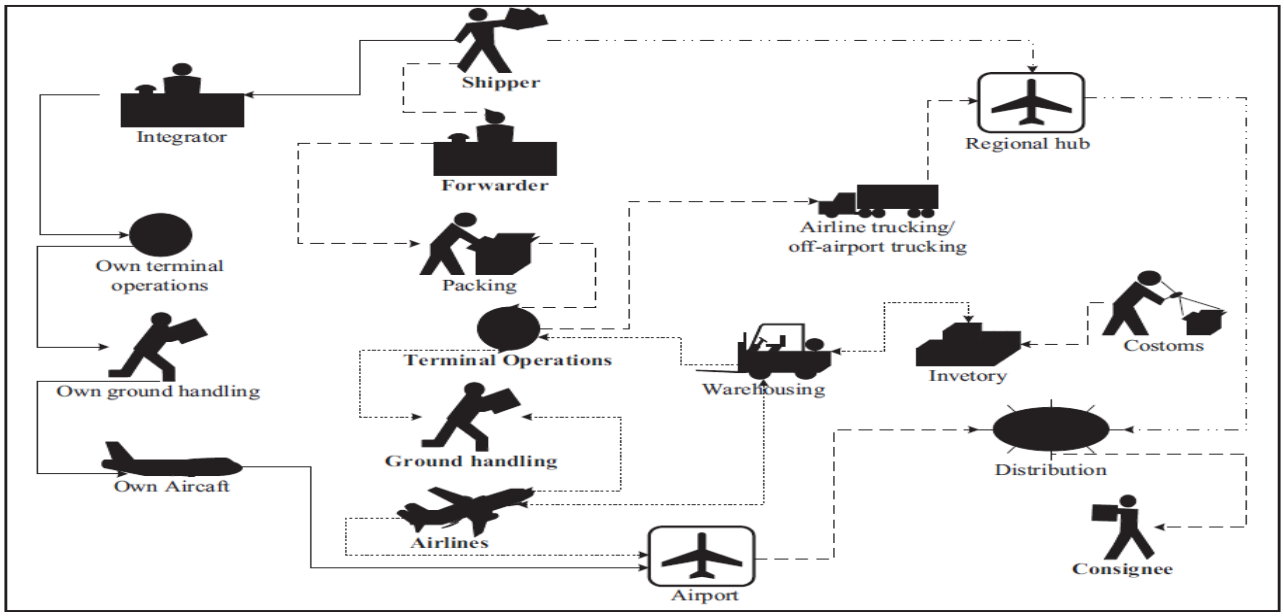

Figure 2. A General Overview of Airline Cargo Transportation

Source: (Bo Feng et al., 2015).

There are many regional studies about air transportation planning and modeling in the literature. Xu and Harris (2008) examined all connections of the US intercity passenger air transport network, as well as average daily passenger traffic, the amount of distances reached, and average road fares using a weighted complex network methodology. Lin (2012) explored weekly flight plans with a complex network approach to study the statistical characteristics of the Chinese aviation system. Burghouwt and Wit (2005) investigated the effects of the fluctuation system implemented in the European air transport network after the deregulation in aviation. Cardillo et al. (2013), another European network modeling study, examined the dynamics of the European air transport network using a multiplexing network formalism.

2.1.3. Economic Effects of the Aviation Industry

International air transportation is vital to the economic development and global competitive advantage of many countries and regions. This importance given to air transport should not be regarded solely at the point of passenger transportation. Air transportation also offers important economic advantages and is frequently preferred for businesses that have goals such as providing quality service to their customers, making production and delivery on time, and in industries where mostly interpersonal communication is important (Button and Taylor, 2000). All this increased the importance of the aviation industry's economic impacts and led it to become a subject frequently researched in air logistics literature. Borenstein (1989), one of these studies, estimated the importance of route and airport control in determining the degree of airline market power. Brueckner (2003), on the other hand, emphasized that air transportation service is an important factor in urban economic development and investigated the relationship between air traffic and the level of employment in the US metropolitan areas.

3. Methodology

3.1. Analysis Method

In this study, the bibliometric analysis was used as the analysis method. Bibliometric analysis was used as a method especially in recent years in studies about the logistics and supply chain performance (Mishra et al., 2018), humanitarian logistics (Zary et al., 2014), urban logistics (Hajduk, 2017; de Carvalho et al., 2019; Neghabadi et al., 2019; Voigt et al., 2019), reverse logistics (Wang et al., 2017; de Campos et al., 2017; Kazemi et al., 2019; da Silva et al., 2019; Bensalem and Kin, 2019), marine logistics (Davarzani et al., 2016), sustainable logistics (Qaiser et al., 2017; Winter and Knemeyer, 2013) and many more logistics issues (Lin and Zhao, 2019; Georgi et al., 2013; Dolati et al., 2019; Charvet et al., 2008; Wang et al., 2019).

The first applications of bibliometric analysis (Osareh, 1996: 149), which emerged with the statistical analysis of bibliographies, date back to the 1890s (Sengupta, 1992). It was first used by E. Wyndham Hulme in 1922 with the term statistical biography (Pitchard, 1969). The term bibliometric was coined by Pichard in 1969. The term has two roots, "biblio" and "metric." The word "biblio" is a word derived from the Latin and Greek word "biblion," which means the book. The term "metrics," which means measurement science, is derived from the Latin or Greek word "metric" or "metricos" (Sengupta, 1992: 76).

The first definition of bibliometric analysis was made by Miles Raising in 1962 using the term statistical biography as "collecting statistics on books and periodicals to demonstrate historical movements, to determine the national or universal research use of books and journals, and to determine and interpret the general use of books and journals of many local statuses" (Raising, 1992). In 1969, Pritchard defined the bibliometric analysis as "to shed light on the written communication processes and nature and development process

of discipline (to the extent this is shown through written communication) by measuring and analyzing various aspects of written communication resources" (Pritchard, 1969). According to the University of Maryland (2019), bibliometric analysis is "quantitative analysis of citations, and content as content for scientific journals, books, and researchers."

3.2. Data Collection Tool

The data set, created for use in research analysis on February 3, 2022, was obtained from the Web of Science Core Collection (WOS) database. The search range is selected as "Subject." In order to acquire comprehensive access to air logistics studies, Boolean logic is applied by typing "Air Logistics" or "Air Transportation" or "Aviation Logistics". Before the filtering process, the WOS database offered a total of 2134 resources. As most of the publications were related to the Covid-19 pandemic and inclusion of these studies in the data set would detract from the main purpose of the research, studies that were published in 2020 and 2021 were excluded, and filtering was carried out over all sources between 1971 and 2019. Since the bibliometric analysis carried out in the research will address the field of social sciences, studies that have been published in fields such as engineering, architecture, medicine, computer science, physics, biology, and meteorology were also excluded. To perform this operation, the following categories were selected in the WOS categories, and the other categories were excluded. These categories are as follows:

- Transportation,
- Operation Research Management Sciences,
- Economics,
- Transportation Science Technology,
- Management,
- Environmental Studies,
- Business,
- Green Sustainable Science Technology,
- Urban Studies,
- Business Finance,
- Environmental Sciences,
- Social Sciences Mathematical Methods,
- Social Sciences Interdisciplinary,
- Ecology
- Biodiversity Conservation
- Regional Urban Planning.

After the category filtering process, "Article" was selected as document type, and all other document types were excluded. Only articles written in English were included in the data set. After all filtering processes, it was understood that a total of 398 articles constituting the data set were published in the journals scanned in Social Sciences Citation Index (SSCI), Science Citation Index Expanded (SCI-EXPANDED), and Emerging Sources Citation Index (ESCI).

3.1. Analysis Tools

The bibliometric analysis performed in this study was carried out with the Bibliometrix and Biblioshiny packages developed in the R programming language. Bibliometrix and Biblioshiny packages were developed by the Italian scientist Massimo Aria in the R language environment. Bibliometrix and Biblioshiny packages are open sources and free. Aria and Cuccurullo (2017) stated that Bibliometrix used in the R language environment is more flexible than other bibliometric tools and that most bibliometric tools integrate network analysis and visualization functions into one software. Xie et al. (2020) suggested that bibliometric analysis can be run with a range of software such as Citespace, Vosviewer, Bibexcel, SciMat, Sci2, CiNetExplorer, but most of this software are cumbersome and do not help researchers to perform a literature analysis in a full workflow.

4. Results

4.1. Features of the Data Set

The data obtained in this study consists of bibliometric information from articles published in 122 different journals and written in the field of air logistics from 1971 to 2019. As shown in Table 1, 398 articles were written by 795 authors. Of these studies, 317 were multi-authored, and only 81 were single-authored. Siamaki et al. (2014) stated that the collaboration index among authors shows the average number of authors per article. Hence, each article in our data set was prepared by an average of 2.28 authors.

Table 1. Key Features of the Data Set

Features	Results
Number of Publications	398
Number of Journals	122
Number of Citations	11179
Average Number of Citations per Publication	15.5
Average Number of Citations per Year of a Publication	1.659
Number of Keywords	1175
Period	1971-2019
Average Number of Publications Per Year	9.41
Average Number of Citations Per Publication	15.5
Number of Authors	795
Number of Authors Publishing in Multi-authored Publications	724
Number of Single-authored Publications	81
Number of Multi-authored Publications	317
Publication Rate Per Author	0.501
Per Publication Co-Author Rate	2.53
Collaboration Index among Authors	2.28
Annual Scientific Productivity Rate	9.78%

4.1. Number of Publications by Year

Numbers of published articles by year are presented in Fig. 3. The first paper on air logistics indexed in the WOS database was published in 1971. From 1971 to 2003, the number of articles was very limited. The low number of airports, airplanes and employment levels and the lack of implementation of privatization policies between the relevant years prevented the aviation industry from benefiting from economies of scale. Such situations are probable explanation for the low numbers of studies published on air logistics before 2004. While the number of articles published in 2003 was 2, this number increased to 17 in 2008. Although the number of articles published in 2009 fell to 8, this decrease has not gained continuity. During the 10-year period covering 2010-2019, the number of articles in air logistics had a continuous upward trend.

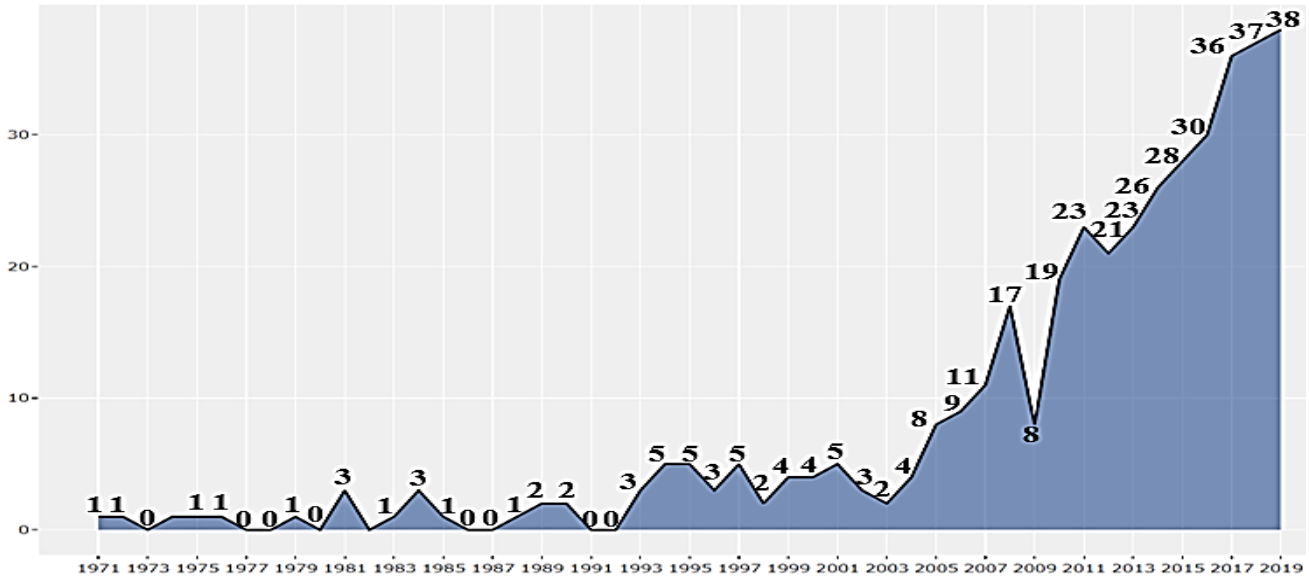

Figure 3. Number of Publications by Year

4.3. Data on Citation Numbers

The data for the 20 years with the highest annual average number of article citations are included in Table 2. The annual average number of citations in Table 2 is obtained by dividing the average number of citations per article by the number of years passed. The year with the highest average of total citations is 1988, with 111 citations. However, it is clear that only one article has been published in the relevant year, leading to this result. The year with the highest one-year average number of citations is 1999, with 3.726. Only 4 articles were published in the corresponding year, many more cited works were published in 1999 compared to other years. Although only 4 articles were published in 1999, these articles were cited much more than articles published in other years. The year closest to the present and highest in citation productivity was 2017 during when 36 studies were published.

Table 2. Annual Average Article Citations

Year	Number of Articles Published per Year (N)	Average Number of Citations per Article	Number of Years Passed	Annual Average Number of Citations
1999	4	78.25	21	3.726
1988	1	111	32	3.468
2001	5	58.2	19	3.063
2017	36	8.305	3	2.768
2012	21	21.952	8	2.744
2004	4	43.75	16	2.734
2011	23	23.434	9	2.603
2015	28	12.107	5	2.421
2014	26	14.153	6	2.358
2016	30	8.733	4	2.183
2005	8	32.625	15	2.175
2013	23	15.217	7	2.173
2010	19	21.263	10	2.126
2019	38	1.815	1	1.815
2007	11	23.454	13	1.804
2008	17	21.588	12	1.799
2018	37	3.5675	2	1.783
1994	5	43.6	26	1.676
1997	5	36.6	23	1.591
1989	2	46.5	31	1.5

With a total of 147 Web of Science citations, Bryan DL, together with O'Kelly ME, published the highest-cited study in the field of air logistics in 1999. Despite Bryan DL has the most cited publication, the author has never published another article in the same area. Aykin T was ranked 2nd with 129 cited studies published in 1995, and 4th with another study published in 1994 with 107 cited research. Both studies conducted by the author are single-authored. Sun XQ's study, published in 2015, has a global citation of 30, although it has been recently published, and ranks first in the average annual citation with 9.2. Sun et al. (2015) aimed to help stakeholders in air transportation systems monitor network performance over time and better understand network dynamics (Table 3).

Table 3. Most Cited Studies

Paper	Year	Number of Global Citations	Number of Local Citations	Annual Average Number of Citations
D. L. Bryan	1999	147	16	6.6818
T. Aykin	1995	129	13	7.2
J.F. Campbell	2005	114	6	4.9615
T. Aykin	1994	107	6	7.125
T. Grosche	2007	104	7	3.3636
P. Malighetti	2008	71	7	4.8636
K.G. Debbage	2001	61	7	3.963
N. Adler	2001	57	6	6.1765
K. P. Li	2005	46	10	7.4286
J. Y. Lin	2012	45	9	4.3333
T. C. Matisziw	2010	37	8	3.6667
X. Q. Sun	2015	30	5	9.2
C. Y. Hsiao	2011	29	5	2.7812
T. C. Matisziw	2012	28	8	5.8571
C. Barnhart	2014	28	6	7.1818
F. Allroggen	2015	27	5	12.1667
S. Wandelt	2015	25	5	5.4615
K. A. Alkaabi	2007	23	5	6.6
P. Wei	2014	22	5	3.05
D. Espinoza	2008	20	4	3.1579

Fig. 4 shows the co-citation network. Citing a publication by two different publications is defined as co-citation (Aria and Cuccurullo, 2017). The network is divided into 6 sections in total, to be displayed in red, brown, purple, yellow, green, and blue colors. In other words, publications in each color group are cited together in different publications. Studies on the location and routing problems for hub-and-spoke networks at airports in the purple group, air transportation network planning and modeling in the red group, international air transportation and economic effects in the brown group, economic effects of the airline industry in the yellow group, structural equation modeling in the blue group, and finally the competition between the airline and the railway in the green group are available.

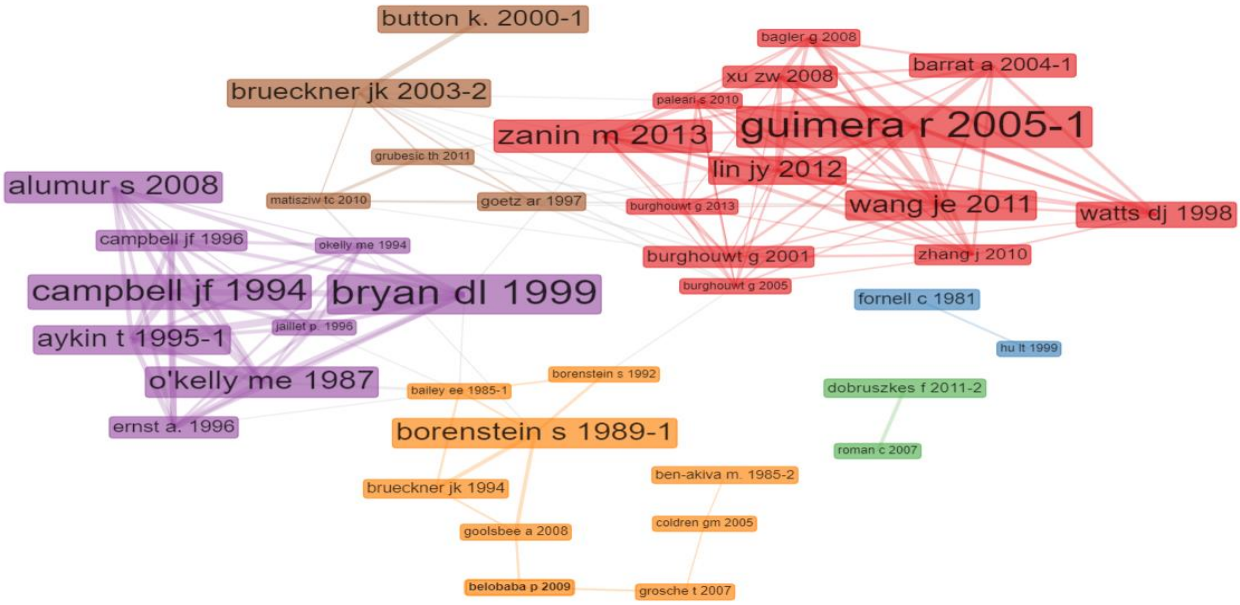

Figure 4. Co-Citation Network

4.4. Author Productivity

The author who produced the most publications is Button K, with 12 articles. Button K is followed by Fugate X with 10 publications, Hansen M with 9 publications, and Sun XQ with 8 publications. Fig. 5 presents the connections of the most co-authored researchers with each other. The size of each box on the network is related to the number of publications by the author. The larger the box, the higher the number of publications belonging to the author. The authors who took part in the same study were shown in the same colors. The authors with the highest level of co-authorship are Martini G, Scotti D and Button K, followed by Sun X and Wandelt S.

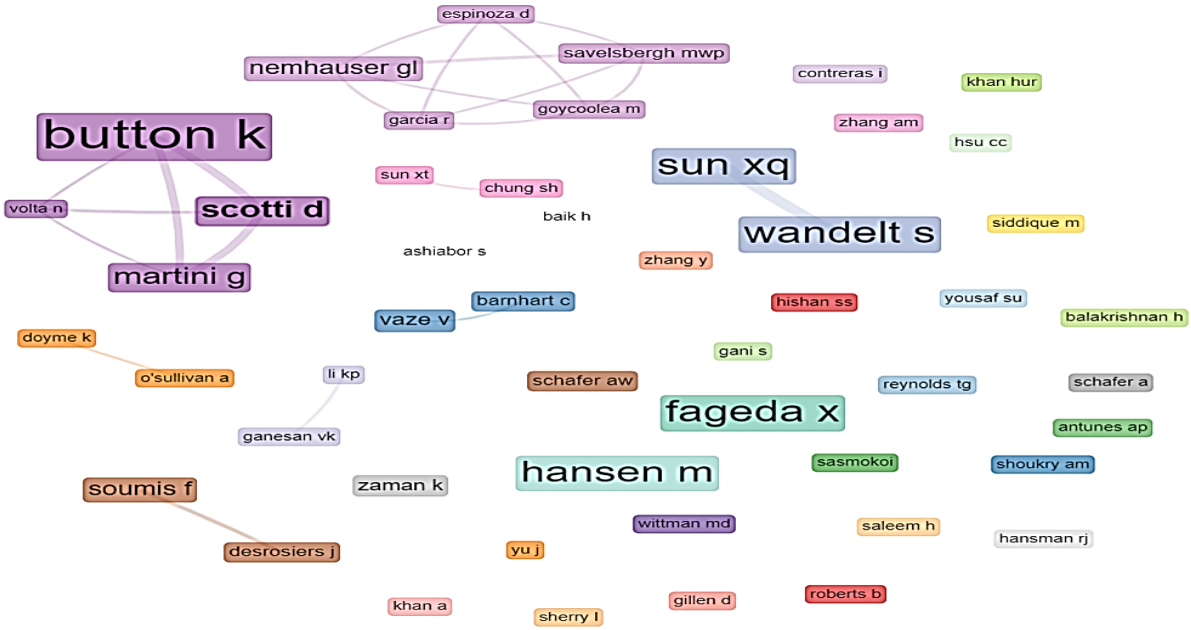

Figure 5. Researchers with the Most Co-Authors

Among the 795 authors included in the data set, the publication performance of the most published authors on a yearly basis is shown in Fig. 6. Author productivity is determined by the calculation of the number of publications and the total number of citations received annually by the authors in the relevant time period (Aria et al., 2017: 6). Considering the year-based author productivity, it is seen that the most published and cited publications were published in 2015. The most productive authors are Sun XQ and Wandelt S, with their studies published in 2015. The number of publications published by both authors in 2015 is 3, the total number of citations is 76, and the annual average number of citations is 12,667.

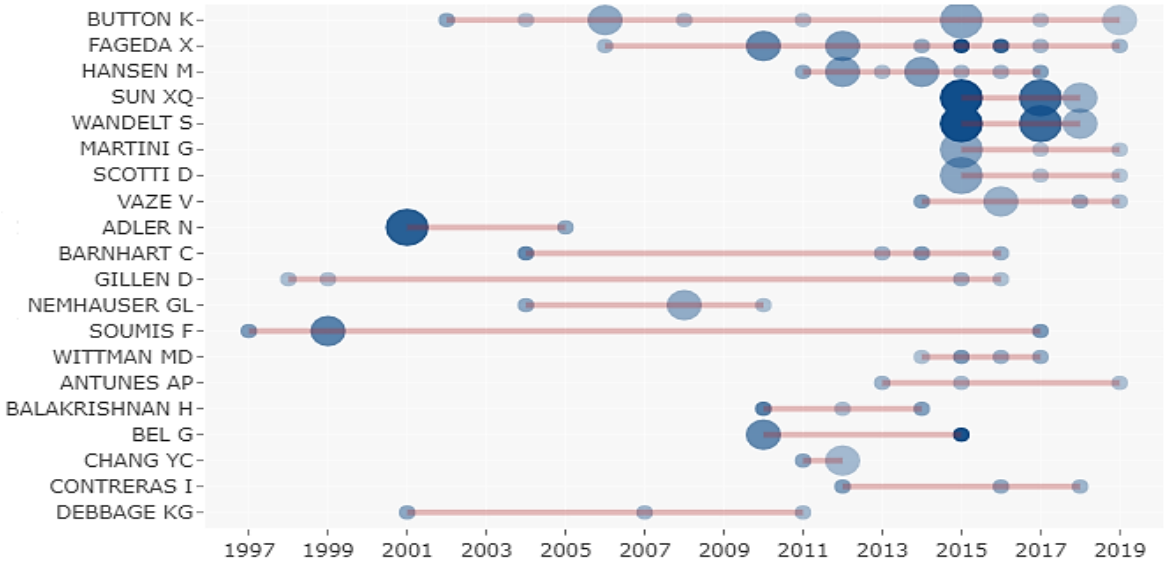

Figure 6. Time-Based Productivity Graphics of Most Publishing Authors

4.5. Data on Journals

In Table 4, the list of the top 20 journals preferred by the researchers, the number of articles published, the h-indices, the g-indices, and the m-indices are presented. The productivity shares of the top 10 journals that publish the most studies in the field of air logistics is 51.5%. 7 of these 10 journals are registered with Elsevier database. The journal with the highest values in air logistics studies, both in the number of articles and

in the indexes showing scientific productivity, is the Journal of Air Transport Management. The other two journals with the highest scientific productivity are Transportation Science and Transportation Research Part E-Logistics and Transportation Review, respectively. Although the number of articles published by Transportation Research Part E-Logistics and Transportation Review is lower than the European Journal of Operational Research ve Transportation Research Part A-Policy and Practice, their scientific productivity performance is higher (Table 4).

Table 4. Top Publishing Journals in Air Logistics

Journal	Articles	Citations	h-Index	g-Index	m-Index
Journal of Air Transport Management	58	900	17	17	28
Transportation Research Record	25	104	6	6	9
Transportation Research Part E-Logistics and Transportation Review	23	373	13	13	19
Transportation Science	20	614	14	14	20
Transportation Research Part A-Policy and Practice	19	420	11	11	19
European Journal of Operational Research	17	637	11	11	17
Journal of Transport Geography	16	363	10	10	16
Transportation Research Part D-Transport and Environment	10	67	5	5	7
Transportation Journal	9	29	3	3	5
Safety Science	8	143	5	5	8
Transportation Quarterly	8	23	3	3	4
Operations Research	7	362	7	7	7
Sustainability	7	18	3	3	4
Transport Policy	7	49	3	3	7
Logistics and Transportation Review	6	9	2	2	2
Transportation Research Part B-Methodological	6	65	5	5	6
International Journal of Transport Economics	5	15	1	1	3
European Journal of Transport and Infrastructure Research	4	18	2	2	4
Expert Systems with Applications	4	107	3	3	4

Fig. 7 shows the development graphics of the most publishing journals in the field of air logistics on the basis of years. Especially with the 2000s, there was a notable increase in air logistics studies. Although the number of articles published by the Journal of Air Transport Management before 1995 was lower than in other journals, it started to grow steadily as of that year. After 2000, it became the journal that published the most articles on air logistics, and in the 2010s, it was able to publish more articles than any other journal. Another journal notable for their work in the field of air logistics is Transportation Research Part E-Logistics and Transportation Review. Especially after 2004, the number of publications has steadily increased, and by 2013 it became the 2nd most published journal in the field of air logistics and the 1st fastest developing journal.

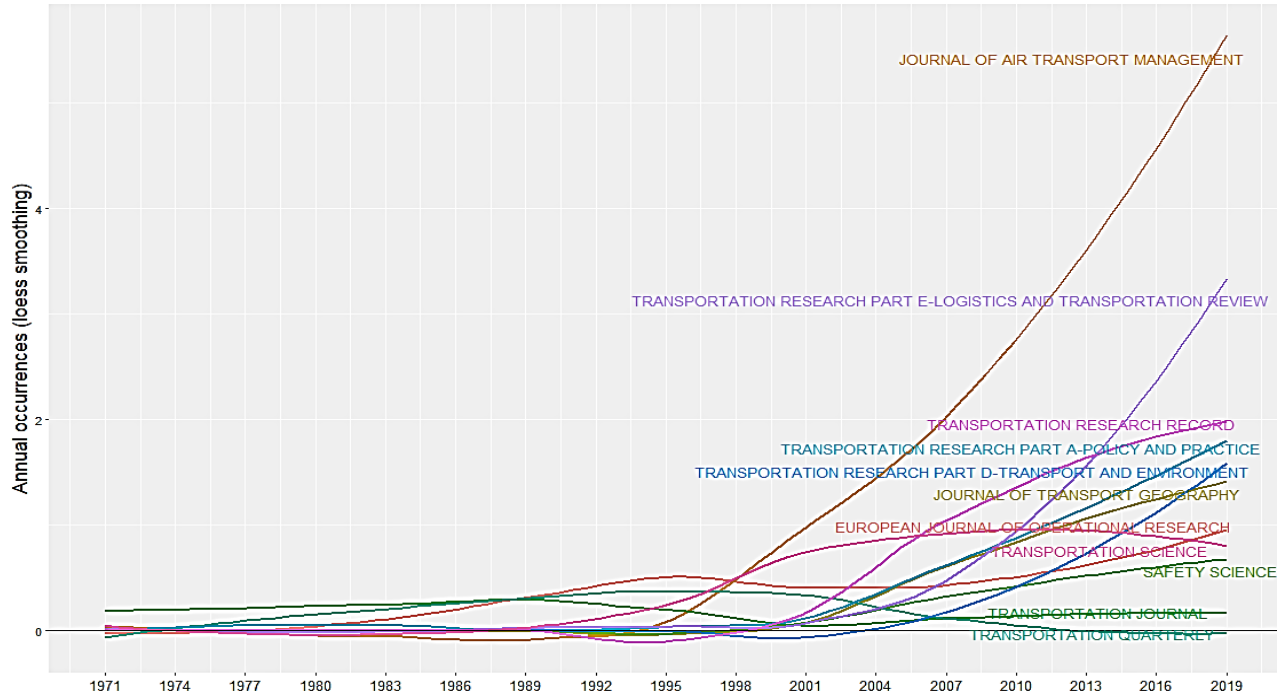

Figure 7. Development Graphics of Most Publishing Journals

4.6. Data on Countries

The number of articles published by the countries may, to some extent, reflect the importance that the country gives to the subject and its success in this subject (Xie, 2019). As seen in Fig. 8, there are two North American countries (the USA and Canada), 5 European countries (Spain, England, Germany, France, and Turkey), two Asian countries (China and Taiwan) and one South American country (Brazil) among the top 10 countries. While the USA ranks first with 236 publications, China ranks second with 86 publications, and Canada and Spain rank third with 44 publications. Among the top 10 countries, there are 3 developing countries (China, Brazil, and Turkey), while the other 7 have developed country status. The articles published by the USA had 2382 citations, and Canada took second place with 433 citations and Taiwan the third place with 423 citations. Israel ranked 6th in the number of citations, with 286 citations received by 8 articles, and ranked first in the average number of citations per article (47.67). In the USA, which has the highest number of articles and citations, the average number of citations per article is 16.89.

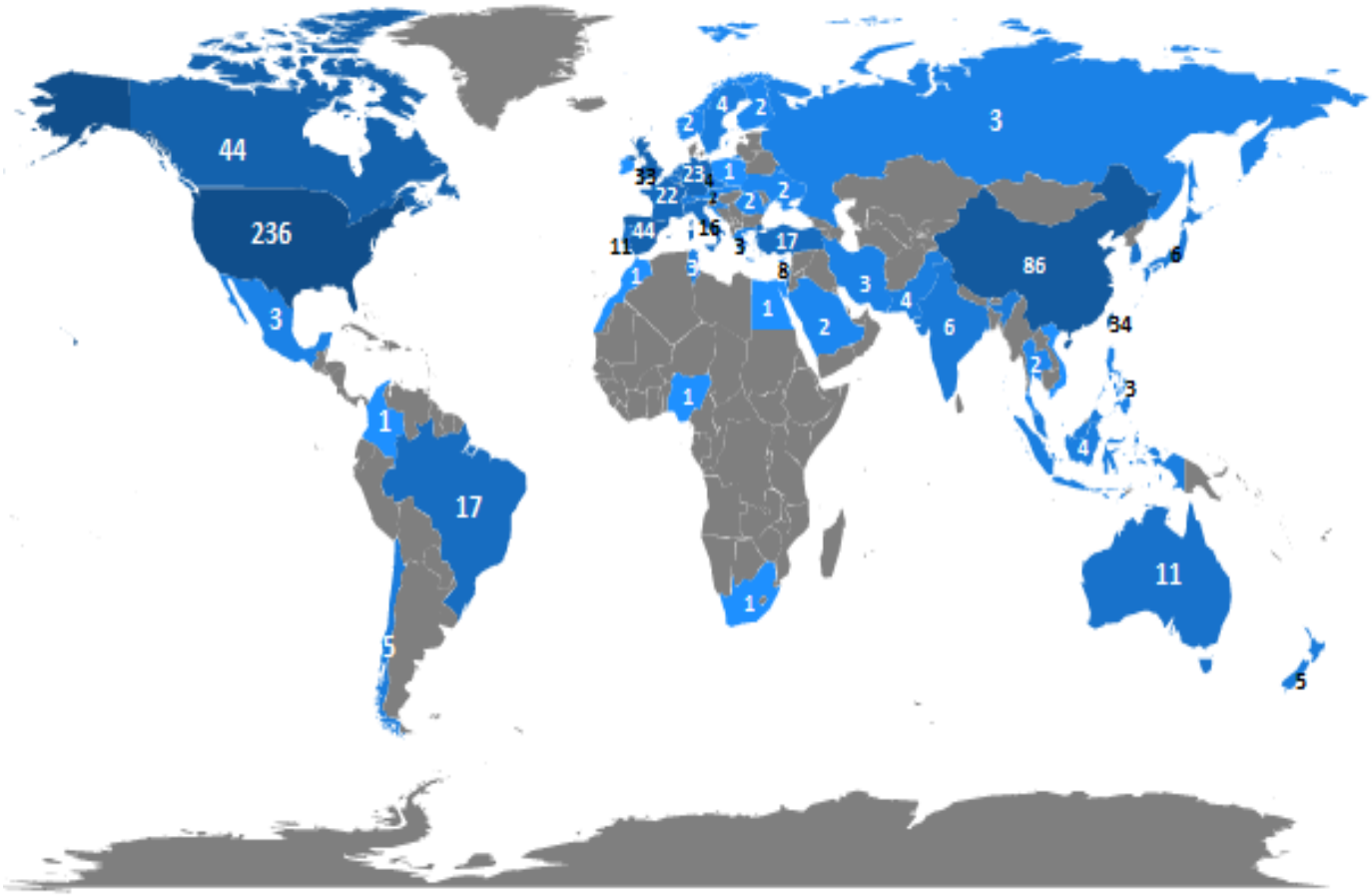

Figure 8. Countries with the Most Publications on Air Logistics

4.7 Data on Keywords

In Fig. 9, there is a network of most used keywords in air logistics. The size of each node on the network reflects the frequency of keywords. The thickness of the line is proportional to the closeness of the links between the two keywords. If there are bold lines between the two words, the two related keywords are more closely related (Chen et al., 2016). The fact that the words in this common keyword network are related to air logistics shows that the abstract analysis process carried out to select the sources in the dataset has been carried out correctly (Shonhe, 2020: 3). "Air transportation," which is preferred as a keyword in 85 different studies, is the most frequently used keyword in the data set. In the 2nd, 3rd and 4th ranks are the words airport, aviation, and transportation, which have been used as keywords a total of 14 times.

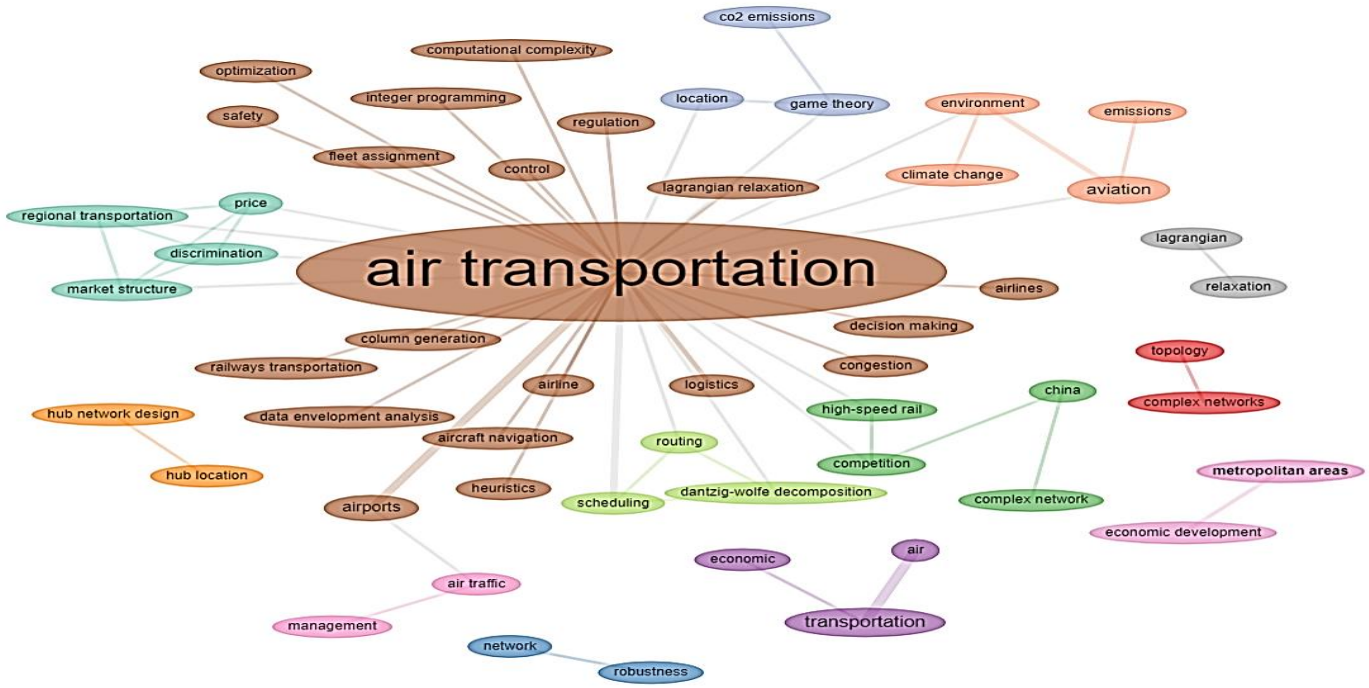

Figure 9. Most Commonly Used Keywords

5. Conclusions, Limitations and Future Research

This study provides a systematic review and bibliometric analysis of articles published in the Web of Science database on air logistics issues between 1971 and 2019 that can be examined in the field of social sciences. Although numerous articles on air logistics have been published, especially in recent years, they are still on an upward trend and far from scientific saturation. On the other hand, at the time of the creation of the data set, it was determined that the vast majority of the studies in the literature on air logistics were related to science. Although 2134 articles were accessed in the first literature review, this number decreased to 398 (approximately 81% decrease) after filtering was done by selecting categories that could be examined under the context of social sciences.

It was observed that there had been a great increase in the number of air logistics studies, especially in the last 10 years, and the number of citations received in the studies published in these years has increased at a higher rate compared to the number of citations published in the previous years. 80% of the studies are multi-author. 91% of the authors have published in multi-author studies. Although the number of citations received by the studies published before the millennium is higher, the number of citations received by the studies published after 2010 is higher than the previous studies. The most productive researchers in the literature are K. Button, X. Fageda, and M. Hansen. The most cited authors are X. Fageda, N. Adler, and J. Desrosiers, respectively.

This study determined that the studies on location-selection and routing problems for hub-and-spoke networks and air transport network planning and modeling at airports were more cited than other subjects. The journal that publishes the most articles is the Journal of Air Transport Management. When analyzed by countries, it is the USA that publishes the most and gets the most citation. The most publishing countries after the USA are China, Canada, and Spain, respectively. The most frequently used keyword is air transportation.

The fact that air logistics was subjected to bibliometric research for the first time reflects the authenticity of this study. Sources subject to research consist only of articles, while papers, books or dissertations were not included in the analysis. A categorical limitation was conducted by analyzing only the studies that could be the subject of research of social sciences. On the other hand, articles published in the field of air logistics in 2020 and 2021 were not included in the data set of this study, since it is thought that the inclusion of articles published after the Covid-19 pandemic in the bibliometric analysis does not fit the main purpose of this research. Considering all these limitations, more and more publications and other publications published in other disciplines can be added to the analysis process of future studies, and thus the scope of this research can be extended.

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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Cite this article: Coskun, A.E, Alpar, M.O, Erturgut, R. (2022). Contribution of Scientific Production to Air Logistics: A Bibliometric Analysis from the 70s to the Present. Journal of Aviation, 6(3), 334-345.